College of Arts and Sciences		
Dossier	**Bob Sandmeyer**	*Curriculum Vitae*

DOSSIER

https://www.uky.edu/~rsand1/dossier/

Consolidated PDFs: *(click links to open files)*
- Sandmeyer Tenure Dossier (*en toto*)
    - Teaching Portfolio section
    - Service Materials section
    - Research section

ZIP Files: *(click links to download files)*
- Sandmeyer Tenure Dossier
    - Teaching Portfolio files
    - Service Materials files
    - Research files

Approved by Philosophy Department Faculty, 24 April 2017

Department of Philosophy
Statement of Promotion and Tenure Expectations:
Special-Title Appointments

Special-Title Series appointments are by their nature variable. Some may have an emphasis on teaching; others on service and administration. This variability will be reflected in the Distribution of Effort document (DOE), and promotion and tenure expectations for STS faculty members will depend upon the individual faculty member's DOE over the course of the probationary period or over the course of time since promotion to associate professor.
Evaluation of faculty for promotion and tenure will be based on a continuing record of high quality, effective, and committed teaching at multiple levels of instruction; high-quality and effective advising at the appropriate levels; service to the department, college and university; and a demonstrable commitment to creative and original philosophical research.

Appointment/Promotion with Tenure to Associate Professor

1. Because the DOE of STS faculty members will normally specify a high concentration of effort in teaching (usually on the order of 70-75% of total effort), the successful candidate will have a continuing record of high-quality, effective, and committed teaching. Although the department both welcomes and values effective, committed advising by its untenured faculty, its advising system is such that it requires of the successful candidate, not that he or she has provided high-quality advising, but only that he or she show at least some evidence of being in the future an effective and committed advisor at both the undergraduate and graduate levels.
   These achievements will be demonstrated primarily through the teaching portfolio. (The teaching portfolio shall contain the items required, and may also include items suggested, in AR II-1.0-5 pertaining to the teaching portfolio.) Committed and effective teaching can also be evidenced by such matters as participation in professional philosophy teaching forums, invited or contributed talks about the teaching of philosophy, teaching-related publications, and grants to promote instructional innovation or pedagogical research.
2. If the DOE specifies a significant concentration of effort in service, then the successful candidate will have demonstrated high quality service at the departmental, college, university and/or professional levels. The quality and nature of such service will be evaluated principally by the chair and other departmental officers, though at the time of promotion the views of all faculty will also be solicited. If, on the other hand, the DOE does not specify a high concentration of effort in service, then it is expected that the successful candidate will have demonstrated modest levels of quality service to the department and, if relevant, the college, university, and profession, establishing a record of effective collaboration in performance of service responsibilities. All faculty members are also expected to contribute to the collective growth and development of the department and, if called upon, college and university. Refereeing essays, manuscripts, proposals, and applications for journals, presses, and institutions falls under service to the profession.
3. The successful candidate with a DOE including administrative duties will have demonstrated creative and effective performance. This performance will be measured by documents provided by faculty, students, staff, or other administrators on the UK campus. If the administrative duties include off-campus activities, external letters may be solicited.
4. As the DOE of STS faculty will not normally emphasize research but rather teaching or service, the department does not expect that faculty member will have a publication record like that of a Regular-Title Series colleague going up for promotion. The expectations will be commensurate with the effort represented by the DOE over the course of the probationary period. The department does expect, however, that the Special-Title Series faculty member will be able to show a commitment to philosophical or pedagogical research in the form of conference and workshop presentations and publications in journals as well as books. This achievement will be primarily demonstrated by (1) external letters of assessment solicited by the unit from leading authorities in the relevant field(s) and (2) the quality, quantity and regularity of the candidate's presentations and publications (already appeared or accepted for publication).
   Faculty must demonstrate that they have established an independent research agenda and show evidence of a sustainable long-term commitment to scholarly research and publication. The department also expects successful candidates to have moved beyond the specific research they conducted in their Ph.D. dissertations (as evidenced by the contents of publications and presentations).

BOB SANDMEYER
Assistant Professor
Department of Philosophy
University of Kentucky

Research Specialty: Phenomenology, esp. Husserl
Philosophy of Ecology
Pedagogy Specialty: Interdisciplinary Education
Sustainability

I. EDUCATION

Ph.D.	2007	University of Kentucky	Philosophy
M.A.	2005	University of Kentucky	Philosophy
	1995	Colorado State University	Philosophy
B.A.	1987	George Washington University	Philosophy/ Political Science

II. EMPLOYMENT HISTORY

University of Kentucky
- Assistant Professor, Department of Philosophy — 2014 – present
- Environmental and Sustainability Studies Program
  - Program Faculty — 2013 – present
  - Director of Undergraduate Studies — 2017-18
- Senior Lecturer, University of Kentucky, Department of Philosophy — 2012 – 2014
  - Lecturer — 2007 – 2012

Mesa State College (Colorado Mesa College), Grand Junction & Montrose Campuses
- Adjunct Faculty, Philosophy — 1995 – 1998

III. AWARDS

"Workshop Series Grant," Cooperative for the Humanities and the Social Sciences, S2022 ($1,500)
"Environmental Humanities – Undergraduate Engagement," Gaines Center for the Humanities, 2021-22. ($500)
"Teaching Sustainability + Teaching Sustainably" University of Kentucky Sustainability Challenge Grant Recipient, with Helen Turner (College of Design), 2017-2018. ($47,085)
Faculty Teach in China Program. Qingdao University of Technology, Qingda, China. 2018. ($1,750)
Faculty Teach in China Program. Jilin University, Changung, China, 2017. ($1,250)

IV. TEACHING

University of Kentucky Courses Taught since fall 2017

Graduate Coursework

PHI 680	Graduate Seminar: Time and Time-Consciousness	F17
PHI 755	Independent Study: Husserl	S21
PHI 755	Independent Study: Environmental Ethics	F19

Undergraduate Coursework

PHI 516	Phenomenological Directions	S22
ENS 400	ENS Senior Capstone	S18
HON 398	Capstone: Metaphysical Approach to Conservation	S19

PHI 395	Independent Study: Aldo Leopold's Conservation Philosophy	F18
ENS 395	Independent Study: Environmental Psychology	S20
PHI 336	Environmental Ethics	standard fall offering
PHI 300	History and Philosophy of Ecology (cross-listed ENS 300)	S14, S17, S21
PHI 205	Food Ethics (also UKC 180)	standard spring offering
UKC 110	Introduction to the Environmental Humanities	F22
PHI 100	Intro to Philosophy: Epistemology & Metaphysics	standard offering

University of Kentucky Courses Taught – fall 2007 to spring 2017

Graduate Seminars

PHI 755	Environmental Philosophy (Independent Study)	S17
PHI 715	Husserl's *Logical Investigations*	F15

Undergraduate Coursework

PHI 561	Problems in Natural Sciences: Mechanism/Teleology	S15
PHI 531	Advance Ethics: Aldo Leopold's Land Ethic	F16
PHI 531	Advance Ethics: Questions Concerning Technology	S16
PHI 516	Phenomenological Directions	F08, S17
PHI 395	Independent Study: The Phenomenology of Nature	F12
PHI 380	Death, Dying, and the Quality-of-Life	F07, S12, S13, F13
PHI 361	Biology and Society	S08–12, S14
PHI 335	The Individual & Society	S07, F11
PHI 310	The Philosophy of Human Nature	F13
PHI 120	Introductory Logic (traditional)	> 10 semesters

Online Coursework

PHI120	Introductory Logic (Designer and Administrator)	6 summers

International Teaching

"Teaching Methods for Interdisciplinary Courses – A Course for Faculty." Summer 2018. Qingdao University of Technology: Qingdao, China – in association with the UK Confucius Institute.

"American Conservation Philosophy & Its Critique – A Course for Undergraduates." Summer 2017. Jilin University: Changchun, China – in association with the UK Confucius Institute.

Thesis Committee Work

Undergraduate Level

Committee Chair. " Radical Environmentalism in the Age of the Anthropocene." Senior Thesis Project. Josh Ehl, University Gaines Center Scholar, 2020-21.

Committee Member. " Decolonizing Ayahuasca: An Examination of Western Interactions with Entheogenic Plants." Senior Thesis Project. Claire Hilbrecht, University Gaines Center Scholar, 2020-21.

Faculty Advisor. "Conservation: Philosophy and Policy." Senior Honors Capstone. Anne Howard, University of Kentucky, 2019

Committee Member. "Exploring Animal Sentience." Senior Thesis Project. Autumn Murphy, University of Kentucky Gaines Center Scholar, 2014-15.

Committee Chair. "Heaven on Earth: Ecotheologies and Environmentalism." Senior Thesis Project. Sam Beavin, University of Kentucky Gaines Center Scholar, 2013-14.

Committee Member. "The Impact of Aesthetic Design on Bus Shelter Usability." Senior Thesis Project. James Crouch, University of Kentucky Gaines Center Scholar, 2012-13.

Graduate Level

Philosophy

Co-Chair. Ph.D. Dissertation Committee. Lila Wakeman. 2021-present.
Co-Chair, Ph.D. Dissertation Committee. Steven Winterfeldt, 2021-present.
Member, Ph.D. Dissertation Committee. Ryan McCoy. 2021-present.

Other

Member, M.S. Dissertation Committee, Wildlife Ecology and Conservation Biology, University of Kentucky. Kay Davis, 2021-present
Expert Reader. M.A. Environmental Psychology, Naropa University. "Good Farming as an Ecopsychosocial Practice." Amy Preece. 2011.

V. SERVICE

Academic

Steering Committee Member, UK Sustainable Agriculture Program, 2011-present
Faculty Sponsor. Philosophy Club, University of Kentucky (2012-Spring 2022)
Faculty Sponsor. Philosophy Graduate Student Association, University of Kentucky (2012-2022)
UK Faculty Sustainability Council, 2016-2020
Teaching and Learning Advisory Committee, College of Arts and Sciences, UK (Fall 2014 to 2020)
Graduate Applications Committee, UK Department of Philosophy (2018-Chair, 2019)
Judge. Dimensions of Political Ecology Working Group Graduate Student Paper Contest (2013, 2019)
UK Senate, A&S Humanities Representative, 2015-2018
Academic Planning and Priorities Subcommittee, 2015-18
Co-coordinator, Speakers Series. Environmental and Sustainability Studies Major. University of Kentucky (Fall 2013 to 2018)
Committee to Form New A&S Interdisciplinary Graduate Certificate: Environmental Studies (2015-2017)
Literary Group Leader. *The Stranger*. Henry Clay High School, Lexington, KY (Feb. 2013)
Advisory Board, Environmental and Sustainability Studies (ENS) B.A. Degree. College of Arts and Sciences, University of Kentucky (2010 – 2013)
Evaluator. GenEd Quantitative Foundations Outcomes. University of Kentucky (2012)
Environmental Degree Programs Committee, Faculty of the Environment, College of Arts & Sciences, University of Kentucky (2009 – 2010)
Education Committee, Tracy Farmer for Sustainability and the Environment, University of Kentucky (2008-2010)
In-Service Instructor, "Teaching Environmental Ethics," UK Dept. of Philosophy (Fall 2009)

Professional Development

Director

Environmental Humanities Initiative. College of Arts and Sciences, UK. (F2021 – present)
Workshop Organizer. "Teaching Philosophy" by Melissa Jacquart. University of Kentucky Philosophy Graduate Student Association. (October 2020)
"Sustain-able Pedagogies Workshop for UK Faculty." Co-director with Helen Turner, College of Design. (Summer-Fall 2018).
Panel Organizer and Presenter. "Interdisciplinary Pedagogy Workshop," Kentucky Philosophical Association. (March 2019)

Participant

Kentucky Campus Compact Service-Learning Educator Learning Community, 2021-22. (This ELC is designed to prepare individuals to teach with service learning, sessions online.)

Colby Summer Institute in Environmental Humanities 2020. Colby College (postponed due to COVID-19, August 2021)

"American Association of Philosophy Teacher's Workshop on Teaching and Learning" at UNC Chapel Hill (February 2019)

Teaching Team Member, Philosophers for Sustainability. (Spring 2019 – *ongoing*)

"Extending the Land Ethic: Current Humanities Voices and Sustainability," NEH Summer Institute for College and University Faculty. (June-July 2016)

Mentoring

Sustainability Mentor. Mentee: Eric Hemphill, University of Central Oklahoma. Association for the Advancement of Sustainability in Higher Education. (2018-2019)

Professional Conferences

Organizer

Panel Organizer and Discussant, "Philosophy in an Interdisciplinary Key" Kentucky Philosophical Association Panel (March 2019)

Session Organizer, International Association of Environmental Philosophy Panel. Dimensions of Political Philosophy Conference (February 2018)

Organizer & Moderator, "International Association for Environmental Philosophy Panel, Dimensions of Political Ecology Conference (February 2018)

Participant

Moderator, "Animal Phenomenology." International Association for Environmental Philosophy (October 2018)

Moderator. "Husserl: Difference, Ecology, and Community." Society for Phenomenology and Existential Philosophy (October 2017)

Invited Participant. "University of Kentucky Food Systems Summit." The University of Kentucky (April 2016)

Invited Participant. "Education for Homecoming: A Sustainable Agriculture Program Convening." The Berry Center, New Castle, KY (May 2015)

Moderator. "Time, Consciousness, and Self-Consciousness." Society for Phenomenology and Existential Philosophy (October 2014)

Moderator. "Husserl on Fact, Intentionality, and Emotions." Society for Phenomenology and Existential Philosophy. (November 2012)

Moderator, "Governing Nature." Dimensions of Political Ecology Conference on Nature/Society. (April 2012)

Host. Kentucky Philosophical Association Meeting. (April 2011)

Moderator. "Studies in Husserl's Phenomenology." 49th Annual Meeting of the Society for Phenomenology and Existential Philosophy. (November 2010)

Moderator. "Heidegger and Psychoanalysis." 43rd Annual Meeting of the Heidegger Circle. (May 2009)

Professional Publications

Editorial Role

Editorial Board Member. *Phenomenological Investigations. Journal of the North American Society for Early Phenomenology*. (2021 – present)

Secretary. North American Society for Early Phenomenology (Secretary: 2015-2018)

Editorial Board Member. *Cogent OA* (2014 – present)

President. Kentucky Philosophical Association (AY 2012-2013)

Vice President. Kentucky Philosophical Association, (AY 2010-2011)

Referee

Environmental Philosophy
Environmental Humanities
Husserl Studies
International Journal of Philosophical Studies
Journal of the History of Philosophy
Columbia University Press
MIT Press
Ohio University Press
Pearson Publishing
Routledge
Studia Phaenomenologica
Wiley-Blackwell

STEM

Co-Principal Investigator. 2022 NSF Convergence Accelerator Proposal. Dr. Jawahir, Dr. Atwood, Dr. Hoyt, Dr. Sandmeyer. University of Kentucky.

VI. RESEARCH

Current Projects

Invited article: "Hans Jonas" (for Encyclopedia of Phenomenology, 2022)

"Developing and Establishing an Environmental Humanities in the University of Kentucky" Draft Proposal 2021, UK.

Books

Husserl's Constitutive Phenomenology: its Problem and Promise. (Routledge, 2009).

Articles

"The Idea of an Existential Ecology" (*Phenomenology and Place*, Rowman & Littlefield International, 2017.

"Life and Sprit in Max Scheler's Philosophy." *Philosophy Compass*. (*Vol. 7, No. 1. Jan 2012*)

Book Reviews

Adam Konopka. *Ecological Investigations: A Phenomenology of Habitats*. In *Husserl Studies* (2020)

Andrea Staiti. *Husserl's Transcendental Phenomenology: Nature, Spirit, and Life.* In *Journal of the History of Philosophy* (2016)

Leopold, Aldo. *A Sand County Almanac and Other Writings on Ecology and Conservation. By Aldo Leopold*. Edited by Curt Meine. – In *Environmental Philosophy* (Spring 2014)

Mohanty, J.N. *The Philosophy of Edmund Husserl. The Freiburg Years (1916-1938)*. In *Husserl Studies* (July 2013)

Hickerson, Ryan. *The History of Intentionality.* – In *Philosophy in Review*. Volume XXIX, No. 2 (2009): 112-114.

Husserl, Edmund. *The Basic Problems of Phenomenology. From the Lectures, Winter Semester, 1910-11*. – In *Journal of the History of Philosophy* 45, no. 2 (2007): 338-339.

Tuttle, Howard N. *Human Life is Radical Reality: An Idea Developed from the Conceptions of Dilthey, Heidegger, and Ortega y Gasset*. – In *Journal of the History of Philosophy* 44 (2006): 128-29.

Welton, Donn, editor. *The New Husserl: A Critical Reader*. – In *Journal of the History of Philosophy* 43 (2005): 122-23.

Web Publication

The Husserl Page (http://www.husserlpage.com/)

Presentations

"A Contemporaneous Critique of Husserl's 1928 Time Lectures." Society for Phenomenology and Existential Philosophy. *2020 meeting postponed*, October 2021.

"Oskar Kraus' Criticism of Husserl's *Vorlesungen zur Phänomenologie des inneren Zeitbewußtseins*." North American Society for Early Phenomenology (May 2019)

"Philosophy in an Interdisciplinary Key." Kentucky Philosophical Association (March 2019)

"The Animal in the United Nations Sustainable Development Goals." Living with Animals (March 2019)

"The UK Sustain-able Pedagogies Faculty Workshop – An Overview." Association for the Advancement of Sustainability in Higher Education (October 2018)

"Sustainability & Philosophy." Invited Speaker, Symposium on Emerging Technologies and Sustainability: Interactions Between Science and Society. University of Kentucky. (Dec 2017)

"An Ecological Understanding of Transcendental Subjectivity." International Association for Environmental Philosophy (October 2017)

"What in the World Does Coexistence with the Animal Mean?" Living with Animals 3: Co-Existence (March 2017)

"Aldo Leopold's Political Ecology." 7th Annual Dimensions of Political Ecology Conference (February 2017)

"Aldo Leopold and Wendell Berry on the Farm." University of Kentucky Food Systems Forum (December 2016)

"Jan Patočka's Conception of an Asubjective Phenomenology" Society for Phenomenology and Existential Philosophy (October 2016)

"The Way of the Machine: Wendell Berry and Martin Heidegger on the Essence of Technology." Interdisciplinary Coalition of North American Phenomenologists (May 2016)

"The Value of the Least in Aldo Leopold's Ethics." Kentucky Philosophical Association Meeting (April 2016)

"Wendell Berry's Critique of Technology in Modern Agriculture." Dimensions of Political Ecology Conference (February 2016)

"Is Hans Jonas an Ecological Thinker?" International Association for Environmental Philosophy (October 2015)

"Philosophy as Rigorous Science? Scheler contra Husserl." North American Society for Early Phenomenology (June 2015)

"Environment in Scheler and Heidegger." Interdisciplinary Coalition of North American Phenomenologists (May 2015)

"The Value of a Varmint." Living with Animals Conference (March 2015)

"An Existential Ecology: A Proposal." International Association for Environmental Philosophy (October 2014)

"Aldo Leopold's Wilderness Idea." Presented as part of the Environmental & Sustainability Studies Program Speakers Series. Film Presentation and Discussion of *Green Fire: Aldo Leopold's a Land Ethic for our Time*. University of Kentucky (October 2014)
"A Study of Life and Land and How this Relates to our Home." University of Kentucky (March 2014)
"The Philosophy of Life: Hans Jonas and Max Scheler." Society for Phenomenology and Existential Philosophy (October 2013)
"The Meaning of Ecology: A Study of Homer's *Odyssey* in Leopold and Berry." International Association for Environmental Philosophy (October 2013)
"Ecology: Study of the Natural Household." Talk before the University of Kentucky EcoLab. (September 2013)
"On the Possibility of Creating Non-Human Spaces." Living with Animals (March 2013)
"The Importance of the Phenomenological Reduction to Max Scheler's Personalism." Society for Phenomenology and Existential Philosophy (November 2012)
"The 1930 'System of Phenomenological Philosophy.'" Husserl Circle (April 2011)
Précis of *Husserl's Constitutive Phenomenology*. Kentucky Philosophical Association. (April 2010)
"An Existential Interpretation of Aldo Leopold's Concept of Land." International Society for Environmental Ethics. (March 2010)
"Husserl's Zigzag Method and the Problem of a Phenomenological Language." Kentucky Philosophical Association. (May 2009)
"Our Kinship with the World." International Association for Environmental Philosophy. (October 2008)
"The Rediscovery of Life within Phenomenology: Hans Jonas and his Relation to Max Scheler." Institute for the Study of Nature at M.I.T. (June 2008)

Commentaries

"Commentary on James Hart's ' Some Moments of Wonder Emergent Within Transcendental Phenomenological Analyses.'" Husserl Circle (May/June 2022)
"Commentary on Simon Gurofsky's 'Kant's Principle of Significance.'" Kentucky Philosophical Association (April 2018)
"Commentary on Matt Pianalto's 'Why Patience is Always a Virtue.'" Kentucky Philosophical Association (April 2014)
Participant. Kentucky Philosophical Association Two-Day Paper Workshop. (July 2013)
"Commentary on Ben Dixon's 'A Decision Procedure for Sustainable Development.'" Kentucky Philosophical Association (April 2012)
"Commentary on Ronald Bruzina's 'Points for a Phenomenology Antecedent to the Dichotomizing of Natur and Geist.'" Husserl Circle (April 2011)
"Commentary on John Anders' 'An Aporetic Approach to Husserl's Reflections on Time.'" The Husserl Circle (June 2008)
"Commentary on Sebastian Luft's paper, 'Abnormality and the Counter-Normal of the Phenomenological Reduction.'" The Husserl Circle (February 1999)

VII. LANGUAGES

German: proficient reading level
Ancient Greek: basic reading level
Modern Hebrew: basic reading and writing level

VIII. MEMBERSHIPS

American Association of Philosophy Teachers
Husserl Circle

International Association for Environmental Philosophy
North American Society for Early Phenomenology
Society for Phenomenology and Existential Philosophy

bob.sandmeyer@uky.edu

College of Arts and Sciences		
Dossier	**Bob Sandmeyer**	*Curriculum Vitae*

DOSSIER: Service Materials (15% distribution of effort)

https://www.uky.edu/~rsand1/dossier/service

Statement of Promotion and Tenure Expectations: STS Appointments[1]

If the DOE specifies a significant concentration of effort in service, then the successful candidate will have demonstrated high quality service at the departmental, college, university and/or professional levels. The quality and nature of such service will be evaluated principally by the chair and other departmental officers, though at the time of promotion the views of all faculty will also be solicited. If, on the other hand, the DOE does not specify a high concentration of effort in service, then it is expected that the successful candidate will have demonstrated modest levels of quality service to the department and, if relevant, the college, university, and profession, establishing a record of effective collaboration in performance of service responsibilities. All faculty members are also expected to contribute to the collective growth and development of the department and, if called upon, college and university. Refereeing essays, manuscripts, proposals, and applications for journals, presses, and institutions falls under service to the profession.

1. **SERVICE STATEMENT**
2. **DEPARTMENT**
    a. Philosophy Club & Philosophy Graduate Student Association
    b. Committee Work
3. **COLLEGE**
    a. Environmental & Sustainability Program
        i. Environmental Studies Graduate Certificate Program Proposal
    b. Political Ecology Working Group
4. **UNIVERSITY**
    a. Environmental Humanities Initiative
    b. Steering Committe, Sustainable Agriculture Major (B.S. Degree)
    c. Faculty Sustainability Council
    d. UK Faculty Senate, 2015-18
5. **PROFESSION**
    a. NSF Grant Proposal (co-PI)
    b. Referee Activities
    c. Editorial Board Memberships
    d. Professional Memberships

Sandmeyer – 1. Service Statement

My academic service at the University of Kentucky plays an enormously important role in my work as a Special-Title Series Faculty. It is to a large extent by virtue my academic service that I have been and am able to contribute most effectively to the collective growth and development of my department(s), my college, and the university, generally. Over my probationary years, I have conscientious designed a service portfolio that allows me to build curriculum and programs here at the University of Kentucky.

Service: Philosophy Department

In philosophy, I have been faculty sponsor to both the undergraduate Philosophy Club (PC) and the Philosophy Graduate Student Association (PGSA) for several years. In these years, I introduced innovations that (i) links the PGSA and the PC together institutionally and (ii) rewritten the PC charter to ensure seamless continuity from year to year. The duties of the PGSA now include an explicit directive to mentor PC officers and to help facilitate the activities of that organization. Additionally, I rewrote the PC Constitution adding the position of vice president and writing into role a transition to the presidency after one year.

During my probationary period, I was a member of the Department Graduate Student Admissions Committee two different years. I am currently the Speakers Committee Chair, and I have been elected one of three faculty members to sit on the Department Executive Committee for AY2022-23.

Within philosophy, I have also been intimately involved in designing and implementing new curriculum essential to the vitality of the department. I wrote both the PHI205 Food Ethics (which fulfills a UK Core requirement) and the PHI336 Environmental Ethics syllabi for approval by the UK Senate. I am the department liaison with the Sustainable Agriculture and the Natural Resources and Environmental Sciences programs. And I have negotiated to include these classes, respectively, as major requirements in their programs. Indeed, PHI205 and PHI336 are two of the most popular classes which we in philosophy offer today. Additionally, I designed and ran an experimental course, The History and Philosophy of Ecology, co-listed as PHI/ENS300. **See my Teaching Portfolio, 3.d**. As noted there, the experimental course this course fulfilled a major requirement of ENS students. This year with the help of the Philosophy DUS I intend to submit documentation to the UK Faculty Senate requesting the course be approved as a regular offering taught every other year.

Service: College of Arts and Sciences – the Environmental & Sustainability Studies Program

In 2010, well before my probationary period relevant to this dossier, the Dean of A&S invited me to join an Advisory Board to Create a New Environmental Degree Program **(see document 3.a.)**. I became a major force in the design and implementation of the Environmental & Sustainability Studies (ENS) B.A. degree here in A&S, and I am a founding member of that Program Faculty. While my appointment resides solely within Philosophy, the most considerable amount of my service work to the College and the University is related either directly to my work as ENS program faculty or indirectly as an environmental philosopher associated with that program.

From 2015 to 2017 I was one of seven members (three core members, including myself) involved in developing a proposal for an Environmental Studies Graduate Certificate Program in A&S **(see document 3.a.i.)**. During AY 2017-18, I was appointed Director of Undergraduate Studies for ENS (**see section 7 of my Teaching Portfolio**).

I helped write the ENS program guidelines which established an Executive Committee (modelled on the Department of Philosophy EC committee) in ENS. During the first year of my probationary period, I and one other faculty member were elected to the first iteration of this EC.

We worked with then acting director, Ernest Yanarella, to create stabilizing governance structures and innovative curriculum at a period in the history of the program marked by lack of development and stagnation. Today, the ENS program is one of the most vibrant and innovative in A&S

As an environmental philosopher, I have been an active participant in the Dimension of Political Ecology (DOPE) conferences since their first in 2011. The DOPE conference is an interdisciplinary conference established and run by graduate students in the University of Kentucky Political Ecology Working Group (PEWG). During my probationary period, I have judged two graduate and two undergraduate essay contests sponsored by PEWG. And acting in my role as a member of the International Association for Environmental Philosophy, I organized and moderated the first "International Association for Environmental Philosophy Panel" at the 2018 Dimensions of Political Ecology Conference.

Department Service: University

Perhaps, the most significant academic work contributing to the collective growth and development in service of my department and my college has been at the university-level. During the height of the COVID lockdown, I became very concerned for the integrity of interdisciplinary efforts here at UK. During this time, I came to see how the pandemic had dis-integrated UK faculty in substantive and possibly enduring ways. Consequently, I envisioned an Environmental Humanities Initiative at UK that would, at once, generate a renewed enthusiasm among UK humanities faculty for their interdisciplinary environmental work and build something here that would outlast me. I took it upon myself to complete a benchmarks study of Environmental Humanities Initiatives for UK during the spring and summer, 2021. On the basis of this study I wrote a proposal to develop and establish an Environmental Humanities Initiative **(see document 4.a.)** and workshopped this proposal at the 2021 Colby Summer Institute for Environmental Humanities (**see section 3.b.ii. of my Teaching Portfolio** for more details). In this proposal I laid out a series of short-, medium-, and long-term goals. Last year, the first of the Initiative, we accomplished three (of three) of our short-term goals: (1) creating an Environmental Humanities Community comprising 60 faculty, administrators, and community members; (2) establishing a partnership with the Cooperative for the Humanities and Social Sciences here at UK to act as incubator of UK-EHI programs; and (3) running our first EH Workshop during the spring 2022 term in which I and two faculty from outside UK (one of whom was incidentally selected as one of three candidates invited to UK for position of Dean of A&S by our Provost) participated. Moving into our second year, I am working to complete some of our medium-term goals. In the fall 2022, I will be teaching an experimental UK Core class, UKC 110 Introduction to the Environmental Humanities (**see section 3.j. of my Teaching Portfolio** for the flyer). This class will form (we hope) the basis of a new undergraduate certificate servicing the interdisciplinary environmental programs here at UK. And this next year I will be working with the Directors of Graduate Studies of our Humanities departments to establish and develop new avenues for funding, research, and pedagogy opportunities for the many graduate students in our EH community.

Since 2011, I have been an active member of the Steering Committee for the UK Sustainable Agriculture program **(see document 4.b.)**. During this year, I developed the Food Ethics class to service this department's social and humanities requirement. More importantly though, I have been a consistent and strong voice for the transition of this program from its status as an Individualized Program to official B.S. Degree. This transition was accomplished three years ago.

In early 2017 the UK Provost established the Faculty Sustainability Council, whose mission was to assess and promote sustainability curriculum and research at UK. My tenure on the committee spanned the two iterations of the Council. After the first Council completed its task, we published the 2018 report, "Sustainability in Research and Instruction at the University of Kentucky:

Challenges and Goals" **(see document 4.c)**. A short-term goal articulated in that report led to a $47,000 grant funding the “Teaching Sustainability, Teaching Sustainably” Workshop co-directed by Helen Turner and me. (**See materials 6.a.iii & 6.a.iii.1. in my Teaching Portfolio** for full details of this workshop.)

From 2015-2018, I served as the Humanities representative on the UK Faculty Senate (**see document 4.d.**). During my tenure as Senator, I served on the Academic Planning and Priorities Committee. This was an especially important committee during an especially important time at UK. It was during these years that the mission of and parameters for the UK Lewis Honors College were established and approved by the UK Faculty Senate.

Service: Profession

Of course, I also completed and am currently engaged in significant professional service. I am currently a co-PI on an NSF Convergent Accelerator Grant Proposal (**see document 5.a.**). Our team recently submitted a National Science Foundation grant proposal having two phases. The first phase is a seed grant of $750,000 to develop quantitative understanding of the total life cycle sustainability effects of the use of critical materials such as Li, Ni and Co in electric vehicle (EV) Li-ion batteries. Phase II is a $5 million grant during which our Team will implement the Phase I plan. My work on the Environmental Humanities Initiative fits neatly in the convergent research parameters defined in the grant, and so I was asked to participate.

I am, of course, involved in several areas more traditionally associated with my work as a philosopher. During my probationary years, I have refereed books or articles in or written book reviews for the following journals: *Environmental Philosophy*, *Environmental Humanities*, *Husserl Studies*, the *International Journal of Philosophical Studies*, *Journal of the History of Philosophy*, and Columbia University Press. I am an editorial board member of the newly created journal, *Phenomenological Investigations. Journal of the North American Society for Early Phenomenology*. I have been a long-standing editorial board member *Cogent Open Access*. Additionally, I have professional memberships and am active in the following philosophical associations or groups: the Kentucky Philosophical Association, American Association of Philosophy Teachers, the Husserl Circle, the International Association for Environmental Philosophy, the North American Society for Early Phenomenology, and the Society for Phenomenology and Existential Philosophy

College of Arts and Sciences		
Dossier	**Bob Sandmeyer**	*Curriculum Vitae*

DOSSIER: Service Materials (15% distribution of effort)

https://www.uky.edu/~rsand1/dossier/service

Statement of Promotion and Tenure Expectations: STS Appointments[1]

If the DOE specifies a significant concentration of effort in service, then the successful candidate will have demonstrated high quality service at the departmental, college, university and/or professional levels. The quality and nature of such service will be evaluated principally by the chair and other departmental officers, though at the time of promotion the views of all faculty will also be solicited. If, on the other hand, the DOE does not specify a high concentration of effort in service, then it is expected that the successful candidate will have demonstrated modest levels of quality service to the department and, if relevant, the college, university, and profession, establishing a record of effective collaboration in performance of service responsibilities. All faculty members are also expected to contribute to the collective growth and development of the department and, if called upon, college and university. Refereeing essays, manuscripts, proposals, and applications for journals, presses, and institutions falls under service to the profession.

1. **SERVICE STATEMENT**
2. **DEPARTMENT**
    a. Philosophy Club & Philosophy Graduate Student Association
    b. Committee Work
3. **COLLEGE**
    a. Environmental & Sustainability Program
        i. Environmental Studies Graduate Certificate Program Proposal
    b. Political Ecology Working Group
4. **UNIVERSITY**
    a. Environmental Humanities Initiative
    b. Steering Committe, Sustainable Agriculture Major (B.S. Degree)
    c. Faculty Sustainability Council
    d. UK Faculty Senate, 2015-18
5. **PROFESSION**
    a. NSF Grant Proposal (co-PI)
    b. Referee Activities
    c. Editorial Board Memberships
    d. Professional Memberships

Sandmeyer, Bob

From: Atwood, David A
Sent: Thursday, August 26, 2010 9:00 AM
To: Sandmeyer, Bob
Subject: Invititation to Join Advisory Board to Create new Environmental BA and BS Degrees

Dear Bob,

The Dean of A&S has appointed me as the new director of the Environmental Studies Program. My primary mandate is to create an Environmental Studies BA Degree and an Environmental Sciences BS Degree. The BA Degree will have options for various areas of concentration. I am in the process of creating an Advisory Board made up of A&S faculty and staff who have an interest in environmental courses and who might also wish to teach courses that would be included in the Degree Programs. I am writing to invite you to be a member of this Advisory Board.

The Advisory Board will make the ultimate decisions on what the BA and BS Degrees entail and all of our deliberations will be transparent and freely accessible to anyone interested in following our progress. I will provide the Board with a beginning suggestion of what the two degrees would look like to open up the discussion. From there I would incorporate any comments and suggestions in a "Planning Document" that would be shared with everyone periodically. I anticipate that we will meet once or twice as a group to discuss the possibilities. I would also like to meet or speak with the Board members individually to ensure that everyone's concerns, and the departments each Board member represents, are being addressed.

I hope you will be willing to help create these exciting, and greatly needed, set of new degrees for A&S, and the University. We have an ambitious timeline to get this program before the A&S and Faculty Senate by Nov. 1 of this year.

Thanks,
David

David A. Atwood
Professor
Department of Chemistry
University of Kentucky
Lexington, KY 40506-0055
Tel: 859-257-7304
Fax: 859-323-9985
Email: Datwood@uky.edu
www.as.uky.edu/chem/faculty/DavidAtwood

ENVIRONMENTAL & SUSTAINABILITY STUDIES

New Bachelor of Arts Degree

College of Arts & Sciences

***Note to Educational Program Committee*
This is a revised version of the document that was submitted and approved by the EPC in spring 2011. After submission, the Geography Department requested time to study the Program and to make suggestions for changes. The primary changes to the current document entail: 1) making ENS 395 optional rather than required, 2) adding a second Geography faculty member to the Advisory Board, 3) changes to the list of GEO courses included in the document.

Professor David Atwood
Director of Environmental & Sustainability Studies
College of Arts & Sciences
University of Kentucky
Email: datwood@uky.edu
Tel: 859-257-7304

Mrs. Kari Burchfield
Interdisciplinary Programs Coordinator
College of Arts & Sciences
University of Kentucky
Email: klburc2@uky.edu
Tel: 859-257-1994

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Document 10. Appendix I. Letter of Support from Dean Mark Kornbluh

Document 11. Appendix II. ENG 205 Letter of from Prof. Mountford

Document 12. Appendix III. PHI 336 Letter from Prof. Bradshaw

****Print copies of Signature Routing Logs provided separately for**:

A. Program

B. New Course: ENS 201

C. New Course: ENS 202

REQUEST TO CLASSIFY PROPOSED PROGRAM

Section I (REQUIRED)

1.	The proposed new degree program will be (please check one): ☒ Undergraduate* ☐ Masters* ☐ Doctoral* ☐ Professional*			
2.	Have you contacted the Associate Provost for Academic Administration (APAA)?			
	YES ☒ Date of contact: Sept. 20, 2010			
	NO ☐ (Contact the APAA prior to filling out the remainder of this form.)			
3.	Degree Title:	Bachelor of Arts		
4.	Major Title:	Environmental & Sustainability Studies		
5.	Option:	Areas of Expertise: 1) Economics and Policy, 2) Ecosystems, 3) Energy and Land, 4) Society, 5) Water Resources		
6.	Primary College:	Arts & Sciences		
7.	Primary Department:	None, Degree is Trans-Departmental		
8.	CIP Code (supplied by APAA)	03.0103		
9.	Accrediting Agency (if applicable):	CPE		
10.	Who should be contacted for further information about the proposed new degree program:			
	Name: Prof. David Atwood Mrs. Kari Burchfield	Email: datwood@uky.edu klburc2@uky.edu	Phone: 257-7304 257-1994	
11.	Has the APAA determined that the proposed new degree program is outside UK's band?			
	☐ YES (Continue with the Section II* on a separate sheet.)			
	☒ NO (This form is complete. Print PAGE ONE & submit with appropriate form for new program.)			

Section II (Attach separate pages.)

I. Submit a one- to two- page abstract narrative of the program proposal summarizing: how this program will prepare Kentuckians for life and work; any plans for collaboration with other institutions; and any plans for participation in the Kentucky Virtual University.

II. Provide a comprehensive program description and complete curriculum. For undergraduate programs include: courses/hours; college-required courses; University Studies Program; pre-major courses; major courses; option courses; electives; any other requirement. Include how program will be evaluated and how student success will be measured. Evaluative items may include, but are not limited to retention in the major from semester to semester; success rate of completion for core courses; and academic performance in suggested program electives.

* After filling out this form, you must also submit a form for New Undergraduate Program, New Master's Program, or New Doctoral Program. There is no form for new professional programs.

REQUEST TO CLASSIFY PROPOSED PROGRAM

III. Explain resources (finances, facilities, faculty, etc.) that are needed and available for program implementation and support.

Answers to the questions below are also required by Kentucky's Council on Postsecondary Education for proposed new programs outside of UK's band. Please visit their website (http://cpe.ky.gov/planning/keyindicators/) for more information about the questions.

IV. Academic Program Approval Checklist

1. **Are more Kentuckians prepared for postsecondary education?**
   A. Entrance requirements:
      1. Test scores (GRE, GMAT, LSAT, MCAT, ACT, SAT, etc.).
      2. High school/college GPA.
      3. Other required discipline knowledge unique to the proposed program.

   B. Transfer requirements:
      1. College transfer GPA.
      2. Recommended/required preparatory courses (prerequisite courses).

   C. Recruitment plans
      1. Plans to ensure success of students coming from "feeder institutions" (either colleges or high schools).
      2. Recruitment and marketing strategies to enroll a diverse student population.

2. **Are more students enrolling?**
   A. Explain the demand for the program by providing the following information:
      1. Anticipated number of students from other majors (including undeclared).
      2. New students entering the programming (including transfers).

   B. Detail recruitment plans (include specific plans to attract non-traditional students, including minorities, and to address gender related issues.)

   C. Contact the Associate Vice President for Employment Equity to obtain EEO plan and status information.

3. **Are more students advancing through the system?**
   A. What is the anticipated time-to-graduation for full-time students entering the program?

   B. Explain any cooperative or practicum experience required to complete the program.

   C. Why do you desire to offer the program? (See 2A) Why is UK the right place to offer this program?
      1. Include a list of other Kentucky institutions offering similar or related programs at this and other levels.

2. List courses from in-state institutions that will transfer into the program.
    a. 48 Hour General Education Transfer Component.
    b. 12 Hour Transfer Articulation Agreement.

3. List courses offered that will transfer into similar programs at other state institutions.

4. Provide information about completed, signed articulation agreements.

D. Delivery
1. What plans are in place for delivering this program through the Kentucky Virtual University or other distance learning technologies? (Council on Postsecondary Education wants special attention given to KVU courses.)

2. What courses can be offered in a non-traditional mode?

E. Collaborative Efforts
1. Future proposals must provide evidence of consultation with other programs in the state and either documentation of collaborative agreements or strong arguments for why they are not feasible.
2. Collaborative agreements should define shared use of resources to improve program quality, efficiency, and student placement.

4. Are we preparing Kentuckians for life and work?

A. How does the program prepare Kentuckians for life and work?

B. What are the accreditation expectations for this program?

C. Are there licensure, certification or accreditation requirements for graduates of this program?

D. What are the projected degree completions?

5. Are Kentucky's people, communities and economy benefiting?

A. Describe external advisory groups involved in the development of this program (e.g., disciplinary groups, community, government, business, labor interests).

B. What are the employment expectations for graduates? Document the contributions of the program to current workforce needs in the state.

C. What other benefits to the Kentucky's community and economy will the program provide?

D. Explain specific benefits of the program.

SECTION II. REQUEST TO CLASSIFY PROPOSED PROGRAM

I. Program Description

A. Abstract

The Bachelor of Arts Major in Environmental & Sustainability Studies (ENS) will be an important addition to the University's Degree possibilities. The Degree was created through the combined efforts of the ENS Advisory Board members within the College of Arts & Sciences and in consultation with faculty and staff throughout the University. The ENS B.A. degree will educate students in a broad range of fundamental environmental studies with concepts of sustainability integrated throughout the curriculum. The programmatic focus on sustainability will place the University at the forefront of degree programs offering courses in this new, critical area of academic endeavor. The coursework requirements consist of 18 credit hours of core courses and 24 credit hours of electives from courses organized in the Areas of Economics and Policy, Ecosystems, Energy and Land, Society, and Water Resources. In order to ensure depth of knowledge and expertise 15 credit hours must be taken within one Area. To provide breadth of knowledge, six credit hours must be taken in a second Area and three credit hours in a third Area. The elective requirements would be fulfilled by taking five courses in one Area, two courses in a second Area, and one course in a third Area. This is called the "5:2:1 Rule". The students will have the freedom to select any combination of courses fulfilling the 5:2:1 Rule. The Areas were created and named to provide a multidisciplinary education not specific to any single discipline or department. Separating the elective courses into "humanities" and "natural sciences" was intentionally avoided. Sustainability is transdisciplinary and most suitably taught in a holistic manner by drawing needed information from disciplinary subjects.

The grouping of courses in each Area provides the students the possibility of selecting thematic clusters of courses according to their own interests and educational aspirations. As examples, the Themes of "Environmental Justice" and "The Built Environment" were created out of the Society Area of Expertise. Many other Themes could be created by the students, such as "Biodiversity" and "Conservation" within the Ecosystems Area, and "Global Climate Change" and "Renewable Energy" within the Energy and Land Areas. As various new Themes emerge over the years, based on the interests of the students and their career goals, they will be provided as options within the Program to provide guidance for future generations of students.

The Environmental & Sustainability Program will create a community of ENS scholars who will graduate with a unique set of transdisciplinary skills and an understanding of the interrelationships that exist between society and our global environment. This will be obtained through the courses and participation in various service-learning activities. The Program intends to play a significant role in helping the College of Arts & Sciences attain the goal of being defined by four key characteristics: innovative preparation for life and career, multidisciplinary scholarly research, connectivity with the world, and substantive community involvement (*Ampersand*: Envision 2020, Fall 2010).

B. Preparing Kentuckians for Life and Work

1. Student Skills Development

Active learning will be employed as the basis of the ENS Core courses. This will be promoted through each student's independent research for the assignments in the Core courses, various engagement activities (on and off campus), through the Independent Study course, ENS 395, and the Capstone course, ENS 400. Environmental subjects and issues are ideally suited to be taught by active learning techniques given the rapidly changing developments that take place. However, these must be examined critically, particularly with regard to how the issues are portrayed in popular publications and the news media. Thus, a primary outcome of the program will be to produce graduates with the ability to think critically and independently. This will be an attribute the students can employ throughout their lives and will make them more successful in their careers. Another important outcome will be to train the students to communicate effectively through written and oral media. These skills will be developed throughout the Core courses, but specifically in ENG 205 and PHI 336. The best of the students' written documents and presentations will be incorporated into the Program Website to educate the public about existing and emerging environmental issues.

The abilities to think critically and to communicate effectively will require a rigorous academic foundation. The factual basis for the social, scientific, economic, and policy issues facing society today will be provided through the new courses, ENS 201 and ENS 202, ideally taken by the students in their first year. Greater expertise in subjects of the students' own interest will be provided by the courses listed in the five areas of expertise following the "5:2:1 Rule".

The lives of the students and those around them will be substantially improved by training in the concepts and practice of Sustainability. This will be manifested, for example, by the graduating students having a clear understanding of the social problems and ecosystem impacts associated with the world's current use of non-renewable resources through energy and water consumption, land use, and commodities used on a daily basis. This will result in Environmental & Sustainability Studies graduates who make wise decisions about the activities they conduct in their lives and work, making them well-informed, global citizens.

The *Student Learning Outcomes* will be:
1) Development and utilization of critical thinking skills
2) Ability to work independently in the creation of new knowledge
3) Demonstration of excellence in communication, with an emphasis on writing
4) Factual academic knowledge in a broad range of environmental issues
5) Expertise in a specific area of environmental studies
6) Understanding the importance of sustainability and ability to implement in life and career.

2. Career Opportunities

The ENS B.A. degree will provide graduating students with a broad liberal-arts education in environmental studies within the context of sustainability. It will provide a strong foundation for a student intending to continue their education at the M.S. or Ph.D. levels. The degree will

also prepare the students for a wide range of career opportunities in city, state and federal government, non-profit organizations, professional societies, and in the private sector. The students will be particularly well-prepared for careers where communication skills are essential. This will be an advantage the ENS B.A. students will have compared to students graduating with traditional "environmental science" degrees and more discipline-specific B.S. degrees. There are many websites that advertise potential career choices including one titled "Environmental Career Opportunities" (http://www.ecojobs.com/). The ENS website will provide external links to selected websites that describe careers having an environmental or sustainability component. This will allow the students to determine whether the ENS B.A. is suitable for their goals in life, before entering the Program, and assist with career selection after graduation. As the ENS Program begins producing high-quality graduates and placing them in various careers it is anticipated that potential employers will eventually contact the Program looking for potential hiring opportunities. Additionally, members of the External Advisory Board will provide guidance and help identify career opportunities.

With their broad-based academic training, graduating ENS students would be well-suited to become educators throughout the P-12 grades. They could pursue careers at the state-level. In Kentucky this could be in the Department for Environmental Protection (KDEP; Divisions of Waste Management, Air Quality, and Water). At the federal level there will be career opportunities in the U.S. National Oceanic and Atmospheric Administration (NOAA) and the Environmental Protection Agency (EPA).

There are many possibilities for employment with non-profit organizations and professional societies, with some examples being Conservation International, Environmental Defense Fund, National Wildlife Federation, the American Planning Association, North American Lake Management Society, and the Society for Ecological Restoration. They could also find employment with newspapers, magazines, and other media-based companies. In these and other career opportunities the students will be able to understand, evaluate, and communicate the meaning and impact of new environmental developments.

The ENS Degree provides a great deal of flexibility in the electives the students may choose, so the students will be able to tailor the courses they select within an Area of Expertise for the career they consider to be ideal.

C. Collaborations with other Institutions

Many of the potential career opportunities listed above, and particularly the KDEP, will provide work-study and internship possibilities for the students. It will be important to begin building a strong relationship with the KDEP as early as possible. Members of the Advisory Board have already met with Secretary Len Peters who was interested in connecting to the new ENS Program. He provided the name and contact information for the Assistant Director of the Division of Carbon Management, who will be the first member of the ENS External Advisory Board. There will also be opportunities for the students to collaborate with various non-profit groups located in Lexington and the state. For example, several ENS Minor students worked with the Kentucky Conservation Committee to review state legislation with potential

environmental impacts. If this collaborative, engagement activity continues then it could receive credit through ENS 395 Independent Study. The students will be introduced to the many possibilities for collaborations in ENS 201 and ENS 202 and encouraged to begin their optional independent study activities as early as possible.

After the ENS Program is established, student exchange programs will be developed with other KY institutions. For example, Atwood is currently working with Prof. Alice Jones and Dr. Tammy Horn at EKU to submit an EPA Environmental Education Regional Grant to support a UK-EKU collaboration on the use of reclaimed mine sites for bee-keeping and the production of pesticide-free beeswax and honey.

It would be ideal to have several of the UK students spend a semester at Berea College to participate and learn from their Sustainability and Environmental Studies Program. This would include studying Berea's famous Ecovillage and how it operates. Other KY institutions have unique expertise and capabilities that would be valuable for UK ENS students to obtain. Likewise, the ENS Program could provide similar opportunities to students from other institutions. Collaborative exchanges with these institutions will be sought once the ENS Program is sufficiently established to host off-campus students, and provide support for ENS students to travel to other institutions.

Collaborations with leading programs outside of KY will be important for the growth of the ENS Program, student development and the generation of new ideas for courses and engagement activities. The first three universities to be explored for this possibility are: Washington (Environmental Studies BA), Pennsylvania State (Energy and Sustainability Policy BA) (two UK benchmarks) and Oregon (Environmental Studies BA). It is anticipated that the "exchange" will initially be one-way with ENS students spending a semester taking courses at the other institution in their 3rd year at UK. This might also entail having one of our faculty visit the host institution to give a seminar and to observe their environmental program. After the UK ENS Program is established it should become a host to students from other institutions leading to a mutually beneficial two-way exchange.

D. Participation in the Kentucky Virtual University

The ENS Program will participate in the KVU. While the ENS Core courses will not be taught online, the ENS 300 Special Topics courses will be well-suited to be offered as virtual courses since they will cover a range of topics that are likely to be of interest to students outside of UK. For example, PS391/ENS 300 "Urban Sustainability in North America" (Prof. Yanarella) was taught online in the summer of 2010 and was taught again in summer 2011.

E. Program Creation and Advisory Board

In consultation with Dean Kornbluh and Associate Dean Schatzki, Prof. Atwood assembled a Program Advisory Board comprised of faculty and staff who would be important participants in the new ENS B.A. Program. The Advisory Board members represent all the A&S College Departments in which relevant ENS elective courses are currently being taught. The Advisory Board met several hours at least once a week throughout fall 2010 to build upon ideas

for a new environmental degree that had been discussed across the College for several years.

Prof. Atwood provided all of the Advisory Board members with emailed copies of the deliberations and plans that were discussed at each meeting. The Board Members were encouraged and expected to share this information with their colleagues in their home departments and elsewhere. Prof. Atwood provided information to interested individuals upon request. Thus, the deliberative process was completely transparent at all stages of the Program development.

Advisory Board Members

1. David Atwood (Chemistry; ENS Director)
2. Arne Bathke (Statistics)
3. Shannon Bell (Sociology)
4. Kari Burchfield (Interdisciplinary Programs)
5. Lisa Cliggett (Anthropology)
6. Alan Fryar (Earth and Environmental Sciences)
7. Rebecca Glasscock (BCTC, ENS 200)
8. Jim Krupa (Biology)
9. Jeff Osborn (Biology; AMSP)
10. Tad Mutersbaugh (Geography)
11. Eric Reece (English)
12. Bob Sandmeyer (Philosophy)
13. Ted Schatzki (Associate Dean, A&S)
14. Shane Tedder (Sustainability Coordinator)
15. Alice Turkington (Geography)
16. Ernie Yanarella (Political Science)

F. Program Structure

The ENS Program is interdisciplinary and will be located in the College of Arts & Sciences. Mrs. Kari Burchfield, a participant in the creation of the Program, is responsible for coordinating interdisciplinary studies in the College of Arts & Sciences.

The ENS Advisory Board will make all the decisions regarding the courses to incorporate into the Program, new courses to be developed, and any other programmatic or curricular issues. The Advisory Board will also oversee the design and content of the Program Website, the Guest Lecture Program, suitable Engagement Activities, Student Scholarships, the selection of an External Advisory Board and any other activities the Program engages in. The Director will manage the day-to-day operation of the Program including the placement of students into appropriate ENS 395 projects. The Director will obtain approval for any decisions that would affect the Program as a whole.

G. The Need for a Program in Environmental & Sustainability Studies

There is an immediate, imperative need to prepare students for a 21st century that will be more significantly impacted by environmental issues than any of the previous generations of students. For example, the next generation of graduating students will need to have a fundamental understanding of the following issues:

i. Energy consumption, and associated ecological, social and political impacts
ii. Natural resource consumption, and associated impacts
iii. Climate change impacts on ecosystems and society
iv. Population growth to nine billion by the end of this century
v. The ecosystem and social impacts of common consumer products
vi. Educating the general public on current and impending environmental problems

It has become clear that the world's resources cannot continue to be utilized in a manner that leads to their depletion and the consequent environmental degradation and ecosystem losses. Society must learn how to manage the world's limited resources in a more sustainable manner. Sustainable development is defined minimally as: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Commission of the United Nations, 1987). Future college graduates must be able to implement sustainable development, specifically, and understand sustainability in its broadest meaning, to be able to succeed in a world with less abundant resources. In doing so, they will become the new leaders of their generation in achieving success while limiting the impacts of society on the carrying-capacity of the Earth. Sustainability is not a separate discipline of academic endeavor but a means of using fundamental academic environmental concepts to solve societal environmental, and by extension, human and economic problems. Sustainability creates and emphasizes inter-relationships among typically separate fields and departments of environmental studies, in recognition that appropriate solutions to environmental problems require the erasure of divisional boundaries. When applied to ecosystem protection sustainability "*is intended to complement, not replace, the more familiar effort to preserve biological diversity through the creation of national parks, wilderness areas, and nature preserves. The idea is to adapt human economic activity to the existing ecosystem rather than destroy those ecosystems...*" (*Earth's Insights* (1994) Callicott, p. 136). Adaptation is a key term in this quotation, but successfully adapting to a world undergoing environmental change requires knowledge and expertise in the relevant environmental subjects, and sustainable activities to limit or forestall catastrophic environmental changes.

The new Environmental & Sustainability Studies Bachelor of Arts Degree represents the logical, and essential, evolution from department-specific studies, through cross-disciplinary studies, to one that emphasizes sustainability within the context of fundamental environmental concepts. The ENS Program will be among the first in the nation to provide a transdisciplinary, holistic approach to understanding, and making changes in, the relationship between humans and their environment.

H. Environmental Programs at Benchmark Institutions

The University of Kentucky Benchmark Institutions are variable with regards to the types of environmental degrees they offer. However, the majority are B.S. degrees in some type of "environmental science". There are six B.A. degrees at high-ranking public universities (U.S. News & World Report, 2011). Specifically these are, Pennsylvania State University (15), the Universities of Florida (17), Iowa (29), Michigan (4), Virginia (2), and Washington (11) (highlighted in the Table below). The University of Kentucky is # 63 in this ranking. Thus, the new environmental degree program will be another achievement in attempting to attain higher national status. More importantly, however, is the potential for the University of Kentucky to be *ahead* of most institutions by creating a degree incorporating sustainability. Of the benchmark institutions only Pennsylvania State University has such a degree and it is called: "Energy and

Sustainability". The University of Kentucky would join higher ranked schools by creating a new environmental degree, would be following the precedent set by the 15th ranked school, but more importantly, UK would be unique in offering a broad-based environmental degree that includes sustainability.

Environmental Degree Programs at UK's Benchmark Institutions		
	Institution	**Degree Title (Degree; All are BS unless indicated otherwise)**
1	Michigan State	Env. Sciences and Agriscience, Env. Sciences and Management
2	N.C. State	Env. Design in Architecture, Env. Engineering, Env. Science-Air Quality, Env. Science- Soil Science, Env. Science-Geology, Env. Science-Statistics, Env. Science-Watershed Hydrology, Env. Technology, Env. Sciences
3	Ohio State	Env. Engineering, Env. Policy and Management, Env. Science
4	Penn. State	Env. Resource Management, Energy Business and Finance, Energy Engineering, Energy and Sustainability Policy (BA)
5	Purdue	Env. and Natural Resources Engineering, Env. Health Sciences, Env. Plant Studies, Env. Soil Science, Env. Studies
6	Texas A&M	Environmental Studies, Bioenvironmental Sciences
7	Arizona	Environmental Research Labs (Center)
8	UCLA	Environmental Science
9	Florida	Env. Engineering, Env. Management in Agriculture and Natural Resources, Environmental Science (BA and BS)
10	Georgia	Agriscience and Env. Systems, Env. Chemistry, Env. Economics and Management, Env. Engineering, Env. Health Science
11	Illinois	Nat. Res. and Env. Sciences, Environmental Sciences (BA and BS)
12	Iowa	Environmental Sciences (BA and BS)
13	Maryland	Env. Science and Technology, Env. Science and Policy
14	Michigan	Program in the Environment (Concentration) (BA and BS)
15	Minnesota	Env. and Natural Resources, Env. Horticulture, Env. Science, Env. Science Policy and Management
16	North Carolina	Environmental Studies (BA and BS)
17	Virginia	Environmental Sciences (BA and BS)
18	Washington	Environmental Studies (BA)
19	Wisconsin	Community and Environmental Sociology (BS)

I. ENS Major Student Enrollment and Benchmark Programs

The ENS Program intends to enroll students that otherwise would not have chosen UK for their undergraduate degree. Initially, the majority of the students are likely to be from the U.S. but as the program grows and becomes more widely publicized it is hoped that a significant number of international students will come to UK for the ENS Program. The A&S *Passport to the World Program* will provide unique opportunities to recruit international students into the ENS Program. Minority and Appalachian student recruitment will be coordinated with the Louis Stokes Alliance for Minority Participation (LSAMP) and the Appalachian and Minority Science, Technology, Engineering, and Mathematics Majors (AMSTEMM) Programs.

The benchmark enrollments for the institutions that made this information accessible are shown in the table on the following page (the first and last three years of each program). The B.A. and B.S. numbers for Florida and Virginia were not listed separately so the enrollments are combined, and thereby larger than what they would be for a separate B.A. program. The general trend is for increasing enrollment which would generally track the overall increase in enrollment at the university. The exception is Maryland who's Environmental Science and Policy numbers increased ~ six-fold in ten years. This could probably be attributed to the proximity of the University to Washington, D.C. and the result of some political occurrence during that time period. The enrollment for Michigan and Texas A&M is similar to the current ENS Minor. Based on these numbers a B.A. program having ~ 100 students would be similar in size to Florida and Virginia, ranked #17 and #2 for public institutions. The ENS B.A. program is likely to be able to reach an enrollment of ~ 100 students in the coming years.

Benchmarks, Programs, and Year : Student Enrollment		
Florida	**Maryland**	**Michigan**
Env. Sci. (BA/BS)	Env. Sci. and Policy (BS)	Env. Econ. and Policy (BS)
2009: 158	2010: 205	2010: 45
2008: 140	2009: 204	2009: 48
2007: 120	2008: 194	2008: 42
- - - - - - -	- - - - - - -	- - - - - - -
2001: 140	1999: 161	2004: 22
2000: 157	1998: 97	2003: 17
1999: 167	1997: 38	2002: 19
Texas A&M	**Virginia**	**Washington**
Env. Studies (BS)	Env. Sci. (BA/BS)	Commun. and Env. Soc. (BS)
2010: 20	2008: 134	2009: 52
2009: 15	2007: 108	2008: 45
2008: 10	2006: 82	2007: 29
2007: 16	- - - - - - -	- - - - - - -
2006: 11	1993: 210	1991: 39
2005: 7	1992: 170	1990: 49
	1991: 127	1989: 41

The timing for the creation of the ENS B.A. is fortuitous as it coincides with the Biology Department making their core degree requirements more stringent. It appears likely that a good number of potential BIO Majors will elect to pursue a different major and the ENS B.A. degree would provide the opportunity to pursue a major in the ENS Ecosystems Area of Expertise. With ≈ 1,500 current majors and associated pressure on teaching and resources the Biology Department will benefit from having the ENS possibility available to the students. The ENS

Program will benefit from having solid enrollment in the beginning years of the program, possibly like the more recent years for Florida and Maryland, two Top-20 universities.

An informal email poll of the students currently planning to graduate with an ENS Minor indicated that they *would not* have elected for an ENS B.A. in preference to the major they are currently enrolled in. Thus, the number of ENS Minor students graduating in the past cannot be used to estimate how many students the ENS B.A. degree program would potentially have. However, a significant proportion of the current ENS Minor students indicated that they would have elected to double major with the ENS B.A. being their secondary degree. It is likely, then, that the ENS B.A. will prove to be an important "companion" degree alongside traditional B.A. and B.S. degrees, and for students with an interest in business or law.

Thus, in the first years of the ENS B.A. program the student enrollment will probably be comprised of students with an interest in biology, those pursuing double-majors, and relatively few students switching from the ENS Minor to the ENS Major. As the ENS Major becomes more established and more widely recognized it is anticipated that the enrollment will be largely comprised of students who would not have come to UK in the absence of the B.A. degree.

The ENS B.A. degree is designed to provide a broad transdisciplinary education in the interrelated areas of environmental and sustainability studies. The degree is structured to provide students with the greatest possible freedom in designing and selecting their elective courses. The program will be ideal for students wishing to continue their education in other areas and for those interested in immediate employment in careers requiring a breadth of knowledge of environmental subjects coupled with strong communication and critical thinking skills. Students planning for more specialized careers in the physical sciences would be better served by more discipline-specific B.S. degrees, or the Natural Resources and Environmental Sciences B.S. offered by the College of Agriculture.

J. Relationship to Environmental Studies Minor

1. Program Description

The Environmental Studies Minor was created in 2002 to *"provide students with the opportunity to become conversant in a range of environmental topics, whether as private citizens in their daily lives or as professional members of corporate, government, legal, medical, and educational circles. The minor draws on topics and perspectives from the natural and physical sciences, the social sciences, and the humanities to underscore the interdisciplinary nature of environmental issues and problems. Students taking the minor are encouraged to integrate the program with their major study focus in order to gain a competitive advantage in grappling with environmental topics."* (Yanarella, Undergraduate Bulletin).

The minor in Environmental Studies requires 18 hours of course work including ENS 200, six credits in sociocultural perspective electives, six credits from science and technology perspective electives, and ENS 400. At least six of the twelve elective credits must be at the 300-

level or higher (this will satisfy the College requirement of at least 24 credits at the 300 level or higher). The elective courses must be taken outside the student's major. A total of 31 students have graduated with an ENS Minor from a variety of departments as shown in the table.

ENS Minor Graduates and Degree Majors									
MAJOR	03	04	05	06	07	08	09	10	Tot
Ag-Ed. Com.	1								1
Ag-Biotech.			1						1
Ag-Individ.					1				1
Anthropology		1	1						2
Architecture				2					2
Biology	1	1		2	1	1		1	7
English	1	1						1	3
Geography		1					3	2	6
Marketing		1							1
Ag-NRCM					2				2
Philosophy				1					1
Political Sci.						1		1	2
Spanish					1				1
Telecom.							1		1
Total	3	5	2	5	5	2	4	5	31

2. Revisions to the Minor

Once the Environmental & Sustainability Studies B.A. is established the Program Advisory Board will evaluate the Environmental Studies Minor with regards to its structure, the list of suitable electives and the impact the degree has had on graduated students. Based on Board meetings and individual conversations between the Director and Board members the list of activities and outcomes listed below are anticipated to take place after the ENS Major has been approved. This listing and potential decisions will need to be formally discussed and approved by the Board before implementation.

i) The Environmental Studies Minor will be changed to a Minor in Environmental & Sustainability Studies to make the Minor consistent with the Major.

ii) ENS 200, Introduction to Environmental Studies, will be phased out over the next several years and replaced by ENS 201. This will bring continuity to the Minor and Major Programs, foster relationships and collaborations among all the ENS students, and make it easier for students to move from the Minor into the Major.

iii) ENS 300 (Special Topics) and ENS 395 (Independent Study) will be common, elective, courses in the Minor and Major degrees.

iv) The list of elective courses suitable for the Minor will be broadened to include the relevant courses listed as electives for the ENS Major. It is critical to have the Minor and Major electives overlap to allow Minor students to seamlessly shift to the Major, if desired. Another benefit to having the same classes listed for both degrees is to create a cohort of students, from both degrees, with similar interests and experience working together.

v) ENS 400 Senior Seminar in Environmental & Sustainability Studies will be a common course for the Minor and Major.

vi) Students in both degrees will be tracked and their post-graduation successes evaluated in the same manner. This will allow a comparison of the relative merits of each degree and reveal the career choices that are most suitable for each.

vii) The ENS Minor and Major degrees will be evaluated with the same metrics to allow direct comparison of the relative merits of each degree.

K. Relationship to Existing UK Environmental Programs

There are five undergraduate degree programs specifically related to environmental subjects currently being offered at the University of Kentucky (according to the 2011-2012 Bulletin). These are: the Topical Major B.S. in Environmental Science in Earth and Environmental Sciences, the Human Geography Tracks (B.A. and B.S.) in Geography, the B.S. in Natural Resources and Environmental Sciences (formerly Natural Resources and Conservation Management, NRCM) in the College of Agriculture, and a Major (B.S) and Minor in Sustainable Agriculture (SAG).

The EES and NRES are B.S. degrees and have Pre-Major requirements in CHE, MA and BIO (NRES only). The ENS B.A. does not have any Pre-major or Major requirements in the physical sciences or mathematics beyond the A&S requirements. The Major requirements for EES are all intra-departmental courses and those for NRES are all within the College of Agriculture (with one exception), as expected given the specific disciplinary goals of the two B.S. degrees. Likewise, the Human Geography B.A. Track within Geography is comprised of GEO courses.

In distinction to the existing UK environmental programs, the ENS degree is consciously interdisciplinary. Consequently, in order to fulfill the 5:2:1 Major Requirement, students must select courses that have at least three different departmental prefixes. This will avoid the unlikely possibility of a student creating a "B.A.-like" disciplinary departmental degree through their ENS selections.

It would be highly unlikely that a student would inadvertently, or intentionally, take courses within the ENS Program that would somehow overlap significantly with the NRES B.S. degree. B.A. degree programs, such as the ENS degree, are, by design, broad-based with substantial flexibility in the courses that students could choose. By contrast, a B.S. degree program is more structured, with clearly defined math and science pre-Major and Major requirements and focused on a disciplinary subject, or range of subjects, in the sciences. The NRES B.S. degree requires that students take nine credits in Analytical Skill Development in either of the areas of Economic and Policy Analysis or Field and Laboratory Analysis of Ecosystems and nine credit hours in one of the Environmental System Emphasis Areas of: Conservation Biology, Human Dimensions and Natural Resource Planning, Environmental Soil Science, Water Resources, or Wildlife Management. The ENS "Economics and Policy" Area, by contrast, has six courses out of thirty-four, and "Water Resources six out of twenty-five courses,

in common with the NRES Program. Roughly half of the twelve overlapping courses have prerequisites that are more suitable for a B.S. degree compared to a B.A. degree. Consequently, the ENS B.A. is designed to be attractive and useful to students with an interest in the environmental and sustainability aspects of the humanities and social sciences, while obtaining sufficient knowledge to be conversant with a range of physical science subjects.

Despite the significant differences between a B.A. in ENS and a B.S. in NRES, there could be substantial, mutually beneficial opportunities between the two programs to collaborate and strengthen UK's environmental course and degree options. For example, it would be ideal to have the B.A and B.S. students from both programs participate in new inter-college courses of mutual interest and need.

Students interested in attending UK in order to obtain an environmentally-focused degree would benefit from having all the various UK environmental programs advertised together. This would allow the students to select the programs, or combination of programs, that best fit their interests and aspirations. Such a comprehensive environmental degree advertisement would also advertise UK's strength in environmental subjects.

II. Comprehensive Program Description and Complete Curriculum

A. General Education Requirements

For students in the ENS Program there are some very good courses with direct relevance to an ENS Degree that would fulfill the General Education (UK Core) requirements. These courses are listed below and would be used in advising ENS students during their first year at UK. The two courses preceded by an asterisk are electives in the ENS Area requirements and, importantly, would count towards the A&S requirement for 39 credits at the 300-level and above.

General Education Requirements	Cr
I. Intellectual Inquiry	
a. Humanities	3
b. Natural, Physical, Mathematical Sciences	3
c. Social Sciences	3
d. Creativity & the Arts	3
II. Composition and Communication	
a. CC-1	3
b. CC-2	3
III. Quantitative Reasoning	
a. Quantitative Foundations	3
b. Statistical Inferential Reasoning	3
IV. Citizenship	
a. Community, Culture and Citizenship in US	3
b. Global Dynamics	3
Total Credit Hours	30

With only three of the UK Core sub-categories containing environmental and/or sustainability courses, there will be opportunities for developing new UK Core courses within the ENS Program. This could take place through the ENS 300 Special Topics course. This will be useful to the students in meeting the A&S B.A. requirement for courses at the 300-level and above.

Natural Sciences

GEO 130: Earth's Physical Environment

GEO 135: Global Climate Change

GLY 110: Endangered Planet: An Introduction to Environmental Geology
GLY 120: Sustainable Planet: The Geology of Natural Resources

Social Sciences
SOC 360: Environmental Sociology
SOC 350: Special Topics: Environmental Justice (To become SOC 363 when approved)

Citizenship: Global Dynamics
ANT 225: Culture, Environmental and Global Issues
ANT 311: Global Dreams and Realities in a "Flat World"
GEO 162: Introduction to Global Environmental Issues
SAG 201: Cultural Perspectives on Sustainability

A&S Requirements	Cr
I. Natural Sciences	
a. NS-1	3
b. NS-2	3
II. Humanities	
a. H-1	3
b. H-2	3
III. Social Sciences	
a. SS-1	3
b. SS-2	3
IV. Language (3rd and 4th)	6
V. Free Electives (2x3 cr)	6
VI. Lab or Field Exp.	3
VII. Grad. Writing Req.	3
Total Credit Hours	36

B. College of Arts & Sciences Requirements

The current Environmental Studies courses, ENS 200 and ENS 400, would satisfy the A&S natural sciences requirement. When approved ENS 201 would also qualify as an A&S natural science. The lists of ENS Area electives contain many other possibilities for satisfying the A&S requirements. Courses with the prefixes, BIO, CHE, and GLY would satisfy the A&S natural Sciences requirement. The ENS Core Requirement, PHI 336, will satisfy one of the A&S humanities requirements. ENG 205, however, would not. There are ENS Area courses with the prefixes, ANT, ECO, GEO, PS, and SOC that would satisfy the A&S social sciences requirement. This will provide the students a great deal of flexibility in meeting the A&S requirement of completing 90 credit hours in A&S or 120 credit hours acceptable to A&S, and make graduation within four years easily achievable.

C. ENS Core Requirements

The Core courses are designed to introduce the students to a broad range of environmental topics, policy needs, current issues, and fundamental environmental knowledge. ENS 201 and ENS 202 will serve as introductory courses to provide a foundation in environmental and sustainability studies within the humanities, social and natural sciences, and policy. Most importantly, the students will learn, in their first year of study, that the concept of sustainability can be applied to all academic subjects. The Advisory Board has selected a single

Required Core Courses		
Course	**Cr**	**Title**
ENS 201	3	Environmental & Sustainability Studies I: Humanities and Social Sciences
ENS 202	3	Environmental & Sustainability Studies II: Natural Sciences and Policy
ENG 205	3	Intermediate Writing
ENS 300	3	Special Topics in Environmental Studies
PHI 336	3	Environmental Ethics
ENS 400	3	Capstone Course: Senior Seminar in Environmental & Sustainability Studies
Total	**18**	

textbook, Environmental Science (8th Edition) by Daniel Chiras, to use for ENS 201 and ENS 202. Among the multitude of potential textbooks that are available, and despite the term "Science" in the title, Chiras' book had the best coverage of environmental studies and sciences information. The book has two other critical features: 1) It contains organized, thought-provoking sections designed to introduce and practice Active Learning techniques, and 2) sustainability is linked to the basic textual information from the first chapter through the last. ENS 201 and 202 will thereby provide an ideal foundation upon which to build the student's capabilities in environmental studies and sustainability.

D. Core Course Descriptions

1. ENS 201 - Environmental & Sustainability Studies I: Humanities and Social Sciences

This new course exposes students to core ideas, theoretical concerns and practical approaches to environmental studies framed within the disciplines of the humanities and social sciences. Students will study human interactions with the environment, both natural and built, and inter-human relations conditioned by local and global environmental factors. Core ideas surveyed in this class include: the meaning of an environmental philosophy, historical and cultural perspectives (Eastern and Western philosophies) of nature, the social construction of nature, environmental justice, environmental racism, local-global linkages, population, consumption and commodity chains, and political ecology. The New Course Form and Syllabus for ENS 201 is included in this document.

Student Learning Outcomes**.** Upon completion of this course students will be able to:

1. Explain the differences in historical, cultural, and philosophical traditions towards the environment.
2. Analyze and critique a specific sustainability management program instituted at the local level.
3. Evaluate the roles that stakeholder and societal diversity play in environmental concerns.
4. Explain how and why environmental toxins and hazards disproportionately affect people of color, low income communities, women, and people of the Global South.
5. Analyze the link between local and global environmental concerns.
6. Apply knowledge gained through the course to reveal social, cultural, gendered, racial and other dimensions of diversity to a given environmental issue (such as a "commodity chain").

2. ENS 202 - Environmental & Sustainability Studies II: Natural Sciences and Policy

This second new course is an introduction to Natural Science and Policy as they pertain to understanding environmental concepts and sustainability issues. The core ideas include understanding how the ecological theories of population dynamics, community structure, and ecosystem dynamics lay a scientific foundation to understanding the nature of current environmental issues and how they might be addressed individually and through governmental legislation. The course will provide core concepts that will be utilized and developed further in the degree electives. The New Course Form and Syllabus for ENS 202 is included in this document.

Student Learning Outcomes**.** Upon completion of this course students will be able to:
1. Understand basic ecological theory from a scientific perspective.
2. Explain the reasons for existing environmental problems.
3. Understand different approaches and strategies to solve existing environmental problems.
4. Show how environmental policies require fundamental scientific developments.
5. Understand the implications of environmental policies for the public well-being.

3. ENG 205 - Intermediate Writing

This nonfiction writing course will train students to improve their writing and critical thinking skills in the context of environmental issues. The course could also incorporate engagement activities, particularly through the study of Robinson Forest in sections taught by Erik Reece. The underlying goal of making this a required course is to train students to be able to communicate effectively in writing, a skill that is particularly critical when describing environmental subjects. The students will also be required to make oral presentations related to their writing assignments. The course will further develop students' critical thinking skills and ability to conduct independent scholarly research.

Student Learning Outcomes**.** Upon completion of this course students will be able to:

1. Understand the origins and purposes of environmental writing.
2. Write effective, clear, and concise descriptions of environmental subjects.
3. Communicate effectively, in written and oral form.
4. Write literature reviews for specific, targeted audiences.
5. Observe the importance of clear, factual writing in educating the public.

4. ENS 300 - Special Topics in Environmental & Sustainability Studies

This course will serve two primary purposes within the ENS B.A. Degree:

a) It will provide a means of introducing new courses that are needed within the Major Requirements within the Degree Themes. For example, the Program needs an Ecology course that does not have the requirements associated with BIO 325 (prerequisites: BIO 150 and BIO 152). A new Ecology course could be created, with approval and assistance from the BIO department, as ENS 300 with a title such as Special Topics: Ecosystems. Once approved and given a specific course number (3XX) the course could be cross-listed within Biology as BIO 3XX. It would have the *minimum* prerequisites of ENS 201 and ENS 202. After successfully being offered and with commitments to continue offering the course regularly, it would be listed under the Areas of "Ecosystems" and "Water Resources" in the listing of Major Courses.

b) The course will allow the introduction of new, important topics into the degree program, possibly on a multi-year basis or more frequently. With approval from the Advisory Board the course could become listed in the appropriate Major Requirement Theme. For example, Prof. Yanarella has created the course: "Urban Sustainability in North America" as PS 391 and cross-listed as ENS 300. Sustainability is a primary theme within the ENS Degree program. However,

there are very few courses currently offered at UK that focus on this critical theme. Another course that might be taught within ENS 300 is Prof. Atwood's DSP 130 course: "Energy and Sustainability" where unsustainable energy use is contrasted with renewable energy sources. This course, or one similar in content, is needed in the "Energy and Land" Area of Expertise.

5. PHI 336 - Environmental Ethics

This course will provide an introduction to moral problems that arise in human interaction with the natural environment. Topics to be addressed include questions such as: what is man's place in nature? Do nonhuman animals or ecosystems have intrinsic moral worth, and if so, how can it be respected? What problems and ambiguities arise in attempting to live in an environmentally responsible fashion? How can we adjudicate conflicts between social and environmental values?

Student Learning Outcomes:

1. Account for one's own connection to local, regional, and global community
2. Identify and differentiate the historical and cultural presuppositions underlying different ethical standpoints
3. Analyze ethical issues pertaining to the environment as they arise both in public policy and regarding individual lifestyle
4. Formulate potential responses to these issues based on widely respected ethical theories such as utilitarianism, deontology, virtue ethics, social constructivism, and feminist critique
5. Evaluate the strengths and weaknesses of a range of such responses
6. Evaluate different environmental strategies implemented on both a regional and a global scale
7. Defend one's own view on these issues.

6. ENS 400 - Capstone Course in Environmental and Sustainability Studies

ENS 400 will be the culmination of the students' activities in the ENS Major. It will be taught by a single instructor. This will be the course where the student's training, education, and engagement are applied to a specific project (activity or study) of the student's own choosing. It will create the transdisciplinary learning that is the over-arching goal of the entire Program. The students will use the skills they have developed, their fundamental knowledge of core concepts, and Area expertise, to complete a Capstone Project. The Capstone Project could be one of the many activities the Office of Sustainability at has identified for UK's campus or one that the students identify and create themselves, either individually or as teams of students.

The Capstone Project will be planned and conducted during the semester the students take ENS 400. However, the students will be encouraged to think about and start planning their Capstone Projects when they take ENS 201, ENS 202, ENG 205, and PHI 336. The ENS Website will provide information and guidelines about the Capstone Project. After the ENS Program has been in operation, the Capstone Projects conducted by previous graduates will located on the ENS Website to provide guidance for future students. The students could, as an option, begin their Capstone Project through ENS 395 with approval from the Director. The Capstone Project must be completed before the end of the semester in which ENS 400 is taken.

Descriptions of the Capstone Projects will be placed on the ENS Website. This would include the student's presentation describing the Project and, when appropriate, the student's written description of the Project. The deliverables for this project will be:

1. Oral presentations and discussions with peers during the course meeting times (these will ideally be set for longer periods, as in a Wed. class from 2-4:30 p).
2. A presentation, using visual or audio media, describing the entirety of the Capstone Project. The presentation will be prepared in a format suitable to have it located on the ENS Website.
3. A written description of the project in the format of a *Kaleidoscope* article. As appropriate, the written description may be submitted to *Kaleidoscope* for publication.

7. ENS 395 - Independent Study (Optional Elective)

This optional course will have a variety of potential uses including having the students contribute to campus sustainability projects, engagement activities on and off campus, independent research (writing projects for publication in Kaleidoscope, and other scholarly publications, laboratory research related to sustainability, field studies, etc.). The Independent Study course could be used to develop and begin projects that would be described, discussed, and debated in the Capstone Course, ENS 400. ENS students will be introduced to ENS 395 in their first year and, ideally, begin thinking about and planning their own project. The first-year students will be encouraged to participate in ongoing ENS 395 projects to whatever extent they are able. Examples of activities the students could engage in, with support from UK's Sustainability Coordinator, Shane Tedder, are listed below.

Where appropriate the EPA P3 (People Prosperity and the Planet-http://www.epa.gov/P3) program will be investigated as a potential source of funding for these projects. The UK Student Sustainability Council (http://www.sustainability.uky.edu/SSC) will be invited to partner with the ENS Program for the projects. Other campuses develop RFPs to send out to local organizations to solicit project proposals.

Potential Independent Study and/or Capstone Projects

i. Carbon Emission Inventories and Comparisons. These could be at individual through institution levels. Emission inventories are a very relevant skill set and are frequently referenced in popular and peer-reviewed literature. They are also required in some circumstances by the EPA and are a major component of the American College and University President's Climate Commitment.

ii. Craft, conduct and analyze a survey of campus attitudes and behaviors toward certain ideas, products or behaviors. This could range from transportation choices, to food choices, to computer settings and printing defaults.

iii. Research the human/economic/ecologic impacts of the textile products (uniforms, sweatshirts etc) that are licensed to bear the UK brand. This could take many forms and investigate many issues including: labor conditions, economic impacts on the state, environmental impact of production transportation and marketing, and consumer awareness of implications (what do they know, what do they care about).

iv. Conduct an Environmental Impact Report of a proposed campus renovation or new construction.

v. Develop proposals for increasing participation in UK's Recycling Program. This could include strategic systemic changes to the existing system. It should include a triple-bottom-line analysis of the impacts of recycling on our campus. Partnership with industry could allow for pilot testing of new student-generated ideas.

vi. Get on the bus. Design a deployable marketing and public relations campaign to encourage students and staff to use public transportation. This would address the City of Lexington's goal to improve traffic conditions and impacts in Lexington.

vii. What does carbon neutral look like at UK? Using existing utility data and projected growth develop multiple scenarios in which the University achieves a net zero balance in carbon emissions while meeting current/projected needs.

viii. Conduct research to determine barriers to behavior change that is sustainability-oriented (though not necessarily sustainability motivated) among different sectors of UK's population.

ix. Ecological Literacy. Do UK students have it? Do they learn it here? Do they need it? What are the best channels to deliver it?

x. Begin an evaluation of Organic Farming with a visit to the local Farmer's Market. Determine what the impact would be to UK and the local economy if all of UK's food was purchased from organic farms. How could this be achieved?

E. Major Requirements

Courses will be offered in the five Areas of Expertise: 1. Economics and Policy, 2. Ecosystems, 3. Energy and Land, 4. Society, and 5. Water Resources. These are listed below and on the following pages. The requirement is that 21 credits must be taken, with fifteen credits in one Area, two credits in a second Area and one credit in a third Area. This is the "5:2:1" Rule for the ENS B.A. Degree. The courses selected for the Major Requirements must have at least three different departmental designations in keeping with the interdisciplinarity that is the basis of the ENS B.A. Moreover, this requirement prevents a student from using the ENS B.A. to obtain a "disciplinary-like" degree without taking the core requirements for the disciplinary degree. The Areas of Expertise are designed to be very general in order to ensure that the topics incorporated aspects of traditional disciplinary subjects, while not being restricted by such boundaries. The course listings are sufficiently extensive to maximize the students' ability to craft a B.A. degree according to their interests and career goals, while remaining within a structured program. Thematic Concentrations will be developed based on the clusters of courses selected by the students that provide the greatest career potential. This will allow the Program to evolve over the years in step with the changing nature of environmental and sustainability issues and needs. It is anticipated that the ENS Program will eventually become defined by the Thematic Concentrations and that the designation of Areas of Expertise will primarily serve as a means of organizing the courses. More information on the Thematic Concentrations is provided in Section F.

1. Economics and Policy Area of Expertise Course Listing

A sustainable balance must be made between economic gain and protection of natural resources. Governments must determine policy and institute laws to provide the necessary protection of natural resources, and provide the guidelines for any development. The courses in this Area will provide the students with training in the interconnectedness of economics, policy and development. The students will have the freedom to select clusters of courses suited to their career goals. For example, students anticipating careers in business may select more courses related to economics and those planning to go to Law School may focus on policy courses. However, any combination of courses in this Area will provide the necessary foundation for future careers where expertise in business and law are important.

Course	Cr	Title	Prereqs	Offered
ECO 202	3	Principles of Economics II	ECO 201	S,F 10,11
ANT 225	3	Culture, Environment, and Global Issues	none	F10, F11
GEO 231	3	Environment and Development	none	Not in 11
GEO 235	3	Environmental Management and Policy	none	F08, 09, 10, 11
GEO 255	3	Geography of the Global Economy	none	F10, F11
GEO 260	3	Geographies of Development in the Global South	none	S10, S11, F11
FOR 280	2	Forest Policy	none	S11
STA 291	3	Statistical Methods	MA 113, 123	S,F 10, 11
NRC 301	3	Natural Resource Conservation and Management	ENG 104, soph.	F10
AEC 303	3	Microeconomic Concepts in Agricultural Economics	ECO 201	S11, F11
ANT 311	3	Global Dreams and Local Realities in a “Flat” World	none	F10, F11
STA 320	3	Introductory Probability	MA 213	S,F 10, 11
GEO 321	3	Land, People, and Development in Appalachia	GEO 130, 152, or 172	S10, F10, F11
ANT 322	3	Ancient Mexican Civilizations	None	F10
AEC 324	3	Agricultural Law	AEC 101	S,F 10, 11
FOR 325	3	Economic Botany: Plants and Human Affairs	PLS 104, 210 1yrBIO	F08, 09, 10, 11
NRC 330	3	NEPA Compliance	NRC 301 W, CI	Not Yet
ANT 338	3	Economic Anthropology	9h cult. ANT,CI	S07, S09
ANT 340	3	Development and Change in the Third World	none	F05, 07, 09, 11
ANT 375	3	Ecology and Social Practice	none	Not in 10, 11
NRC 381	3	Natural Resource Policy Analysis	NRC 301	S09, S10, S11
ENS 395	3	Independent Study: Economics and Policy	None	Not Yet
ECO 401	3	Intermediate Microeconomic Theory	ECO 202	S,F 10, 11
AEC 424	3	Principles of Environmental Law	AEC 101 or ECO 201	S,F 10, 11
GEO 442G	3	Political Geography	none	S10, F11
AEC 445G	3	Introduction to Resource and Env. Economics	ECO 201	S,F 10, 11
GEO 455	3	Economic Geography	GEO 152, 160 or 172	F10
ANT 470G	3	Regional American Ethnology	ANT 220	F07, F09
ECO 473G	3	Economic Development	ECO 401	S10, F10
AEC 479	3	Public Economics (CL ECO 479)	ECO 401	S,F 10, 11
AEC 483	3	Regional Economics	ECO 202	S10, S11
ANT 532	3	Anthropology of the State	9h cult. ANT CI	Not Yet
AEC 532	3	Agriculture and Food Policy	AEC 305	S07, 08, 10, 11
ANT 543	3	Cultural Resource Management	9h cult. ANT CI	F01, S03
AEC 545	3	Resource and Env. Economics (CL NRC 545)	ECO 201	F08, F09, F10

2. Ecosystems Area of Expertise Course Listing

The courses within this Area will provide a fundamental understanding of ecosystems and the need to interact with natural environments in a sustainable manner. Biology and Ecology are the primary disciplinary bases of this Area.

Course	Cr	Title	Prerequisites	Offered
FOR 219	4	Dendrology	None	F09, F10, F11
FOR 230	3	Conservation Biology	None	F10, F11
ANT 240	3	Introduction to Archeology	None	S09, S10, S11
ENT 300	3	General Entomology	None	F09, F10, F11
BIO 303	4	Introduction to Evolution	BIO 150, BIO 155	F11
BIO 325	4	Introduction to Ecology	BIO 303	S,F 10, 11
GEO 321	3	Land, People, and Dev. in Appalachia	GEO 130, 152, or 172	S,F 10, 11
GEO 331	3	Global Environmental Change	GEO 130 or equiv.	Not Yet
ANT 342	3	North American Archaeology	ANT 240 or CI	not 10, 11
BIO 361	3	Ecology of Kentucky Flora	1yr BIO	F08, F09, F10
BIO 351	3	Plant Kingdom	BIO 150	F09, F10, F11
FOR 340	4	Forest Ecology	BIO 103 or BIO 150	F09, F10, F11
ANT 342	3	North American Archeology	ANT 240 or CI	not 10, 11
FOR 370	4	Wildlife Biology and Management	None	S11
ANT 375	3	Ecology and Social Practice	None	Not 10, 11
BIO 375	3	Behavioral Ecology and Sociobiology	1yr BIO	F09, F10, F11
ENS 395	3	Independent Study: Ecosystems	none	Not Yet
ENT 402	3	Forest Entomology (CL FOR 402)	1yr BIO	F09, F10, F11
GEO 431	3	Political Ecology	None	S11, F11
BIO 452G	2	Laboratory in Ecology	BIO 325	S09, S10, S11
GEO 530	3	Biogeography and Conservation (CL BIO)	6h BIO, Phys Geo, or CI	F09, S11
GEO 531	3	Landscape Ecology	6h BIO, Phys Geo or CI	Not yet
CE 555	3	Microbial Aspects of Env. Engineering	CHE 105, 107, ENGR, CI	F10, F11
BIO 559	4	Ornithology	1 yr BIO	S07, S09
PLS 566	3	Soil Microbiology	PLS 366	S09, 10, 11

3. Energy and Land Area of Expertise Course Listing

Obtaining energy from non-renewable sources typically involves land use. Forests have historically been humans' primary source of energy, and continue to be a source of fuel (albeit minor) throughout the world. Coal mining, particularly surface mining, causes substantial changes to land features, and their associated ecosystems. With the emergence of tar sands and shale oil as sources of petroleum, the need to understand the connection between energy and land has grown more important. The listing of courses in this Area will provide a multidisciplinary education in this subject area. To supplement the absence of energy courses in this list, additional courses on this subject will be offered through ENS 300. For example, Prof. Atwood's DSP-130 course, "Energy and Climate" could be easily modified to provide a stronger emphasis on traditional and renewable energy sources.

Course	Cr	Title	Prerequisites	Offered
GLY 220	4	Principles of Physical Geology	None	S,F 10, 11
ANT 225 *OR*	3*	Cultural, Env., Global Issues	None	F10, F11
GEO 231 *OR*	3*	Environment and Development	None	Not in 11
GEO 235	3*	Environmental Management and Policy	None	F08, 09, 10, F11
PHY 231	4	General University Physics	MA 113	S,F 10, 11
ANT 240	3	Introduction to Archeology	None	S09, S10, S11
EGR 240	3	Energy Issues (as EGR 199 SR)	Engr. Standing, CI	F10
FOR 240	2	Forestry and Natural Resource Ethics	None	S11
HIS 240	3	History of Kentucky	None	S,F 10, 11
ANT 241	3	Origins of Old World Civilization	None	S10, S11
ANT 242	3	Origins of New World Civilization	None	F10, S11, F11
STA 291	3	Statistical Methods	MA 113 or 123	S,F 10, 11
GEO 321 *OR*	3*	Land People and Development in Appalachia	GEO 130, 152, or 172	S10, F10, F11
GEO 322	3*	Geography of Kentucky	GEO 152, 160, or 172	infrequent
GEO 331	3	Global Environmental Change	GEO 130	Not Yet
ANT 340	3	Development and Change in the Third World	None	F05, 07, 09, 11
GLY 341 *OR*	3*	Landforms	GLY 220	S01, S02, S03
GEO 351	3*	Physical Landscapes	GEO 130	S,F 10, 11
ANT 351	3	Special Topics: Appropriate Subtitle	tbd	F11
GLY 360	4	Mineralogy	CHE 105, GLY220 and GLY 230 or 235	S11
ENS 395	3	Independent Study: Energy and Land	None	Not Yet
ENG 401	3	Nature Writing	2yrENG	S10
BAE 504	3	Biofuels Production and Properties	BAE 503	F10, F11
GEO 531	3	Landscape Ecology	6h Phys. Geogr. or BIO	Not Yet
GEO 550	3	Sustainable Resource Development and Environmental Management	GEO 130 or 210	Not Yet
CHE 565	3	Environmental Chemistry	CHE 105, 107	S08, 09, 10, 11

*Only one of the courses marked with an asterisk and separated by "or" can be taken.

4. Society Area of Expertise Course Listing

This Area explores the way that human society interacts with the environment. Recent research has revealed "coupled human- natural systems" (as labeled by NSF) are a primary driver of environmental change, and also a key source of solutions to environmental problems. This Area will build students' knowledge base of the mutually influencing human-environment dynamic, with a solid grounding in the social sciences.

Course	Cr	Title	Prerequisites	Offered
SAG 201	3	Cultural Perspectives on Sustainability	None	S10, S11
LA 205	3	Introduction to Landscape Architecture	None	S08, 09, 10, 11
ANT 221	3	Native People of North America	None	S09, 10, 11
ANT 225	3	Culture, Environment, and Global Issues	None	F10, F11
GEO 231	3	Environment and Development	None	F11
ANT 245	3	Food, Culture, and Society	None	Not Yet
GEO 285	3	Introduction to Planning	None	S10, F10, F11
SOC 302	3	Sociological Research Methods	SOC	S,F 10, 11
ANT 303	3	Topics in Anthropology of Food	None	Not Yet
ANT 311	3	Global Dreams and Local Realities	None	F10, F11
ARC 314	3	History and Theory: 20th Century and Contemporary Architecture	ARC 111, 212, 231	F08, 09, 10, 11
ARC 315	3	History and Theory: Urban Forms	ARC 314, or CI	S09, 10, 11
ARC 325	3	Theories of Urban Forms	None	Not Yet
GEO 321	3	Land, Development, & People in Appalachia	GEO 130, 152 or 172, or IC	S10, F10, F11
GEO 331	3	Global Environmental Change	GEO 130 or CI	Not Yet
ANT 340	3	Development and Change in the Third World	None	F05, 07, 09, 11
ANT 342	3	North American Archeology	ANT 240 or CI	Not in 10, 11
SOC 350	3	Special Topics: Environmental Justice (This Topic to become SOC 363 if approved)	SOC 101, CLD 102 or ENS 201	F10, S11, F11
SOC 360	3	Environmental Sociology	SOC 101 or CLD 102	S,F 10, 11
PHI 361	3	Biology and Society	3 hr BIO or CI	S09, S10, S11
ANT 375	3	Ecology and Social Practice	None	Not in 10, 11
SOC 380	3	Globalization: A Cross-Cultural Perspective	SOC 101 or CLD 102	S,F 10, 11
PS 391 ENS 300	3	Urban Sustainability in North America	none	Su 09, 10, 11
ENS 395	3	Independent Study: Society	None	Not Yet
SOC 420	3	Sociology of Communities	SOC 302 or 304 or CLD 405 or CI	S10, F10, S11
ANT 431G	3	Culture and Society in Sub-Saharan Africa*	ANT 220 or CI, *change ANT 326	S11
GEO 431	3	Political Ecology	None	S11, F11
ANT 470G	3	Regional American Ethnology	ANT 220 or CI	F09
GEO 485G	3	Urban Planning and Sustainability	GEO 285 or CI	S09, F09, S11
PS 491	3	Sustainable Urban Design	none	F06
SOC 517	3	Rural Sociology	CI	F06, F08, F10
ANT 525	3	Applied Anthropology	9 hr ANT or CI	S04, F07, S08
SOC 534	3	Sociology of Appalachia	CI	F10, S06, S07
ANT 545	3	Historical Archeology	ANT 240	S11
ANT 555	3	Eastern North American Archeology	ANT 240	S11

5. Water Resources Area of Expertise Course Listing

Students taking courses in this Area may select clusters that are more human-oriented with conservation, policy, and literature offerings, or more science-oriented with geography, geology, and engineering offerings. Water is expected to become a limited resource in the near future as the Earth's population continues expanding. Thus, graduates with training in the various aspects of water resources (sources, conservation, policy, economics, human impacts) will become more valuable with the coming years.

Course	Cr	Title	Prerequisites	Offered
GLY 210	3	Habitable Planet: Evolution of the Earth System	None	S05, 06, 07
GLY 220	3	Principles of Physical Geology	None	S,F 10, 11
ANT 225	3	Culture, Environment, and Global Issues	None	F10, F11
ANT 240	3	Introduction to Archeology	None	S09, S10, S11
GEO 230	3	Weather and Climate (CL ANT)	GEO 130	F08, 09, 10, 11
ENG 232	3	Literature and Place	None	S10, F10, S11
GEO 235	3	Environmental Management and Policy	None	F08, 09, 10
NRC 320	3	Data Collection Techniques	BIO 150, 152, CHE 105	F08, 09, 10, S11
GEO 331	3	Global Environmental Change	GEO 130	Not Yet
ENG 336	3	Appalachian Literature	None	F10, S11
GLY 341	3	Landforms	GLY 220	S01, 02, 03
GEO 351	3	Physical Landscapes	GEO 130	S,F 10, 11
GLY 385	3	Hydrology and Water Resources	GLY 220	F09, F10, F11
ENS 395	3	Independent Study: Water Resources	None	Not Yet
ENG 401	3	Special Topics: Nature Writing	UK WRITING REQ	S10
GEO 451G	3	Fluvial Forms and Processes	GEO 351 or GLY 341	S09, S10, F11
NRC 455G	3	Wetland Delineation	BIO 150, 152	F07, 08,09,10
FOR 460G	3	Forest Watershed Management	CHE 104, MA 109, FOR 200, PLS 366	F08, 09, 10, 11
GEO 530	3	Biogeography and Conservation	None	F09, S11
GLY 530	3	Low-Temperature Geochemistry	GLY 360, MA114 or CI	F09, 10, 11
BAE 532	3	Introduction to Stream Restoration	CE 341, ENGR or CI	S08, 09, 11
BAE 538	3	GIS for Water Resources	BAE 347, CE 461G, CI	F08, 09, 10, 11
CE 555	3	Microbial Aspects of Env. Engineering	CHE 105, 107, Engr. CI	F10, F11
CHE 565	3	Environmental Chemistry	CHE 105, 107	S08, 09, 10, 11
GLY 585	3	Hydrogeology	GLY 220 ,MA 113or123	S08, 09, 10, 11

F. Course Listings for Examples of Thematic Concentrations

As an option, students may create their own **Thematic Concentration** by taking a cluster of related courses within an **Area of Expertise**. Examples of two of these are shown on this and the following page. The students will not be required to select a Theme; these will be provided so the students can easily determine what courses are most relevant for the subject they are most interested in. This will also provide insight into which faculty mentors would be most suitable to collaborate on the student's ENS 395 and ENS 400 project. Another outcome from the use of informal Themes will be to more readily determine what courses are needed to strengthen a nascent Theme, or to identify the courses that are needed to create a Theme that would strengthen the Program. Some examples of potential future Themes are shown in section 3. Additional Thematic Concentrations will be identified over the coming years based upon the clusters of courses selected by the students. It is anticipated that each Area of Expertise will ultimately have a group of associated Themes that will be useful in advertising the Program, and again, to provide guidance for the students' selection of courses.

1. Environmental Justice (within Society Area of Expertise)

This theme explores in detail the power issues and social inequalities tied to environmental change, problems and crises, and pathways for a more just society in relation to the environment. Particular attention is given to the ways that environmental risks and hazards disproportionately affect people of color, low income communities, women, and people of the Global South, as well as the ways that power plays out across social and environmental landscapes.

Course	Cr	Title	Prerequisites	Offered
ANT 225	3	Culture, Environment, and Global Issues	None	F10, F11
GEO 231	3	Environment and Development	None	F11
ANT 311	3	Global Dreams and Local Realities in a "Flat" World	none	F10
GEO 321	3	Land, People, and Development in Appalachia	GEO 130, 152, or 172	S10, F10, F11
ENG 336	3	Appalachian Literature	None	F10, F11
SOC 350	3	Special Topics: Public Sociology (to become SOC 363: Environmental Justice)	SOC 101/ CLD 102 or ENS 201	S,F 10, 11
GEO 321	3	Land, Development, & People in Appalachia	GEO 130, 152 or 172, CI	S10, F10, F11
ANT 340	3	Development and Change in the Third World	None	F07, 09, 11
SOC 380	3	Globalization: A Cross-Cultural Perspective	SOC 101 or CLD 102	S10, F10, S11
GEO 431	3	Political Ecology	None	S11, F11

2. The Built Environment (within Society Area of Expertise)

Courses within this Theme will describe how urban and rural development currently takes place and emphasize the need, and means, of creating more sustainable places for human habitation. For example, a substantial portion of the global energy demand is lost due to inefficiencies in commercial and residential buildings. "Urban sprawl" has progressed essentially without limit, and has threatened the very qualities of the regions that made them attractive for living and working to begin with. The expertise provided in this Area will be critically needed as the Earth's cities continue to grow, and the natural resources these cities rely upon, become less readily available.

Course	Cr	Title	Prerequisites	Offered
LA 205	3	Introduction to Landscape Architecture	None	S08, 09, 10, 11
GEO 222	3	Cities of the World	None	S,F 10, 11
GEO 285	3	Introduction to Planning	None	S10, F10, S11
ANT 311	3	Global Dreams Local Realities in a "Flat" World	None	F10, F11
ARC 314	3	History and Theory: 20th Century and Contemporary Architecture	ARC 111, 212, 231	F08, 09, 10, 11
ARC 315	3	History and Theory: Urban Forms	ARC 314, or CI	S09, 10, 11
ARC 325	3	Theories of Urban Forms	None	Not Yet
ANT 340	3	Development and Change in the Third World	None	F05, 07, 09, 11
PS 391/ENS 300	3	Urban Sustainability in North America	None	Su 09, 10, 11
SOC 420	3	Sociology of Communities	SOC 302 or 304 or CLD 405 or CI	S10, F10, S11
GEO 422	3	Urban Geography	GEO 152, 160, 172 or 222, or CI	F08, F09, S11, F11
GEO 485G	3	Urban Planning and Sustainability	GEO 285 or CI	S09, F09, S11
PS 491	3	Sustainable Urban Design	None	F06
GEO 545	3	Transportation Geography	GEO 455 or CI	F03, 04, 05

3. Other Potential Thematic Concentrations

The coursework organization by **Areas of Expertise** allows for the identification of various new **Thematic Concentrations**. The identification of a particular Theme could be based on a combination of instructor interests, student interests, and career potential. The thematic concentrations would ideally be in areas that are of particular interest to participating faculty who could serve as mentors during a student's time in the Program, and potentially as a research advisor for the ENS 395 option (and departmental ---395 research). For example, the Themes of "Environmental Justice" and "The Built Environment" were based on the specific interests of Profs. Bell and Yanarella, respectively. It is anticipated that several important new Thematic Concentrations will be identified shortly after students begin the program. Thus, the Themes can be tailored to a student's interest. Finally, the Themes can be organized around subjects for which there is significant career potential. These could be identified by the External Advisory

Board (with members from state and federal government, and corporations) and by graduating ENS students (some of whom should be included in the External Advisory Board). A list of potential future themes is provided here:

i. Economics and Policy: Resources and Products, Commodity Chains, Life Cycle Assessment
ii. Ecosystems: Biodiversity, Conservation, Invasive Species
iii. Energy and Land: Global Climate Change, Renewable Energy, Robinson Forest, Mining
iv. Society: Environmental Health, History of Environmental Issues, World Citizenship
v. Water Resources: Water Contaminants, Water Conservation.

G. Measures of Student Success

1. Student Learning Outcomes

i) Curriculum Map

The specific targeted outcomes for the Program and the courses where the outcomes are addressed are shown in the Table below. The outcomes will provide the students with the four key characteristics that are the general goals of the College of Arts & Sciences. These are: innovative preparation for life and career, multidisciplinary scholarly research, connectivity with the world, and substantive community involvement (*Ampersand*: Envision 2020, fall 2010). Specific outcomes will be associated with developing skills and knowledge that the students will utilize to build successful careers and to live healthy, productive lives as global citizens. This will be an evolutionary process and will keep pace with the continuous changes taking place in the human-nature relationship. The Advisory Board will assess the Outcomes at the end of each semester and make any changes that are identified. The Tables shown on the next two pages represent the ENS Curriculum Map for the Core courses and the five Areas of Expertise.

ii) Annual Student Learning Outcomes

Year One: After taking ENS 201 and ENS 202 the students will demonstrate a basic understanding of all the most significant environmental concepts and issues in the areas of the humanities, social and natural sciences, and policy. They will understand the connection between economics and natural resources in the context of sustainability. The specific Outcomes expected are listed in the Table on the previous page.

Years Two and Three: The students will take the Core courses, ENG 205, ENS 300, and PHI 336, in this time period. This group of courses will substantially develop the students' basic "Skills and Training" Outcomes (Section A. in the Table above). At the end of years 2 and 3 the students will demonstrate an ability to think critically, communicate effectively, and conduct independent research. The students will demonstrate an understanding of sustainability, what it means, where it is needed, and begin thinking about how to achieve sustainability-oriented goals. The students will have begun taking their Area courses and started developing an expertise in the Area of their choice. Sustainability will be a significant component of the Core courses, and the students will be able to apply concepts of sustainability to other courses they are taking.

Year Four: The learning outcomes will be centered on ENS 400 and the 300-level and above courses the students take in their Area of expertise. The students will demonstrate mastery of sustainability and how the concept relates to subjects in the humanities, social sciences, and natural sciences. They will be able to use their skills and training to demonstrate this mastery. They will demonstrate an ability to apply sustainability concepts to achieving the goals of their Capstone Project. The students will demonstrate expertise in a specific, single Area of study, and general knowledge in two other Areas.

Curriculum Map	Core Courses						Areas of Expertise				
I = Outcome is Introduced R = Outcome is Reinforced E = Outcome is Emphasized L = Reinforcement Likely	ENS 201: Hum. & Soc. Sci.	ENS 202: Nat. Sci. & Policy	ENG 205: Intermed. Writing	ENS 300: Special Topics	PHI 336: Environ. Ethics	ENS 400: Capstone Course	Economics and Policy	Energy and Land	Ecosystems	Society	Water Resources
Outcomes											
A. Skills and Training											
1. Critical Thinking	I	R	R	R	E	E					
2. Written Communication	I		E	L	E	E					
3. Oral Communication	I	R			E	E					
4. Independent Study	I	I		L	R	E					
5. Research Techniques		I	R		R	E					
B. Core Concepts, Understand											
1. Historical and Current Views of Environment	I		R		E					R	
2. Ethical Theories for Human-Env. Relationship	I				E					R	
3. Impacts of Population on Natural Resources		I						R	R	L	R
4. Link Between Local and Global Impacts	I		R		E		R	L		R	
5. Ecological Theories		I						R	R		R
6. Biological Diversity		I	R					L	R		L
7. Pollution: Local and Global	I	R					R	R	R	R	R
8. Basis of Environmental Problems		I	R		R		R	R	R	R	R
9. Solutions to Environmental Problems		I	R		E		R	R	L	R	L
10. Connection Between Policy and Science		I	R				E	R		L	L
11. Traditional Energy Sources		I					R	R		L	
12. Renewable Energy		I					R	R			
13. Natural Resources		I					R	R	R		R
14. Climate Change and Impacts		I					R	R	L	R	L

All of Section A. Utilized Here

Curriculum Map (continued)	Core Courses						Areas of Expertise				
I = Outcome is Introduced R = Outcome is Reinforced E = Outcome is Emphasized L = Reinforcement Likely	ENS 201: Hum. & Soc. Sci.	ENS 202: Nat. Sci. & Policy	ENG 205: Intermed. Writing	ENS 300: Special Topics	PHI 336: Environ. Ethics	ENS 400: Capstone Course	Economics and Policy	Energy and Land	Ecosystems	Society	Water Resources
Outcomes											
C. Sustainability Knowledge											
1. Natural Resource Consumption	I	R	R	L	L	R	R	R		L	R
2. Conservation Needs		I				L		R	R		R
3. Energy Sources and Use		I				R	R	R		L	
4. Local Management Program	I			L		L	R				R
5. Recycling		I				L	R	L		L	
6. Land Use	I	R	L	L		L	R	R	R	L	R
7. Commodity Chains	I					R	R			R	
8. Appropriate Urban Development	I	R				L	R			R	
9. Agriculture and Food Supply	I	R				L	R	R			
10. Applied to Global Problems	I	R			R	R	R	R	R	R	R
11. Applied to National and State	I	R		L		L	R	R	R	R	R
12. Applied to City and University	I	R		L		R	L				
13. Applied to Community, Individual	I			L	R	R		L		L	L
14. and Global Citizenship	I	R			R	R	R			R	
D. Engagement Activities											
1. University and City	I			L		R					
2. Environmental Organizations	I	R		L		R		L	L		L
3. Study/Conservation of Local Natural Resources		I	R	L	R	R		L	L		L
4. On-Campus Events	I	R		R		R	L	L	L	L	L

2. Student Retention and Success Rate for Completion of Degree

Students will be monitored through the University's APEX Degree Audit system throughout their time in the Program. Each semester the Director will obtain a list of the students in the ENS Program and check their progress. If any problems are found they will be reported to the Advisory Board and the corrective action taken. Student monitoring will be facilitated by the Assessment Plan described in the next section.

H. Program Assessment

1. Oversight by ENS Advisory Board

The Program will be reviewed on the six-year cycle set by the University. The Advisory Board will create additional methods of evaluation and review all of the information that is produced and take the necessary actions.

2. Periodic Assessments

It will be important to foster, monitor, and assess student development as they progress through the Program. This will give the ENS faculty the opportunity to solve problems or correct mistakes the students are making and to better advise the students in selecting courses and making career plans. It will provide the information needed to make changes in the core and elective courses being offered. Furthermore, it will ensure that the ENS students are graduating with the requisite skills and fundamental knowledge to succeed in their eventual careers. This level of attention will lead to greater student success, ensure high-quality graduates, and continually increase the reputation of the Program. The Advisory Board, in conjunction with UK's Assessment Office, will create an Assessment Plan comprising three periodic assessments. These could take place, for example, in the first week of the entry-level course, ENS 201, after the student completes their 3rd Area Course (out of the 5 required in a single Area of Expertise), and in the final week of the Capstone Course, ENS 400. The Table shown on the following page was patterned after the article by Rowles, Ewen, Underwood, and Watkins: "Assessing Professional & Personal Development in Contemporary Graduate Education" (http://www.uky.edu/IRPE/assessment/presentations/Assessment%20Conf-103006.pdf). It will provide the starting point for the ENS Advisory Board to work from.

Periodic Student Assessments						
Evaluation Metrics	**Assessment Schedule**					
	ENS 201 Week 1		**3rd Area Course**		**ENS 400 Final Week**	
	Score	**Mean**	**Score**	**Mean**	**Score**	**Mean**
A. Intellectual Growth						
specific questions						
B. Factual Content						
1. Core Courses: specific questions						
2. Area of Expertise (5): specific questions						
3. Area Breadth Courses (1 each): specific questions						
C. Sustainability Concepts						
specific questions						
D. Critical Thinking						
specific questions						
E. Engagement						
specific questions						
F. Current Events						
specific questions						
G. Personal Growth*						
1. Involvement and Commitment						
2. Emotional Well-Being and Stress Management						
3. Time Management						
4. Physical Health						
***From Rowles, Ewen, Underwood and Watkins**						

III. Resources

A. Commitment from the Dean of the College of Arts & Sciences

*The support letter from Dean Kornbluh is attached as Appendix I

B. Existing Courses (Included as Core Courses within the ENS B.A. Degree)

1. ENG 205 - Intermediate Writing.

Four sections of this course are taught each semester. It will train students to improve their writing and critical thinking skills in the context of environmental issues. The course could also incorporate engagement activities, particularly through the study of Robinson Forest in sections taught by Erik Reece. The underlying goal of making this a required course is to train students to be able to communicate effectively in writing, a skill that is particularly critical when describing environmental subjects. The course will further develop students' critical thinking skills and ability to conduct independent scholarly research. A letter from Prof. Mountford

giving permission to incorporate this course as a Core Requirement in the ENS Degree is attached as Appendix II.

2. PHI 336 - Environmental Ethics.

Robert Sandmeyer and other instructors will teach this course once a semester. It will provide students with the philosophical underpinnings of the most significant environmental sciences that have developed and are still in the process of evolving today. The course will provide the ethical basis for understanding the relationship of humans to the environment. The course also has an underlying goal of developing students' critical thinking skills and will incorporate a significant amount of independent scholarly research. A letter from Prof. Bradshaw giving permission to incorporate this course as a Core Requirement in the ENS Degree is attached as Appendix III.

C. New Courses

ENS 201 and ENS 202 were created specifically for the ENS B.A. Degree Program. They are designed to provide a foundation in social sciences and humanities (ENS 201) and natural science and policy (ENS 202). The two courses may be taught by members of the Advisory Board, or other faculty or instructors, with expertise in the areas covered by the two courses. The concepts that will be learned in the two courses will be expanded and developed more fully in subsequent courses. The textbook, Environmental Science 8th Edition by Chiras, was chosen primarily because it integrated sustainability throughout each chapter and was one of the few textbooks that included the social implications of environmental impacts. Sustainability is the underlying theme for the ENS B.A. degree. Additionally, the textbook included active learning exercises and "point-counter point" discussions in each chapter.

D. Potential New Courses

1. BIO 3XX: Ecosystems. During the planning of the ENS Degree it became apparent that a general Ecology course was needed (BIO 3XX) that did not have the prerequisites of the existing Biology courses covering this subject. This course would substantially strengthen the coursework in the Ecosystems Area of Expertise. The development of this course would require the approval and assistance of the BIO department.

2. ANT 3XX: Environmental Archeology. Changes in climate, abrupt and long-term, have had critical impacts on past regions and civilizations. Moreover, humans have induced local environmental changes that have often been beneficial, but more frequently detrimental. Through new techniques, and access to areas of the world not previously open to study, Archeology has steadily revealed important information about the how humans interacted with their local environments in the past. Interest in Environmental Archeology (a sub-discipline of Anthropology) has grown substantially in the past decade since it provides detailed information on how past societies have responded to climate change. Lessons from the past should be used as guides and warnings for behaviors today. This new archeology course will teach students how detailed environmental information is obtained through archeological techniques to provide an understanding of the human-environment relationship over long periods of time.

3. HIS 3XX: Environmental History of "Region". The Advisory Board also noted the absence of "Environmental History" courses. Courses on this subject could be named "The Environmental History of X" where X = a region or country. Understanding what has happened to past societies can provide critical information about how societies today should respond to environmental changes. A recently published book on this subject could be used as a starting point for such a course: *The Retreat of the Elephants: An Environmental History of China* (Mark Elvin, 2004). This course would be distinguished from the ANT course, "Environmental Archeology" through the use of print media (historical documents and works of art) to elucidate how past civilizations viewed and chronicled environmental changes, and their associated responses. It could utilize and synthesize factual information obtained through environmental archeology techniques.

4. Energy Courses. The "Energy and Land" listing of courses would benefit from having a new course that specifically describes conventional and renewable energy sources. Prof. Atwood's existing DSP-130 course "Energy and Sustainability" would be ideally suited for this purpose and could be taught as ENS 300. Courses at the 300 and 400 levels could be taught by Engineering faculty, including those in the Center for Applied Energy Research (CAER).

5. Theme-Specific Courses. Specific Themes would be potentially based on the interests or courses of specific faculty or groups of faculty. For example, The Built Environment Theme was inspired by a course created by Prof. Yanarella titled: "Urban Sustainability in the United States and Canada". The Environmental Justice Theme originated from the interests of Prof. Bell who developed and taught a new special topics (SOC 350) course in fall 2011 titled "Environmental Justice". When approved, this course will be taught regularly as SOC 363: Environmental Justice.

6. Research Methods Course(s). There are disciplinary courses that teach students how to conduct research such as ANT 490: Anthropological Research Methods, GEO 300: Geographic Research and SOC 302: Sociological Research Methods. All research methods courses incorporate some interdisciplinary aspects but are ultimately focused, necessarily, on the disciplinary subject. Research Methods in Environmental & Sustainability Studies will have components of most, if not all the disciplines in A&S. This would include, at a minimum, training students to read, understand, critically assess, and utilize information from print and verbal media (and possibly visual media). For research where data is obtained, it would be ideal for the students to have a foundation in the application of statistics in drawing factual, reasonable conclusions from the information they generate or gather. Thus, the new Research Methods course would most likely comprise fundamental concepts and techniques from A&S disciplinary departments and, where applicable, coupled with statistical analyses.

7. TOX 3XX. Prof. Mary Vore, Chair of Toxicology, has expressed an interest in potentially developing a course on the subject of Environmental Human Health.

NEW UNDERGRADUATE PROGRAM FORM

(Attach completed "Application to Classify Proposed Program"[1])

1. General Information:

College:	Arts & Sciences	Department:	N/A Degree is trans-departmental
Major Name:	Environmental & Sustainability Studies	Degree Title:	Bachelor of Arts
Formal Option(s), if any:	Areas of Expertise: 1) Economics and Policy 2) Ecosystems 3) Energy and Land 4) Society; 5) Water Resources	Specialty Field w/in Formal Options, if any:	Thematic Concentrations can be created by students in any Area of Expertise. Examples are: 1) Environmental Justice 2) The Built Environment

Date of Contact with Assoc. Provost for Academic Administration[1]:	Sept. 20, 2010	Today's Date:	Nov. 17, 2011
Accrediting Agency (if applicable):	CPE		
Requested Effective Date:	☐ Semester following approval. OR	☒ Specific Date[2]:	Aug. 1, 2012

Contact Person in the Dept:	Prof. David Atwood Mrs. Kari Burchfield	Phone:	257-7304 257-1994	Email:	datwood@uky.edu klburc2@uky.edu

2. General Education Curriculum for this Program:

The new General Education curriculum is comprised of the equivalent of 30 credit hours of course work. There are, however, some courses that exceed 3 credits & this would result in more than 30 credits in some majors.

- There is no foreign language requirement for the new Gen Ed curriculum.
- There is no General Education Electives requirement.

General Education Area		Course	Credit Hrs
I. Intellectual Inquiry (one course in each area)			
Arts and Creativity		Any	3
Humanities		Any	3
Social Sciences		Any	3
Natural/Physical/Mathematical		Any	3
II. Composition and Communication			
Composition and Communication I		CIS or WRD 110	3
Composition and Communication II		CIS or WRD 111	3
III. Quantitative Reasoning (one course in each area)			
Quantitative Foundations[3]		Any	3
Statistical Inferential Reasoning		Any	3
IV. Citizenship (one course in each area)			
Community, Culture and Citizenship in the USA		Any	3

[1] Prior to filling out this form, you MUST contact the Associate Provost for Academic Administration.

[2] Programs are typically made effective for the semester following approval. No program will be made effective unless all approvals, up through and including Board of Trustees approval, are received.

[3] Note that MA 109 is NOT approved as a Gen Ed Quantitative Foundations course. Students in a major requiring calculus will use a calculus course (MA 113, 123, 137 or 138) while students not requiring calculus should take MA 111, PHI 120 or another approved course.

	Global Dynamics		Any	3
			Total General Education Hours	30

3. Explain whether the proposed new program (as described in sections 4 through 12) involve courses offered by another department/program. Routing Signature Log must include approval by faculty of additional department(s).

There are two required courses that are not listed with the ENS prefix:
1) ENG 205 (Intermediate Writing; to become WRD 205) Prof. Roxanne Mountford, Chair
2) PHI 336 (Environmental Ethics) Prof. David Bradshaw, Chair

4. How will University Graduation Writing Requirement be satisfied?

☒ Standard University course offering	Please list: _____
☐ Specific course	Please list: _____

5. How will college-level requirements be satisfied?

☒ Standard college requirement	Please list: I. Foreign Language requirement (9 cr). II. Disciplinary requirement (18 cr) will be satisfied by ENS B.A. requirement that five courses be taken in one Area, two in a 2nd Area and one in a 3rd Area. The Areas: Economics and Policy, Ecosystems, Energy and Land, Society, Water Resources, provide the breadth of interdisciplinary knowledge that is the goal of the A&S Disciplinary Requirements. III. The Lab/Field Work requirement (1cr) could be satisfied by ENS 395 or ENS 400 projects that require field work (upon petition), in addition to the laboratory courses listed in the Undergraduate Bulletin. IV. The Cross-Cultural requirement (6 cr) will be fulfilled by courses other than those listed in the five Areas. There are no preferred courses for IV. based on the ENS degree.
☐ Specific required course	Please list: _____

6. List pre-major or pre-professional course requirements, including credit hours (if applicable):

N.A.

7. List the major's course requirements, including credit hours:

1. ENS 201, 3 cr, Environmental & Sustainability Studies I: Humanities and Social Sciences
2. ENS 202, 3 cr, Environmental & Sustainability Studies II: Natural Sciences and Policy
3. ENG 205, 3 cr, Intermediate Writing (to become WRD 205)
4. ENS 300, 3 cr, Special Topics in Environmental & Sustainability Studies
5. PHI 336, 3 cr, Environmental Ethics
6. ENS 400, 3 cr, Capstone Course in Environmental & Sustainability Studies
7. Five courses (15 cr) in one Area of Expertise, two in another (6 cr), and one in a third Area (3 cr)

8. Does program require a minor? ☐ Yes ☒ No

If so, describe, including credit hours. _____

9. Does program allow for an option(s)? ☒ Yes ☐ No

If so, describe option(s) below, including credit hours, and also specialties and subspecialties, if any:
24 cr will be taken as electives in three Areas of Expertise following the "5:2:1" plan with 5 cr in one Area, 6 cr in a 2nd Area, and 3cr in a 3rd Area of Expertise for a total of 24 cr. ENS 395 (Independent Study) is an optional course that can be included in any of the five Areas of Expertise.

10. Does the program require a certain number of credit hours outside the major subject in a related field? ☐ Yes ☒ No

If so, describe, including credit hours: _____

11. Does program require technical or professional support electives? ☐ Yes ☒ No

If so, describe, including credit hours: _____

12. Is there a minimum number of free credit hours or support electives? ☐ Yes ☒ No

If so, describe, including credit hours: _____

13. Summary of Required Credit Hours.

a. Credit Hours of Premajor or Preprofessional Courses:	_____	Not Applicable ☒
b. Credit Hours for Major Requirements:	42	
c. Credit Hours for Required Minor:	_____	Not Applicable ☒
d. Credit Hours Needed for Specific Option:	24	Not Applicable ☐
e. Credit Hours Outside of Major Subject in Related Field:	_____	Not Applicable ☒
f. Credit Hours in Technical or Prof. Support Electives:	_____	Not Applicable ☒
g. Minimum Credit Hours of Free/Supportive Electives:	_____	Not Applicable ☒

h. Total Credit Hours Required by Level:

100:	none	200:	9-16	300:	min = 24	400-500:	3 or more

i. Total Credit Hours Required for Graduation: 42

14. Rationale for Change(s) – if rationale involves accreditation requirements, please include specific references to those.

This is a new program

15. List below the typical semester by semester program for a major. If multiple options are available, attach a separate sheet for each option.

YEAR 1 – FALL: (e.g. "BIO 103; 3 credits")	*Four-Year Graduation Plans for each Area provided in a separate file	**YEAR 1 – SPRING:**	_____
YEAR 2 - FALL :	_____	**YEAR 2 – SPRING:**	_____
YEAR 3 - FALL:	_____	**YEAR 3 - SPRING:**	_____
YEAR 4 - FALL:	_____	**YEAR 4 - SPRING:**	_____

NEW UNDERGRADUATE PROGRAM FORM

Signature Routing Log

General Information:

Major Name and Degree Title: _____

Proposal Contact Person Name: _____ Phone: _____ Email: _____

INSTRUCTIONS:

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
		/ /	
		/ /	
		/ /	
		/ /	
		/ /	

External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision[4]
Undergraduate Council			
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

_____

[4] Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

Four Year Graduation Plan
Bachelor of Arts in Environmental & Sustainability Studies
General Course Listing

UNIVERSITY OF KENTUCKY
College of Arts and Sciences

Year 1

	Fall	Credits		Spring	Credits
	Gen Ed Global Dyamics	3		Foreign Language 102	4
	Foreign Language 101	4		Gen Ed Statistical Reason	3
	Gen Ed Quantitative Found	3		Gen Ed N/P/M	3
	Gen Ed Comp/Com	3		Gen Ed Comp/Com	3
		13		A&S Lab	1
					14

Year 2

	Fall	Credits		Spring	Credits
	Foreign Language 201	3		Foreign Language 202	3
	Gen Ed Humanities	3		Gen Ed SS	3
	Gen Ed Arts/Creativity	3		A&S NS	3
Core	ENS 201	3	Core	ENS 202	3
	+Elective*	3		+Elective*	3
		15			15

Year 3

	Fall	Credits		Spring	Credits
Core	ENG 205 / 2nd Tier Writing	3	Th2	ENS 395	3
Core	ENS 300	3		A&S NS	3
Th1	300+ A&S HU	3	Core	PHI 336 / A&S HU	3
Th1	300+ Theme (1) / A&S SS	3	Th1	300+ Theme (1) / A&S SS	3
	Gen Ed Citizenship US	3		300+ Elective(s)*	4
		15			16

Year 4

	Fall	Credits		Spring	Credits
Th1	300+ Theme (1)	3	Th2	300+ Theme (2)	3
Th1	300+ Theme (1)	3	Th3	300+ Theme (3)	3
	300+ Elective*	3	Core	ENS 400 / A&S NS	3
	300+ Elective*	3		+Elective*	3
	+Elective*	4		+Elective*	4
		16			16

TOTAL CREDITS: 120

»Incoming students do not have to enroll in ENG 104 if they have any of the following: 1) An ACT English score of 32 or higher; 2) an SAT Verbal score of 700 or higher; 3) or a score of 4 or 5 on the English Language AP exam. In these situations, the student should replace ENG 104 with electives. If ENG 104 must be taken, it can be taken any time in the 1st year of study at UK.

*To be discussed with your academic advisor.

+ 6 hours of 'free' electives - that do not count toward any other requirement - must be taken. Additional electives may be required to reach the required minimum of 120 hours. Consider pursuing a 2nd major or minor with these elective hours.

UNIVERSITY OF KENTUCKY
College of Arts and Sciences

Four Year Graduation Plan
Bachelor of Arts in Environmental & Sustainability Studies
Area of Expertise: Economics and Policy

	Year 1				
	Fall	**Credits**		**Spring**	**Credits**
	Gen Ed Social Science	3		Foreign Language 102	4
	Foreign Language 101	4		Gen Ed Statistical Reason	3
	Gen Ed Quantitative Found	3		Gen Ed Comp/Com	3
	Gen Ed Comp/Com	3	P	GEO 160 / Gen Ed Global Cit	3
		#		A&S Lab	1
					14
	Year 2				
	Fall	**Credits**		**Spring**	**Credits**
	Foreign Language 201	3		Foreign Language 202	3
	Gen Ed Humanities	3	Th1	GEO 235	3
	Gen Ed Arts/Creativity	3		Gen Ed Citizenship US	3
Core	ENS 201	3	Core	ENS 202	3
P	ECO 201	3	P	ECO 202	3
		#			15
	Year 3				
	Fall	**Credits**		**Spring**	**Credits**
Core	ENG 205 / 2nd Tier Writing	3	Th2	ENS 395	3
Core	ENS 300	3		A&S NS	3
Th1	NRC 301	3	Core	PHI 336 / A&S HU	3
Th1	ANT 311/ A&S SS	3	Th1	300+ Elective / A&S SS	3
	A&S NS	3		300+ A&S HU	3
		#			15
	Year 4				
	Fall	**Credits**		**Spring**	**Credits**
Th2	300+ Elective	3	Th1	AEC 445G	3
Th1	GEO 455	3	Th3	300+ Elective	3
	Gen Ed N/P/M	3	Core	ENS 400 / A&S NS	3
	300+ Elective*	3		300+ Elective	3
	+ Elective*	4		+ Elective*	4
		#			16

TOTAL CREDITS: 120

*To be discussed with your academic advisor.

+ 6 hours of 'free' electives - that do not count toward any other requirement - must be taken. Additional electives may be required to reach the required minimum of 120 hours. Consider pursuing a 2nd major or minor with these elective hours.

UNIVERSITY OF KENTUCKY
College of Arts and Sciences

Four Year Graduation Plan
Bachelor of Arts in Environmental & Sustainability Studies
Area of Expertise: Ecosystems

	Year 1				
	Fall	**Credits**		**Spring**	**Credits**
	Gen Ed Comp/Com	3		Foreign Language 102	4
	Foreign Language 101	4		Gen Ed Comp/Com	3
	MA 111 / Gen Ed QF	3	P	BIO 148	3
	Gen Ed Humanities	3		Gen Ed Statistical Reason	3
		13		BIO 151	1
					14
	Year 2				
	Fall	**Credits**		**Spring**	**Credits**
	Foreign Language 201	3		Foreign Language 202	3
	Gen Ed Social Science	3		Gen Ed N/P/M	3
P	BIO 152	3		A&S SS	3
Core	ENS 201	3	Core	ENS 202	3
	Gen Ed Citizen Global	3		Gen Ed Citizen US	3
		15			15
	Year 3				
	Fall	**Credits**		**Spring**	**Credits**
Core	ENG 205 / 2nd Tier Writing	3		300+ Elective	3
Core	ENS 300	3		A&S NS	3
Th1	ENT 402	3	Core	PHI 336 / A&S HU	3
Th1	BIO 361/ A&S NS	3		Elective	4
	300+ Gen Ed Humanities	3		Gen Ed A/C	3
		15			16
	Year 4				
	Fall	**Credits**		**Spring**	**Credits**
Th1	BIO 375	3	Th1	ENS 395	3
Th1	PLS 566	3	Th2	300+ Elective	3
	300+ A&S HU	3	Core	ENS 400 / A&S NS	3
Th2	300+ Elective	3	Th3	300+ Theme (3)	3
	300+ Elective*	4		+Elective*	4
		16			16

TOTAL CREDITS: 120

*To be discussed with your academic advisor.

+ 6 hours of 'free' electives - that do not count toward any other requirement - must be taken. Additional electives may be required to reach the required minimum of 120 hours. Consider pursuing a 2nd major or minor with these elective hours.

Four Year Graduation Plan

UNIVERSITY OF KENTUCKY
College of Arts and Sciences

Bachelor of Arts in Environmental & Sustainability Studies

Area of Expertise: Energy and Land

	Year 1				
	Fall	**Credits**		**Spring**	**Credits**
	Gen Ed Comp/Com	4		Foreign Language 102	4
	Foreign Language 101	4		Gen Ed Statistical Reason	3
	MA 111 / Gen Ed QF	3		Gen Ed Comp/Com	3
	Gen Ed Citizen US	3	P	GEO 130	3
		14			13
	Year 2				
	Fall	**Credits**		**Spring**	**Credits**
	Foreign Language 201	3		Foreign Language 202	3
	Gen Ed Humanities	3		Gen Ed Social Science	3
	Gen Ed N/P/M	3	Th1	HIS 240 / A&S HU	3
Core	ENS 201	3	Core	ENS 202	3
P	ECO 201	3		A&S NS	3
		15		A&S Lab	1
					16
	Year 3				
	Fall	**Credits**		**Spring**	**Credits**
Core	ENG 205 / 2nd Tier Writing	3	Th2	ENS 395	3
Core	ENS 300	3	Th1	GEO 321 /A&S NS	3
	Gen Ed Citizen Global	3		PHI 336 / A&S HU	3
Th1	ANT 340/ A&S SS	3	Th1	300+ Elective / A&S SS	3
	300+ Elective*	3		300+ Elective(s)*	3
		15			15
	Year 4				
	Fall	**Credits**		**Spring**	**Credits**
Th1	ENG 401	3		300+ Elective	3
Th1	GEO 351	3	Th3	300+ Elective	3
Th2	300+ Elective	3	Core	ENS 400 / A&S NS	3
	300+ A&S HU	3		Gen Ed A/C	3
	+Elective*	4		+Elective*	4
		16			16

TOTAL CREDITS: 120

^The USP Math and Inference Requirements can be satisfied with 1 calculus course. If at any point you complete a calculus course, future courses marked with a ^ may be replaced with electives.

»Incoming students do not have to enroll in ENG 104 if they have any of the following: 1) An ACT English score of 32 or higher; 2) an SAT Verbal score of 700 or higher; 3) or a score of 4 or 5 on the English Language AP exam. In these situations, the student should replace ENG 104 with electives. If ENG 104 must be taken, it can be taken any time in the 1st year of study at UK.

*To be discussed with your academic advisor.

be required to reach the required minimum of 120 hours. Consider pursuing a 2nd major or minor with these elective hours.

UNIVERSITY OF KENTUCKY
College of Arts and Sciences

Four Year Graduation Plan
Bachelor of Arts in Environmental & Sustainability Studies
Area of Expertise: Society

	Fall	Credits		Spring	Credits
Year 1					
	Gen Ed Comp/Com	3		Foreign Language 102	4
	Foreign Language 101	4		Gen Ed Comp/Com	3
	MA 111 / Gen Ed QF	3		Gen Ed N/P/M	3
	Gen Ed Citizen US	3		Gen Ed Citizen Global	3
		13		A&S Lab	1
					14
Year 2					
	Foreign Language 201	3		Foreign Language 202	3
	Gen Ed Humanities	3		SOC 101 / Gen Ed SS	3
	Gen Ed A/C	3		GEO 130 / A&S NS	3
Core	ENS 201	3	Core	ENS 202	3
	+Elective*	3		Gen Ed Statistical Reason	3
		15			15
Year 3					
Core	ENG 205 / 2nd Tier Writing	3	Th2	ENS 395	3
Core	ENS 300	3		SOC 304	3
	+Elective*	4	Core	PHI 336 / A&S HU	3
Th1	GEO 321 / A&S SS	3	Th1	SOC 380 / A&S SS	3
	A&S NS	3	Th1	PS 391	3
		16			15
Year 4					
	300+ Elective	3	Th1	SOC 360	3
Th1	GEO 321	3	Th3	300+ Elective	3
	300+ Elective*	3	Core	ENS 400 / A&S NS	3
Th2	300+ A&S HU	3		300+ Elective*	3
	+Elective*	4		+Elective*	4
		16			16

TOTAL CREDITS: 120

*To be discussed with your academic advisor.

+ 6 hours of 'free' electives - that do not count toward any other requirement - must be taken. Additional electives may be required to reach the required minimum of 120 hours. Consider pursuing a 2nd major or minor with these elective hours.

UNIVERSITY OF KENTUCKY
College of Arts and Sciences

Four Year Graduation Plan
Bachelor of Arts in Environmental & Sustainability Studies
Area of Expertise: Water Resources

	Year 1				
	Fall	**Credits**		**Spring**	**Credits**
	Gen Ed Comp/Com	3		Foreign Language 102	4
	Foreign Language 101	4		Gen Ed Comp/Com	3
	MA 111 / Gen Ed QF	3	P	CHE 105 / Gen Ed N/P/M	3
	Gen Ed A/C	3	P	GEO 130	3
		13		CHE 105 / A&S Lab	1
					14
	Year 2				
	Fall	**Credits**		**Spring**	**Credits**
	Foreign Language 201	3		Foreign Language 202	3
	Gen Ed Humanities	3	P	BIO 150	3
P-Th1	GLY 220	3		A&S HU	3
Core	ENS 201	3	Core	ENS 202	3
	Gen Ed Statistical Reason	3		Gen Ed Social Science	3
		15			15
	Year 3				
	Fall	**Credits**		**Spring**	**Credits**
Core	ENG 205 / 2nd Tier Writing	3	Th2	ENS 395	3
Core	ENS 300	3		A&S NS	3
Th1	GLY 385	3	Core	PHI 336 / A&S HU	3
Th1	300+ Elective / A&S SS	3	Th1	GEO 351 / A&S SS	3
	Gen Ed Citizen Global	3		300+ Elective(s)*	3
		15			15
	Year 4				
	Fall	**Credits**		**Spring**	**Credits**
Th1	ENG 401	3		300+ Elective*	3
Th1	GEO 331	3	Th3	300+ Elective	3
Th2	300+ Elective	3	Core	ENS 400 / A&S NS	3
	300+ Elective*	3		Gen Ed Citizen US	3
	+Elective*	4		+Elective*	4
		16			16

TOTAL CREDITS: 120

^The USP Math and Inference Requirements can be satisfied with 1 calculus course. If at any point you complete a calculus course, future courses marked with a ^ may be replaced with electives.

»Incoming students do not have to enroll in ENG 104 if they have any of the following: 1) An ACT English score of 32 or higher; 2) an SAT Verbal score of 700 or higher; 3) or a score of 4 or 5 on the English Language AP exam. In these situations, the student should replace ENG 104 with electives. If ENG 104 must be taken, it can be taken any time in the 1st year of study at UK.

*To be discussed with your academic advisor.

+ 6 hours of 'free' electives - that do not count toward any other requirement - must be taken. Additional electives may be required to reach the required minimum of 120 hours. Consider pursuing a 2nd major or minor with these elective hours.

UNIVERSITY OF KENTUCKY
College of Arts and Sciences

Four Year Graduation Plan
Bachelor of Arts in Environmental & Sustainability Studies
Thematic Concentration: Environmental Justice within Area of Expertise: Society

Year 1

	Fall	Credits		Spring	Credits
	Gen Ed Comp/Com	3		Foreign Language 102	4
	Foreign Language 101	4		Gen Ed Statistical Reason	3
	MA 111 / Gen Ed QF	3		Gen Ed Comp/Com	3
	Gen Ed Citizen US	3		Gen Ed N/P/M	3
		13		A&S Lab	1
					14

Year 2

	Fall	Credits		Spring	Credits
	Foreign Language 201	3		Foreign Language 202	3
	Gen Ed A/C	3		Gen Ed Social Science	3
	Gen Ed Humanities	3		A&S NS	3
Core	ENS 201	3	Core	ENS 202	3
	+Elective*	3		+Elective*	3
		15			15

Year 3

	Fall	Credits		Spring	Credits
Core	ENG 205 / 2nd Tier Writing	3	Th2	ENS 395	3
Core	ENS 300	3		A&S NS	3
	300+ A&S HU	3	Core	PHI 336 / A&S HU	3
Th1	300+ Elective / A&S SS	3	Th1	300+ Elective / A&S SS	3
	300+ Elective*	3		300+ Elective(s)*	4
		15			16

Year 4

	Fall	Credits		Spring	Credits
Th1	300+ Elective	3		300+ Elective*	3
Th1	300+ Elective	3	Th3	300+ Elective	3
Th2	300+ Elective	3		ENS 400 / A&S NS	3
	300+ Elective*	3		Gen Ed Citizen Global	3
	+Elective*	4		+Elective*	4
		16			16

TOTAL CREDITS: 120

*To be discussed with your academic advisor.

+ 6 hours of 'free' electives - that do not count toward any other requirement - must be taken. Additional electives may be required to reach the required minimum of 120 hours. Consider pursuing a 2nd major or minor with these elective hours.

UNIVERSITY OF KENTUCKY
College of Arts and Sciences

Four Year Graduation Plan
Bachelor of Arts in Environmental & Sustainability Studies
Thematic Concentration: The Built Environment within Area of Expertise: Society

Year 1

	Fall	Credits		Spring	Credits
	Gen Ed Comp/Com	3		Foreign Language 102	4
	Foreign Language 101	4		Gen Ed Statistical Reason	3
	MA 111 / Gen Ed QF	3		Gen Ed Comp/Com	3
	ARC 111	3		Gen Ed N/P/M	3
		#		A&S Lab	1
					14

Year 2

	Fall	Credits		Spring	Credits
	Foreign Language 201	3		Foreign Language 202	3
	Gen Ed Humanities	3		SOC 101 / Gen Ed SS	3
	+Elective*	4		GEO 222 / A&S SS	3
Core	ENS 201	3	Core	ENS 202	3
	ARC 212	3		ARC 213	3
		16			15

Year 3

	Fall	Credits		Spring	Credits
Core	ENG 205 / 2nd Tier Writing	3	Th2	ENS 395	3
Core	ENS 300	3	Th1	SOC 304	3
	300+ A&S HU	3	Core	PHI 336 / A&S HU	3
Th1	ANT 340 / A&S SS	3		A&S NS	3
	ARC 314	3	Th1	ARC 315	3
		15			15

Year 4

	Fall	Credits		Spring	Credits
Th2	300+ Elective	3	Th1	SOC 420	3
Th1	GEO 422	3	Th3	300+ Elective	3
	Gen Ed A/C	3	Core	ENS 400 / A&S NS	3
	Gen Ed Citizen Global	3		Gen Ed Citizen US	3
	+Elective*	4		+Elective*	4
		16			16

TOTAL CREDITS 120

*To be discussed with your academic advisor.

+ 6 hours of 'free' electives - that do not count toward any other requirement - must be taken. Additional electives may be required to reach the required minimum of 120 hours. Consider pursuing a 2nd major or minor with these elective hours.

NEW COURSE FORM

1.	**General Information.**								
a.	Submitted by the College of:	Arts & Sciences				Today's Date:	Nov. 17, 2011		
b.	Department/Division:	Interdisciplinary Programs							
c.	Contact person name:	David Atwood		Email:	datwood@uky.edu		Phone:	257-7304	
d.	Requested Effective Date:	☐ Semester following approval		OR	☒ Specific Term/Year[1] :		Fall 2012		
2.	**Designation and Description of Proposed Course.**								
a.	Prefix and Number:	ENS 201							
b.	Full Title:	Environmental & Sustainability Studies I: Humanities and Social Sciences							
c.	Transcript Title (if full title is more than 40 characters):	Env. & Sust. Stud. I: Hum. & Soc. Sci.							
d.	To be Cross-Listed[2] with (Prefix and Number):	N/A							
e.	Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours[3] for each meeting pattern type.								
	3 Lecture	_____ Laboratory[1]		_____ Recitation		_____ Discussion		_____ Indep. Study	
	_____ Clinical	_____ Colloquium		_____ Practicum		_____ Research		_____ Residency	
	_____ Seminar	_____ Studio		_____ Other – Please explain:		_____			
f.	Identify a grading system:	☒ Letter (A, B, C, etc.)		☐ Pass/Fail					
g.	Number of credits:	3							
h.	Is this course repeatable for additional credit?						YES ☐	NO ☒	
	If YES:	Maximum number of credit hours:		N/A					
	If YES:	Will this course allow multiple registrations during the same semester?					YES ☐	NO ☒	
i.	Course Description for Bulletin:	This course will provide a foundation in the core ideas, theoretical concerns and practical approaches to environmental studies framed within the disciplines of the humanities and social sciences. Students will study human interactions with the environment, both natural and built, and inter-human relations conditioned by local and global environmental factors. Students will obtain a basic conceptual and historical understanding of the nature and value of their local, regional, and global environment.							
j.	Prerequisites, if any:	None							
k.	Will this course also be offered through Distance Learning?						YES[4] ☐	NO ☒	
l.	Supplementary teaching component, if any:	☐ Community-Based Experience		☐ Service Learning		☐ Both			

[1] Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.
[2] The chair of the cross-listing department must sign off on the Signature Routing Log.
[3] In general, undergraduate courses are developed on the principle that one semester hour of credit represents one hour of classroom meeting per week for a semester, exclusive of any laboratory meeting. Laboratory meeting, generally, represents at least two hours per week for a semester for one credit hour. (from *SR 5.2.1*)
[4] You must *also* submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.

NEW COURSE FORM

3.	**Will this course be taught off campus?**	YES ☐	NO ☒
4.	**Frequency of Course Offering.**		
a.	Course will be offered (check all that apply):	☒ Fall ☐ Spring ☐ Summer	
b.	Will the course be offered every year?	YES ☒	NO ☐
	If NO, explain: _____		
5.	**Are facilities and personnel necessary for the proposed new course available?**	YES ☒	NO ☐
	If NO, explain: _____		
6.	**What enrollment (per section per semester) may reasonably be expected?**	30	
7.	**Anticipated Student Demand.**		
a.	Will this course serve students primarily within the degree program?	YES ☒	NO ☐
b.	Will it be of interest to a significant number of students outside the degree pgm?	YES ☒	NO ☐
	If YES, explain:	This course would be appropriate for General Education Credit under categories I.a and I.c	
8.	**Check the category most applicable to this course:**		
	☒ Traditional – Offered in Corresponding Departments at Universities Elsewhere		
	☐ Relatively New – Now Being Widely Established		
	☐ Not Yet Found in Many (or Any) Other Universities		
9.	**Course Relationship to Program(s).**		
a.	Is this course part of a proposed new program?	YES ☒	NO ☐
	If YES, name the proposed new program:	B.A. in Environmental & Sustainability Studies	
b.	Will this course be a new requirement[5] for ANY program?	YES ☒	NO ☐
	If YES[5], list affected programs:	B.A. in Environmental & Sustainability Studies	
10.	**Information to be Placed on Syllabus.**		
a.	Is the course 400G or 500?	YES ☐	NO ☒
	If YES, the *differentiation for undergraduate and graduate students must be included* in the information required in ***10.b***. You must include: (i) identification of additional assignments by the graduate students; and/or (ii) establishment of different grading criteria in the course for graduate students. (See *SR 3.1.4*.)		
b.	☒ The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable, from ***10.a*** above) are attached.		

[5] In order to change a program, a program change form must also be submitted.

NEW COURSE FORM

Signature Routing Log

General Information:

Course Prefix and Number: ENS 201

Proposal Contact Person Name: David Atwood Phone: 257-7304 Email: datwood@uky.edu

INSTRUCTIONS:

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
		/ /	
		/ /	
		/ /	
		/ /	
		/ /	

External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision[6]
Undergraduate Council			
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

[6] Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

SYLLABUS
ENS 201-001: Environmental and Sustainability Studies I: Humanities and Social Sciences
MWF tba
Location

Contact Information

- Instructor Name
- Office
- Office Ph.
- Email
- Office Hours
  (or by appointment)

Required Texts

- Chiras, Daniel 2010. Environmental Science 2010 (8th edition). Sudbury, MA: Jones and Bartlett Publishing.
- King, Leslie and Deborah McCarthy (eds) 2009. *Environmental Sociology: From Analysis to Action.* Lanham, MD: Roman and Littlefield
- Texts and handouts available through the class Blackboard shell

Overview of course

This course exposes students to core ideas, theoretical concerns and practical approaches to environmental studies framed within the disciplines of the humanities and social sciences. Students will study human interactions with the environment, both natural and built, and inter-human relations conditioned by local and global environmental factors. Core ideas surveyed in this class include: the meaning of an environmental ethic philosophy, historical and cultural perspectives (Eastern and Western philosophies) of nature, the social construction of nature, environmental justice, environmental racism, local-global linkages, population, consumption and commodity chains, and political ecology. Students will obtain a basic conceptual and historical understanding of the nature and value of their local, regional, and global environment. This understanding will form the basis by which the student will analyze many of the problems pertinent to human social reality.

Course Goals/Objective:

Through this course, students will gain a foundational knowledge of environmental ethics, environmental writing, and the interactions between the environment and the social world. This knowledge will be utilized in the humanities and social science courses taken by the student in the areas necessary for the completion of the ENS B.A. degree.

Student Learning Outcomes:

Upon completion of this course students will be able to:

- Explain the differences in historical, cultural, and philosophical traditions towards the environment.
- Analyze and critique a specific sustainability management program instituted at the local level
- Evaluate the roles that stakeholder and societal diversity play in environmental concerns.
- Explain how and why environmental toxins and hazards disproportionately affect people of color, low income communities, women, and people of the Global South.
- Analyze the link between local and global environmental concerns.
- Apply knowledge gained through the course to reveal social, cultural, gendered, racial and other dimensions of diversity to a given environmental issue (such as a "commodity chain").

Grading:

The course consists of three components for the grade:

Exams	
Midterm Exam	20 %
Final Exam	30 %
Assignments	
Sustainability Project	20 %
Commodity Chain Analysis	20 %
Participation	10 %

Grading Scale
A = 90% and above
B = 80-89%
C = 70=79%
D = 60-69%
E = 59% and below

Course Requirements:

Students must satisfactorily complete all assignments and exams in order to pass the class. Students will be provided with a Midterm Evaluation (by the midterm date) of course performance based on these criteria completed to that date.

Exams (midterm exam worth 20% and final exam worth 30% for a total of 50%): In their midterm and comprehensive final exam students will demonstrate their mastery of both content knowledge (gained through class lectures, discussion, and activities and course readings), and critical thinking. Each exam will be graded on a 100 point scale. The final exam will be comprehensive in scope.

Assignments (20% each for total of 40%): Students will complete two *group/paired (ie: groups of 2 or 3 students work together)* projects / assignments during the semester. These assignments will develop students' skills in 1) understanding the inter-linkages of the human experience and the natural world in which we live 2) the ways distant places are linked through extraction, production and consumption of environmental products, and the role of inequality, power and justice in these linkages.

NOTE: These assignments are group projects. As such, the whole group will receive the same grade. However, each student will grade the contribution of all group members, so that in the event that one group member does not contribute meaningfully, that student's grade will be dropped to a significantly lower grade than the group grade. Group collaboration can take place via email, a facebook page, a wiki, a blog, in person, phone calls and any other way that works. Some class time during discussion sections will be given for group work. But substantial time outside of class will be required for these projects.

- Assignment 1 – The first project will be a research paper of approximately 10 pages. In this paper, the group will detail the efforts at the local level, i.e., either by (i) a university, (ii) a city, and/or (ii) a state (such as the Commonwealth of Kentucky) to implement sustainable management practices. In this paper, students will explain what sustainable practices are, detail the sustainable practices implemented by the institutional body studied, explain the various pragmatic and ethical rationales for the implementation of these practices implemented or planned by the institution studied, provide the set of evaluative criteria offered to judge the efficacy of these practices (if any are given), and offer their own evaluation both of these criteria and the efficacy of the practices implemented.
- Assignment 2 – The second project will be a "commodity chain analysis" in which a pair or group of 3 students identifies a "raw" product (ie: coal, copper, diamonds, coltan, coffee, Brazil nuts, acai berries, toxic waste, pollution, etc) that is extracted from a particular global location (ie: Eastern Kentucky, Zambia, South Africa, Democratic Rep. of Congo, Guatemala, Amazon, US Industries, etc). Then, conducting substantial library research, students will trace that product from the point of extraction, through processing, to consumers in a different global location. While the "commodity" gives coherence to the research, students must focus their research on the SOCIAL dimensions of the extraction, production and consumption of the commodity. The final section of this assignment will consist of a "social justice" analysis of this commodity chain, including recommendations for increased equity between producers and consumers in a global context. This assignment will be some form of multi media, according the students' choice, skills and interests. Possible formats include: an Electronic poster (with memo), a blog (with text and images), a video or other media (with instructor approval).

Participation (10% total): Participation during class discussions is one of the best ways to facilitate learning of the class material. Participation includes engaging in all class activities (debates, roll playing, group exercises) as well as offering insightful and useful comments during discussion. Simply speaking does not count towards participation (beware the class clown); comments should further the conversation and indicate reflective thinking. Additionally, participation will frequently include participating in "discussions" via blackboard, and posting comments to the various group projects produced during the semester. The participation grade will be given in two "installments" with half given at the mid-term and the other half at the end of the semester.

CLASS POLICIES

1. Absences: After 1 unexcused absence from class a student's grade will drop by 2% points per absence. Excused absences are given only: a) with presentation of a VALID MEDICAL or EMERGENCY excuse, IN WRITING (written by a medical doctor), b) with a death in the family (copy of the obituary required), or c) by pre-arrangement with the professor.
    a. Arrival 10 minutes or more after the start of discussion section constitutes an absence. Departure 10 minutes before the end of discussion section constitutes an absence.
    b. If you will be absent from class due to a religious holiday that is not already recognized by the university, you must inform and discuss this (these) absence(s) with your Professor.
    c. If you are a university athlete, you must have your travel/absence schedule approved by the professor. You must present a written schedule of anticipated absences. This schedule must identify the specific dates you will be absent (not the whole schedule of athletic events), and must also give a phone number for the athletic coordinator who knows your schedule. If you anticipate missing more than 3 discussion section meetings during the semester, you should withdraw from the course this semester, and take the course at a time when it does not conflict with your extracurricular activities. (If you anticipate missing only 2 discussion section meetings due to athletic commitments, those absences will stand as "free" absences, and you will suffer the 30 point drop per absence after the two).
    d. After eight (8) total absences (excused and unexcused), you will receive a failing grade in the course.
2. Make-up exams: A student may not take a make-up quiz unless s/he has an excused absence. Excused absences are given only: a) with presentation of a VALID MEDICAL or EMERGENCY excuse, IN WRITING (written by a medical doctor), b) with a death in the family (copy of the obituary required), or c) by pre-arrangement with the professor. Any other failure to take a quiz when it is scheduled will result in no credit for the quiz (0%). If you do have an excused absence and need to make up a quiz, you must make arrangements with your TA to take the makeup within a week of the quiz date.
3. Late assignments: Due dates and TIMES are listed in the schedule. Unless a student has an excused absence (see above),the instructor will not accept late assignments. If you have a problem completing your assignment on time, you need to communicate with your instructor immediately. If your assignment is not accepted because it is late, you will receive 0 (zero) points for the assignment. If you do not turn in an assignment you will receive 0 (zero) points.
4. Cheating / Plagiarizing: A few simple words: don't do it. For purposes of clarity, cheating includes copying or "borrowing" answers from others on quizzes, citing others' work as your own in essays, and plagiarizing or taking material verbatim from texts, lectures, and articles (including anything from web-sites) without proper citation of the author(s). All such incidents will be handled according to University policy as outlined in the *University Senate Rules* and *Student Rights and Responsibilities*. The minimum punishment for cheating or plagiarism is an "E" in the course. This is University Policy.
    a. *Points concerning plagiarism and cheating in the Student Code of Conduct are not meant to discourage students from sharing ideas and collaborating. On the contrary, unless instructed otherwise, students in this class should collaborate as much as possible, but must acknowledge such collaboration in any work submitted for a grade*
5. Classroom civility and decorum: The university, college and program has a commitment to respect the dignity of all and to value differences among members of our academic community. There exists the role of discussion and debate in academic discovery and the right of all to respectfully disagree from time-to-time. Students clearly have the right to take reasoned exception and to voice opinions contrary to those offered by the instructor and/or other students (S.R. 6.1.2). Equally, a faculty member has the right -- and the responsibility -- to ensure that all academic discourse occurs in a context characterized by respect and civility. Obviously, the accepted level of civility would not include attacks of a personal nature or statements denigrating another on the basis of race, sex, religion, sexual orientation, age, national/regional origin or other such irrelevant factors.
6. Academic Accommodations due to disability: If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address jkarnes@eamil.uky.edu) for coordination of campus disability services available to students with disabilities.
7. Religious Accommodations: Students anticipating absence for a major religious holiday during the fall semester must notify me in writing or email prior to the last day for adding classes. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (jkarnes@email.uky.edu, 257-2754).

READINGS AND ASSIGNMENT SCHEDULE

This schedule, and assigned readings, are subject to adjustment throughout the semester.

Introduction

Week 1 **Class Introduction -**
READ Chiras Chapter 1: Environmental Science

SECTION I – HUMANS IN THE ENVIRONMENT: UNDERSTANDING THE ENVIRONMENT AND OUR RELATION TO IT

Week 2 **The Roots of Our Understanding: Western and Non-Western Conception of Nature**
READ: Selections available on Bb: "Genesis," John Locke *Two Treatise*, E. White "Black Women in the Wilderness," Luther Standing Bear "Nature," additional selections representative of Buddhist, Shinto, Indian, Animist conceptions of nature.

Details of Assignment 1 presented to students: Sustainability project

Week 3 **Environmental ism in American**
READ: Essays: " H.D. Thoreau "Walking," A. Leopold "A Land Ethic," W. Berry "An Entrance into the Woods," W. Stegner "Wilderness Letter, T.T. Williams "The Clan of One Breasted Women."

Week 4 **The Social Construction of Nature**
READ: (1) "Wild Horses and the Political Ecology of Nature Restoration in the Missouri Ozark" in *Environmental Sociology,* ch. 7
(2) "The Pristine Myth" William Denevan (available through JSTOR)

Week 5 **Environmental Sustainability**
READ: (1) Chiras chapter 2: Environmental Protection and Sustainability
(2) Chiras chapter 3: Understanding the Root Causes of the Environmental Crisis

Week 6 **The Ethical Justification for Creating a Sustainable Society**
READ: (1) Chiras, chapter 24
(2) Brian Berry, "Sustainability and Intergenerational Justice"

Week 7 **Law, Government, and Society**
READ: Chiras chapter 27

MIDTERM EXAM (on all previous readings, discussion, lectures, films, etc).

SECTION II – HUMANS IN THE ENVIRONMENT: SOCIETY, CULTURE, BEHAVIOR AND JUSTICE

Week 8 **Human Populations and diversity**
READ: Chiras chapter 8: Population: measuring growth and its impact

DUE: Assignment 1

Week 9 **Population and diversity continued**
READ: Chiras Chapter 9: Stabilizing the Human Population: Strategies for Sustainability.

Details of Assignment 2 presented to students: Commodity Chain Analysis

Week 10 Economies and Consumption
READ: Chiras Chapter 25: Sustainable Economics: Understanding the Economy and Challenges Facing the Industrial Nations

Week 11 Economies and Consumption continued
READ: Chiras Chapter 26: Sustainable Economic Development: Challenges Facing the Developing Nations

Week 12: Social Inequalities and Environmental Injustices
READ: (1) "The Unfair Trade-Off: Globalization and the Export of Ecological Hazards" by Daniel Faber. (Chapter 11 in *Environmental Sociology: From Analysis to Action,* edited by Leslie King and Deborah McCarthy)
(2) "The Next Revolutionary Stage: Recycling Waste or Recycling History?" by David Pellow. (Chapter 6 in *Environmental Sociology: From Analysis to Action,* edited by Leslie King and Deborah McCarthy)

Week 13: Environmental Racism and Industrial Pollution
READ: (1) "Environmental Racism Revisited" (Ch. 5 in Robert Bullard's *Dumping in Dixie*)
(2) "Corporate Responsibility for Toxins" by Gerald Markowitz and David Rosner. (Chapter 10 in *Environmental Sociology: From Analysis to Action,* edited by Leslie King and Deborah McCarthy)

SECTION III: FROM KNOWLEDGE TO ACTION -- OUR ROLE IN THE GLOBAL ENVIRONMENT

Week 14: Struggles for Environmental Justice
READ: "Environmental Justice: Grassroots Activism and its Impact on Public Policy Decision Making" by Robert D. Bullard and Glenn S. Johnson (Chapter 4 in *Environmental Sociology: From Analysis to Action,* edited by Leslie King and Deborah McCarthy)

Week 15: Struggles for Environmental Justice, continued
READ: Case studies of successful environmental justice activism (TBA). Examples: "Operation Return to Sender" and "Ban the Burn: The Anti-Incinerator Movement in the Philippines" in Chapter 4 of David N. Pellow's *Resisting Global Toxics: Transnational Movements for Environmental Justice,* or the article "Environmental Justice Comes Full Circle: Warren County Before and After" (2007) by Dollie Burwell and Luke Cole (in *Golden Gate University Environmental Law Journal*).

DUE: Assignment 2 Multi-media "commodity chain analysis"

Week 16: Course Synthesis – what steps to take?
READ: tba

Week 17 Finals week

FINAL COMPREHENSIVE EXAM (synthetic- comprehensive)

NEW COURSE FORM

1.	**General Information.**								
a.	Submitted by the College of:	Arts & Sciences			Today's Date:	Nov. 17, 2011			
b.	Department/Division:	Interdisciplinary Programs							
c.	Contact person name:	David Atwood		Email:	datwood@uky.edu		Phone:	257-7304	
d.	Requested Effective Date:	☐ Semester following approval		OR	☒ Specific Term/Year[1] :	Spring 2013			
2.	**Designation and Description of Proposed Course.**								
a.	Prefix and Number:	ENS 202							
b.	Full Title:	Environmental & Sustainability Studies II: Natural Science and Policy							
c.	Transcript Title (if full title is more than 40 characters):	Env. & Sust. Stud. I: Nat. Sci. & Policy							
d.	To be Cross-Listed[2] with (Prefix and Number):	N/A							
e.	Courses must be described by <u>at least one</u> of the meeting patterns below. Include number of actual contact hours[3] for each meeting pattern type.								
	3 Lecture	_____ Laboratory[1]		_____ Recitation		_____ Discussion		_____ Indep. Study	
	_____ Clinical	_____ Colloquium		_____ Practicum		_____ Research		_____ Residency	
	_____ Seminar	_____ Studio		_____ Other – Please explain:		_____			
f.	Identify a grading system:	☒ Letter (A, B, C, etc.)		☐ Pass/Fail					
g.	Number of credits:	3							
h.	Is this course repeatable for additional credit?						YES ☐	NO ☒	
	If YES:	Maximum number of credit hours:		N/A					
	If YES:	Will this course allow multiple registrations during the same semester?					YES ☐	NO ☒	
i.	Course Description for Bulletin:	This is an introduction to Natural Science and Policy as they pertain to understanding environmental studies. The core ideas include understanding how the ecological theories of population dynamics, community structure, and ecosystems dynamics lay a scientific foundation to understanding the nature of current environmental issues and how they might be addressed individually and through governmental legislation.							
j.	Prerequisites, if any:	None							
k.	Will this course also be offered through Distance Learning?						YES[4] ☐	NO ☒	
l.	Supplementary teaching component, if any:	☐ Community-Based Experience		☐ Service Learning		☐ Both			
3.	**Will this course be taught off campus?**						YES ☐	NO ☒	

[1] Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.
[2] The chair of the cross-listing department must sign off on the Signature Routing Log.
[3] In general, undergraduate courses are developed on the principle that one semester hour of credit represents one hour of classroom meeting per week for a semester, exclusive of any laboratory meeting. Laboratory meeting, generally, represents at least two hours per week for a semester for one credit hour. (from *SR 5.2.1*)
[4] You must *also* submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.

NEW COURSE FORM

4.	**Frequency of Course Offering.**			
a.	Course will be offered (check all that apply):	☒ Fall	☐ Spring	☐ Summer
b.	Will the course be offered every year?		YES ☒	NO ☐
	If NO, explain:	_____		
5.	**Are facilities and personnel necessary for the proposed new course available?**		YES ☒	NO ☐
	If NO, explain:	_____		
6.	**What enrollment (per section per semester) may reasonably be expected?**	30		
7.	**Anticipated Student Demand.**			
a.	Will this course serve students primarily within the degree program?		YES ☒	NO ☐
b.	Will it be of interest to a significant number of students outside the degree pgm?		YES ☒	NO ☐
	If YES, explain:	This course would be appropriate for General Education Credit under categories I.a and I.c		
8.	**Check the category most applicable to this course:**			
	☒ Traditional – Offered in Corresponding Departments at Universities Elsewhere			
	☐ Relatively New – Now Being Widely Established			
	☐ Not Yet Found in Many (or Any) Other Universities			
9.	**Course Relationship to Program(s).**			
a.	Is this course part of a proposed new program?		YES ☒	NO ☐
	If YES, name the proposed new program:	B.A. in Environmental & Sustainability Studies		
b.	Will this course be a new requirement[5] for ANY program?		YES ☒	NO ☐
	If YES[5], list affected programs:	B.A. in Environmental & Sustainability Studies		
10.	**Information to be Placed on Syllabus.**			
a.	Is the course 400G or 500?		YES ☐	NO ☒
	If YES, the *differentiation for undergraduate and graduate students must be included* in the information required in ***10.b***. You must include: (i) identification of additional assignments by the graduate students; and/or (ii) establishment of different grading criteria in the course for graduate students. (See *SR 3.1.4*.)			
b.	☒	The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable, from ***10.a*** above) are attached.		

[5] In order to change a program, a program change form must also be submitted.

NEW COURSE FORM

Signature Routing Log

General Information:

Course Prefix and Number: ENS 202

Proposal Contact Person Name: David Atwood Phone: 257-7304 Email: datwood@uky.edu

INSTRUCTIONS:

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
		/ /	
		/ /	
		/ /	
		/ /	
		/ /	

External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision[6]
Undergraduate Council			
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

[6] Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

ENS 202-001: Environmental and Sustainability Studies II: Natural Science and Policy

Day/Time/Place: TBD

Instructor: TBD	**Email: TBD**
Office phone: TBD	**Office address: TBD**
Preferred method on contact: TBD	**Office Hours: days and times TBD**
Teaching/Grad. Assist: TBD	**email: TBD**

Overview of course
This is an introduction to Natural Science and Policy as they pertain to understanding environmental studies. The core ideas include understanding how the ecological theories of population dynamics, community structure, and ecosystems dynamics lay a scientific foundation to understanding the nature of current environmental issues and how they might be addressed individually and through governmental legislation.

Student Learning Outcomes:
Upon completion of this course students will be able to:

- Understand basic ecological theory from a scientific perspective.
- Explain the reasons for existing environmental problems.
- Understand different approaches and strategies to solve existing environmental problems.
- Impact of urban and rural development on ecosystems and habitats
- Sustainable land management (and ecosystem protection)
- Show how environmental policies require fundamental science

Course Goals/Objective:
The goal of this course is to show students that ecological theory can explain existing environmental problems, and that understanding ecological theory will provide a foundation for solving them.

Required textbooks:
This course has one textbook:

- Chiras, Daniel 2010. Environmental Science (8th edition). Sudbury, MA: Jones and Bartlett Publishing.

Grading:
The course consists of three components for the grade:

Exams: Two over the course of the semester, each 15%	30 %
Assignment:	40 %
Final Exam (comprehensive)	20%
Participation	10 %

Final grades are calculated based on the following breakdown:

A = 90% and above

B = 80-89%

C = 70-79%

D = 60-69%

E = 59% and below

Course Requirements: Students must complete all assignments and exams in order to pass the class.

Exams (two semester exams 15% each for total of 30%, final exam 20%): Approximately every six weeks there will be a exam through which students demonstrate their mastery of both content knowledge (gained through class lectures, discussion, and activities and course readings), and critical thinking. Each exam will be graded on a 100 point scale, and worth 15% of the final grade. The final exam (worth 20% of the final grade), will cover the new material introduced during the last third of the class AND key ideas, concepts and knowledge gained from the entirety of the course.

Assignment (40%): At the beginning of the semester, each student will select an environmental topic of interest that needs to be approved by the instructor. During the course of the semester, each student will then collect a minimum of ten published news articles on the subject. These articles will be organized in a notebook. Each article will include a brief review of the significant points in the article. Each student will then generate a typed five page synopsis of these articles describing problems faced, prevailing controversies, and potential solutions.

Participation: Participation during class discussions is one of the best ways to facilitate learning of the class material. Participation includes engaging in all class activities (debates, roll playing, group exercises) as well as offering insightful and useful comments during discussion. Simply speaking does not count towards participation (beware the class clown); comments should further the conversation and indicate reflective thinking. Additionally, participation will frequently include participating in "discussions" via blackboard, and posting comments to the various group projects produced during the semester. The participation grade will be given in two "installments": half will be given at the mid-term and the other half at the end of the semester (for a maximum of 10% of the total grade)

Chapter Coverage and Examination Dates:

Week	Topic	Chapter
1	Principles of Ecology: How Ecosystems Work	4
2	Principles of Ecology: Biomes and Aquatic Life Zones	5
3	Principles of Ecology: Self-Sustaining Mechanisms in Ecosystems	6
4	Human Ecology: Our Changing Relationship with the Environment	7
Exam 1		
5	Population: Measuring Growth and Its Impact (review of ENS 201 material)	8
6	Stabilizing the Human Population: Strategies for Sustainability (review of ENS 201 material)	9
7	Creating a Sustainable System of Agriculture to Feed the World's People	10
8	Preserving Biological Diversity	11
Exam 2		
9	Grasslands, Forests, and Wilderness: Sustainable Management Strategies	12
10	Water Resources: Preserving Our Liquid Assets and Protecting Aquatic Ecosystems	13
11	Nonrenewable Energy Sources	14
12	Foundations of a Sustainable Energy System: Conservation and Renewable Energy	15
13	The Earth and Its Mineral Resources	16
14	Creating Sustainable Cities, Suburbs, and Towns:	17
15	Air Pollution and Noise: Living and Working in a Healthy Environment	19
16	Global Air Pollution: Ozone Depletion, Acid Deposition, and Global Climate Change	20

Finals week, **Final Exam**

Class policies:

1. Absences: After one1 unexcused absence from class a student's grade will drop by 2% points per absence. Excused absences are given only: a) with presentation of a VALID MEDICAL or EMERGENCY excuse, IN WRITING (written by a medical doctor), b) with a death in the family (copy of the obituary required), or c) by pre-arrangement with the professor.
    a. Arrival 10 minutes or more after the start of discussion section constitutes an absence. Departure 10 minutes before the end of discussion section constitutes an absence.
    b. If you will be absent from class due to a religious holiday that is not already recognized by the university, you must inform and discuss this (these) absence(s) with your Professor.
    c. If you are a university athlete, you must have your travel/absence schedule approved by the professor. You must present a written schedule of anticipated absences. This schedule must identify the specific dates you will be absent (not the whole schedule of athletic events), and must also give a phone number for the athletic coordinator who knows your schedule. If you anticipate missing more than 3 discussion section meetings during the semester, you should withdraw from the course this semester, and take the course at a time when it does not conflict with your extracurricular activities. (If you anticipate missing only 2 discussion section meetings due to athletic commitments, those absences will stand as "free" absences, and you will suffer the 30 point drop per absence after the two).
    d. After eight (8) total absences (excused and unexcused), you will receive a failing grade in the course.
2. Make-up exams: A student may not take a make-up quiz unless s/he has an excused absence. Excused absences are given only: a) with presentation of a VALID MEDICAL or EMERGENCY excuse, IN WRITING (written by a medical doctor), b) with a death in the family (copy of the obituary required), or c) by pre-arrangement with the professor. Any other failure to take a quiz when it is scheduled will result in no credit for the quiz (0%). If you do have an excused absence and need to make up a quiz, you must make arrangements with your TA to take the makeup within a week of the quiz date.
3. Late assignments: Due dates and TIMES are listed in the schedule. Unless a student has an excused absence (see above),the instructor will not accept late assignments. If you have a problem completing your assignment on time, you need to communicate with your instructor immediately. If your assignment is not accepted because it is late, you will receive 0 (zero) points for the assignment. If you do not turn in an assignment you will receive 0 (zero) points.
4. Cheating / Plagiarizing: A few simple words: don't do it. For purposes of clarity, cheating includes copying or "borrowing" answers from others on quizzes, citing others' work as your own in essays, and plagiarizing or taking material verbatim from texts, lectures, and articles (including anything from web-

sites) without proper citation of the author(s). All such incidents will be handled according to University policy as outlined in the *University Senate Rules* and *Student Rights and Responsibilities*. The minimum punishment for cheating or plagiarism is an "E" in the course. This is University Policy.

5. Classroom civility and decorum: The university, college and program have a commitment to respect the dignity of all and to value differences among members of our academic community. There exists the role of discussion and debate in academic discovery and the right of all to respectfully disagree from time-to-time. Students clearly have the right to take reasoned exception and to voice opinions contrary to those offered by the instructor and/or other students (S.R. 6.1.2). Equally, a faculty member has the right -- and the responsibility -- to ensure that all academic discourse occurs in a context characterized by respect and civility. Obviously, the accepted level of civility would not include attacks of a personal nature or statements denigrating another on the basis of race, sex, religion, sexual orientation, age, national/regional origin or other such irrelevant factors.
6. Academic Accommodations due to disability: If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

UNIVERSITY OF KENTUCKY

College of Arts and Sciences
Office of the Dean
213 Patterson Office Tower
Lexington, KY 40506-0027
859 257-5821
fax 859 323-1073
www.as.uky.edu

January 5, 2011

Professor David Atwood
Director, Environmental Studies Program
125 Chemistry/Physics Building
CAMPUS 0055

Dear David,

I am writing to express my enthusiastic support for the new Environmental & Sustainability Studies (ENS) B.A. Degree that you and the ENS Advisory Board devised last semester. The College fully intends to provide the resources needed to make this degree program a successful one. Indeed, when I initiated this process of designing a BA program last spring, I recognized that it would be necessary to commit College of Arts & Sciences resources to support it. Below is outlined the specific items of support that the College will provide.

I. Staff and Budget

Ms. Kari Burchfield, the College's Interdisciplinary Program Coordinator, has worked closely with you and the Board during the planning process. Ms. Burchfield or another staff member designated by the College will provide administrative support for the ENS Degree Program in the future. In the past, the College has allocated $8,000 in operating expenses to the ENS Minor Degree. It pledges to provide at least this amount in future years to support the ENS B.A. and ENS Minor degrees. Additional operating expenses will be allocated to the program as the number of majors' increases.

II. Core Courses

The ENS B.A. degree has seven core courses: ENS 201, ENS 202, ENG 205 (which will become WRD 205), PHI 336, ENS 395, and ENS 400. These courses will be taught by professors and lecturers from College departments and count as part of the normal teaching loads of these faculty. The College will provide any extra teaching resources to their home departments that are needed to maintain the integrity of these departments' curricula.

The two presently existing courses on this list, PHI 336 and ENG 205 (WRD 205), are annually offered in the fall and spring respectively. Should demand for these two courses rise as a result of the B.A. degree, the College will provide the Philosophy and Writing, Rhetoric, and Digital Media units with the resources needed to add course sections.

III. ENS Minor

The College wants regular faculty, as opposed to part-time instructors, to teach its courses. I recognize, however, that there is a need for Dr. Rebecca Glasscock (of BCTC) to continue as the instructor for ENS 200, the initial course in the ENS Minor, until the new ENS B.A. program is established. When ENS 200 is replaced by ENS 201, ENS 201 will be taught by regular UK faculty alone.

IV. Faculty Hiring

The College is committed to adding a faculty line in the area of ENS, to be hired in the 2011-12 academic year. The tenure home of the hire is open, and the College is particularly interested in hiring someone with a joint appointment in a second department. The person should be hired in a field identified by the Advisory Board as one of acute need in the College in the general area of ENS. The College is open to the possibility of additional hires in this general area, for instance, in the areas of environmental ethics or writing. I expect that in any hiring process you and the Advisory Board will work with relevant departments to identify and recruit appropriate candidates.

I appreciate the diligence and effort that you and the Advisory Board expended to achieve the goal of a new environmental degree for the College. I greatly look forward to seeing this important program established.

Sincerely,

Mark Lawrence Kornbluh
Dean

MLK:akh

cc: Ted Schatzki, Associate Dean of Faculty
Betty Lorch, Associate Dean of Research and Graduate Studies
Anna Bosch, Associate Dean of Undergraduate Programs
Kirsten Turner, Chief Financial Officer/Chief of Staff
Kathleen Harman, Director of Finance

Atwood, David A

To: Mountford, Roxanne D
Subject: RE: Quick email confirming inclusion of ENG 205 into ENS B.A. Degree Program?

-----Original Message-----
From: Mountford, Roxanne D
Sent: Thursday, December 09, 2010 9:32 PM
To: Atwood, David A
Subject: RE: Quick email confirming inclusion of ENG 205 into ENS B.A. Degree Program?

This is incredibly impressive! We're working on a BA in writing, rhetoric, and digital media, with an established course in Environmental Writing. We won't be done in time for you to include the course in your BA, but our intention is for you to replace 205 with this course in the near future. I just want you to know, though, that we're working on it! In the meantime, you have our permission to include 205 in your list.

Roxanne

Roxanne Mountford, PhD
Director, Division of Writing, Rhetoric, and Digital Media Co-Director, Composition and Communication Program Associate Professor of Rhetoric University of Kentucky
mountford@uky.edu
From: Atwood, David A
Sent: Thursday, December 09, 2010 8:29 PM
To: Mountford, Roxanne D
Subject: Quick email confirming inclusion of ENG 205 into ENS B.A. Degree Program?

Hi Roxanne,

I know you've already indicated that we can include ENG 205 as a Core course in the new ENS Degree, but I've been advised to give you a description of the program to make sure you had the information. Nothing has changed in the attached document compared to what Erik might have described to you, but it would let you see the degree plans in more detail. If you can let me know we are still okay to include ENG 205 that would be great.

Once I have your okay (and similar responses from a couple of other Chairs) I will be able to submit the full documentation package to the College. I'll send you a copy of the full submission, as well. Looks like we might actually be able to make this happen for fall 2011, but it will be a long journey through the committees…

Thanks much,
David

Atwood, David A

To: Bradshaw, David H
Subject: RE: PHI 336 in ENS Degree

From: Bradshaw, David H
Sent: Tuesday, December 14, 2010 12:04 PM
To: Atwood, David A
Cc: Sandmeyer, Robert
Subject: RE: PHI 336 in ENS Degree

Dear Prof. Atwood - Sorry for the delay getting back to you about this. I've read the ENS proposal and am certainly glad to support the plan to include PHI 336 as a core course. One minor caution is that we currently offer only two sections of this course per year, so if demand grows beyond that we may need to discuss with the College ways to expand our offerings. That's a bridge to be crossed later, and in no way tempers our enthusiasm about the proposal.

Best wishes,
David Bradshaw

Professor and Chair
Philosophy Department
University of Kentucky
Lexington, KY 40506-0027

office (859) 257-7107
fax (859) 257-3286

From: Sandmeyer, Robert
Sent: Friday, December 10, 2010 12:57 PM
To: Bradshaw, David H
Cc: Atwood, David A
Subject: PHI 336 in ENS Degree

Hi David,

David Atwood is putting together the final draft documents for the B.A. Degree in Environmental and Sustainability Studies proposal. See the attached PDF which contains the information regarding the structure and content of the degree. (I direct your attention to page 4 and 6, especially.)

He needs an email from you saying that including PHI 336 in the new ENS B.A. is okay.

Let me know if you have any questions. You can also contact David directly with questions.

Bob

Bob Sandmeyer, Ph.D.
Lecturer, University of Kentucky
Department of Philosophy
1429 Patterson Office Tower
Lexington, KY 40506-0027
USA

SIGNATURE ROUTING LOG

General Information:

Proposal Type: Course ☐ Program ☒ Other ☐

Proposal Name[1] (course prefix & number, pgm major & degree, etc.): Bachelor of Arts in Environmental & Sustainability Studies

Proposal Contact Person Name: David Atwood, Kari Burchfield Phone: 257-7304, 257-1994 Email: datwood@uky.edu, klburc2@uky.edu

INSTRUCTIONS:
Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
ENS, Director		David Atwood / 257-7304 / datwood@uky.edu	
Writing Rhetoric and Digital Media, Director		Roxanne Mountford / 257-6985 / mountford@uky.edu	
Philosophy Dept., Chair		David Bradshaw / 257-7107 / dbradsh@uky.edu	
Education Policy Committee		Randall Roorda, Humanities / 257-1033 / rroorda@uky.edu Joanna Badagliacco, Soc. Sci. / 257-4335 / jmb@uky.edu	
A&S, Associate Dean		Anna Bosch / 257-6689 / bosch@uky.edu	

External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision[2]
Undergraduate Council			
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

[1] Proposal name used here must match name entered on corresponding course or program form.
[2] Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

SIGNATURE ROUTING LOG

SIGNATURE ROUTING LOG

General Information:

Proposal Type: Course ☒ Program ☐ Other ☐

Proposal Name[1] (course prefix & number, pgm major & degree, etc.): ENS 201: Environmental & Sustainability Studies I: Humanities and Social Sciences

Proposal Contact Person Name: David Atwood, Kari Burchfield Phone: 257-7304, 257-1994 Email: datwood@uky.edu, klburc2@uky.edu

INSTRUCTIONS:
Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
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Writing Rhetoric and Digital Media, Director		Roxanne Mountford / 257-6985 / mountford@uky.edu	
Philosophy Dept., Chair		David Bradshaw / 257-7107 / dbradsh@uky.edu	
Education Policy Committee		Randall Roorda, Humanities / 257-1033 / rroorda@uky.edu Joanna Badagliacco, Soc. Sci. / 257-4335 / jmb@uky.edu	
A&S, Associate Dean		Anna Bosch / 257-6689 / bosch@uky.edu	

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Council	Date Approved	Signature	Approval of Revision[2]
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Senate Council Approval		University Senate Approval	

Comments:

[1] Proposal name used here must match name entered on corresponding course or program form.
[2] Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

SIGNATURE ROUTING LOG

SIGNATURE ROUTING LOG

General Information:

Proposal Type: Course ☒ Program ☐ Other ☐

Proposal Name[1] (course prefix & number, pgm major & degree, etc.): ENS 202: Environmental & Sustainability Studies I: Natural Sciences and Policy

Proposal Contact Person Name: David Atwood, Kari Burchfield Phone: 257-7304, 257-1994 Email: datwood@uky.edu, klburc2@uky.edu

INSTRUCTIONS:
Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
ENS, Director		David Atwood / 257-7304 / datwood@uky.edu	
Writing Rhetoric and Digital Media, Director		Roxanne Mountford / 257-6985 / mountford@uky.edu	
Philosophy Dept., Chair		David Bradshaw / 257-7107 / dbradsh@uky.edu	
Education Policy Committee		Randall Roorda, Humanities / 257-1033 / rroorda@uky.edu Joanna Badagliacco, Soc. Sci. / 257-4335 / jmb@uky.edu	
A&S, Associate Dean		Anna Bosch / 257-6689 / bosch@uky.edu	

External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision[2]
Undergraduate Council			
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

[1] Proposal name used here must match name entered on corresponding course or program form.
[2] Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

SIGNATURE ROUTING LOG

Environmental Studies Graduate Certificate Program Proposal

Members of the committee: Shannon Bell (Chair), Bob Sandmeyer, Betsy Beymer-Farris, Kathy Newfont, David Atwood, Jim Krupa, and Lisa Cliggett (on leave)

Rationale:

Given the increasing awareness of environmental crises facing our planet, such as climate change, pollution, and biodiversity loss, interdisciplinary research, teaching, and grant funding to understand and solve these significant environmental problems is growing at a tremendous rate. As a result of this great interest in the environment by both students and scholars, the large majority of our benchmark institutions offer doctoral and master's degrees and/or certificate programs in environmental studies and sciences. Therefore, our proposal for an Environmental Studies Graduate Certificate Program provides an exciting opportunity to create cohesion and transdisciplinarity between faculty and students across UK's campus and to showcase our ability to lead this fast growing field of study about environment-society relationships. In addition, providing a cross-college graduate certificate could provide a way to help connect and build upon the existing and important environment and sustainability-related initiatives currently taking place in the Colleges of Arts & Sciences and Agriculture, Food, and the Environment (as well as other campus wide programs). For these reasons, we propose an Environmental Studies Graduate Certificate that will provide opportunities to build transdisciplinary scholarship and showcase UK's strengths in research, teaching, and graduate training focused on the environment. Our vision, goals, and requirements for this certificate are provided below.

Graduate Certificate in Environmental Studies Requirements:

12 credits + Interest in incorporating an environmental/ecological theme into MA thesis, PhD dissertation, or practicum required by the student's home department.

COURSEWORK:

- **Core Class** (3 credits)
  All students enrolled in the certificate program will take one core class that is co-taught by three faculty members (one from the social sciences, one from the natural/physical sciences, one from the humanities). Each faculty member will teach a 5-week module in his or her area, covering one of the three hours of course credit.

- **Electives** (6 credits)
  Students will take two electives from a list of suggested courses focusing on the environment from across the university. Students may propose courses not on the list, but at least one of the two courses must be in a department outside the student's home department. Prior to

registration, the graduate director will send an email to all participating departments requesting a list of environment-focused graduate courses (typically 500 level and above) that will be offered during the following semester. This list will be posted to the certificate program's website and distributed to graduate certificate students. Electives must be approved by the graduate program director.

- **Professional Practicum I & II** (3 credits total – 1 fall, 2 spring)

  Two professional practicums will focus on planning and participating in the University of Kentucky Political Ecology Working Group's (UK-PEWG) Dimensions of Political Ecology (DOPE) annual interdisciplinary and internationally recognized graduate and undergraduate conference on environment-society relationships. This entirely graduate student-organized conference attracts undergraduate and graduate students, scholars, and practitioners from around the world interested in and working on environment-society relationships from a wide variety of disciplinary backgrounds. Given the conference's international notoriety and success, we feel this event to be the perfect venue to showcase the work of our students and to advertise the program. The course expectations for each semester will be as follows:

  <u>Professional Practicum I (Fall Semester, 1 credit hour):</u>

  1. Become a member of the Political Ecology Working Group and DOPE conference planning committee.
  2. Participate in all Dimensions of Political Ecology (DOPE) Conference planning meetings (optional service on DOPE advisory committee, if elected by the Political Ecology Working Group). Sign-in sheet will be provided at DOPE meetings for attendance at the meetings and sent to the office mailbox of faculty member teaching the course.
  3. Plan an "Environmental Studies Graduate Certificate Session" for the DOPE conference. Tasks include: creating a call for proposals/abstracts to be distributed to all Environmental Studies Graduate Certificate students, nominating and inviting a session discussant, and conducting preliminary research for a research paper that each student enrolled in Professional Practicum I will present at the DOPE conference.
  4. Produce a document detailing
     a. Session Call for Proposal
     b. Abstracts of all papers solicited/accepted to the session
     c. Log of planning activities completed during (summer and) fall term
     d. Abstract of the student's own research he/she plans to present at DOPE

  <u>Professional Practicum II (Spring Semester, 2 credit hours):</u>

  1. Continual engagement with PEWG and DOPE.
     a. Active participation in the conference administration tasks generally
     b. Organizing the Environmental Studies Graduate Certificate session(s)

2. Produce:
    a. 10-20 page manuscript of research presented at the Environmental Studies Graduate Certificate session(s).
    b. List of contacts made through DOPE that are relevant to student's academic interests (a "network summary")
    c. Log of all organizing activities during spring term
3. Optional: Prepare manuscript presented at the conference for submission to a peer-reviewed journal.

The two practicums, which must be taken during consecutive semesters, will be overseen by an Environmental Studies-affiliated faculty member (qualifying for 3 faculty teaching credit hours).

Graduate Certificate in Environmental Studies

Possible Electives

(Notes: Some of the courses are cross listed. Not all of these courses are offered regularly. Some of the courses do have prerequisites.)

Anthropology Courses

ANT 525 APPLIED ANTHROPOLOGY

ANT 543 CULTURAL RESOURCE MANAGEMENT

ANT 608 ANTHROPOLOGY OF FOOD AND NUTRITION

ANT 637 SOCIOCULTURAL DIMENSIONS of ECONOMIC DEVELOPMENT

ANT 640/SOC 640 SCIENCE, AGRICULTURE, AND DEVELOPMENT

ANT 641/SOC 641 GENDER ISSUES IN DEVELOPMENT

ANT 684/SOC 684 FARMING SYSTEMS RESEARCH METHODS

ANT 725 SEMINAR IN APPLIED ANTHROPOLOGY

ANT 732 SEMINAR IN ECOLOGICAL ANTHROPOLOGY

ANT 734 SEMINAR IN ECONOMIC ANTHROPOLOGY

ANT 736/ SOC 737 CULTURE, ENVIRONMENT AND DEVELOPMENT.

ANT 774 FOOD AND FOOD SECURITY IN A CHANGING WORLD

Biology Courses

BIO 530 BIOGEOGRAPHY AND CONSERVATION

BIO 561 INSECTS AFFECTING HUMAN & ANIMAL HEALTH

BIO 609 POPULATION AND COMMUNITY ECOLOGY

BIO 667 INVASIVE SPECIES BIOLOGY

Chemistry Courses

CHE 410G INORGANIC CHEMISTRY (understanding common elemental water contaminants like Hg, As, etc. other subjects that require a fundamental knowledge of chemistry)

CHE 514 DESCRIPTIVE INORGANIC CHEMISTRY (mostly transition metal chemistry, but hits other subjects that require a fundamental knowledge of chemistry, beyond CHE 410G)

CHE 565 ENVIRONMENTAL CHEMISTRY

CHE 580 TOPICS IN CHEMISTRY: SUBTITLE (if it is an environmental-relevant course).

Earth & Environmental Sciences Courses

EES 610 TOPICS IN HYDROGEOLOGY AND SURFICIAL PROCESSES (If topic pertains to "contaminant hydrogeology" or another topic of relevance to environmental studies).

Geography Courses

GEO 451G FLUVIAL FORMS AND PROCESSES.

GEO 465 SPECIAL TOPICS IN GEOGRAPHY.

GEO 490G AMERICAN LANDSCAPES.

GEO 530 BIOGEOGRAPHY AND CONSERVATION.

GEO 531 LANDSCAPE ECOLOGY.

GEO 544 HUMAN POPULATION DYNAMICS.

GEO 550 SUSTAINABLE RESOURCE DEVELOPMENT AND ENVIRONMENTAL MANAGEMENT.

GEO 619 REMOTE SENSING FUNDAMENTALS.

GEO 708 GEOGRAPHIC INFORMATION SYSTEMS RESEARCH METHODOLOGIES.

GEO 709 ADVANCED GISCIENCE.

GEO 712 DEVELOPMENT STUDIES AND GEOGRAPHY

GEO 718 TOPICAL SEMINAR IN GEOGRAPHY OF ENVIRONMENT AND RESOURCES

GEO 721 TOPICAL SEMINAR IN PHYSICAL GEOGRAPHY

GEO 731 EARTH SURFACE SYSTEMS.

History Courses

While there are currently no environmental-related history courses on the books, new faculty member Kathryn Newfont would like to develop a graduate-level Environmental History course.

Philosophy Courses

(None of these courses, except for PHI 531.001, is always directly about the environment, but may be, depending on course subtitle or individual project selected)

PHI 531 ADVANCED TOPICS IN ETHICS (Subtitle Required). (3)

PHI 531.001 Advanced Topics in Ethics: Appraisals of Aldo Leopold's Land Ethic (Fall 2016, Sandmeyer)

*PHI 561 PHILOSOPHICAL PROBLEMS IN THE NATURAL SCIENCES (Subtitle). (3)

PHI 630 SEMINAR IN VALUE THEORY. (3)

PHI 680 SPECIAL TOPICS IN PHILOSOPHY. (3)

PHI 755 TUTORIAL IN INTERDISCIPLINARY ISSUES. (1-6)

PHI 790 RESEARCH IN PHILOSOPHY. (3)

Sociology Courses

SOC 640/ANT 640 SCIENCE, AGRICULTURE, AND DEVELOPMENT

SOC 641/ANT 641 GENDER ISSUES IN DEVELOPMENT

SOC 684/ ANT 684/ FARMING SYSTEMS RESEARCH METHODS

SOC 735 TOPICAL SEMINAR IN SOCIAL INEQUALITIES: INEQUALITIES IN THE ENVIRONMENT

SOC 737/ANT 736 CULTURE, ENVIRONMENT AND DEVELOPMENT

Another graduate course that is currently being developed is CLIMATE CHANGE, ENVIRONMENT, AND SOCIETY (no course number yet)

Departments in the College of Agriculture, Food, and the Environment (CAFÉ) that might also have courses that could qualify:

- Agricultural Economics
- Animal & Food Sciences

- Biosystems & Agricultural Engineering
- Community & Leadership Development
  Entomology
- Forestry
- Integrated Plant & Soil Science
- Plant Pathology
- Veterinary Science

Developing and Establishing an Environmental Humanities Initiative at the University of Kentucky

DRAFT (incomplete)
September 2021

(*an analysis of benchmark institutions*)

Environmental Humanities Research Data
https://www.uky.edu/~rsand1/environmentalhumanities

Bob Sandmeyer, Ph.D.
Assistant Professor of Philosophy
Environmental and Sustainability Studies Program Faculty
University of Kentucky
bob.sandmeyer@uky.edu

INTRODUCTION

(*to be written in collaboration with faculty cluster*)

- humanities defined
    - 1965 National Foundation on the Arts and the Humanities Act:
        - "The term 'humanities' includes, but is not limited to, the study and interpretation of the following: language, both modern and classical; linguistics; literature; history; jurisprudence; philosophy; archaeology; comparative religion; ethics; the history, criticism and theory of the arts; those aspects of the social sciences which have humanistic content and employ humanistic methods; and the study and application of the humanities to the human environment with particular attention to reflecting our diverse heritage, traditions, and history and to the relevance of the humanities to the current conditions of national life."
- a definition of EH
    - https://web.colby.edu/environmentalhumanities/scholars/
        - EH is both "critical" and "imaginative," bearing on analytical and creative aspects of humanities work. "Critical" is any method or approach that reveals and questions the conditions under which knowledge and practice bearing on human/nonhuman nature relations is produced, whether these conditions are institutional, historical, technological, cultural, ideological, social, symbolic, economic, or conceptual. The plurality of critical approaches within the humanities can provide constructive contrasts that reveal assumptions not available to those operating with the methods of a single isolated discipline. Secondly, the imaginative storytelling, narrative, and sensory experiences the arts can provide generate powerful ways of reckoning with the madness of our current situation, stitching together pathways through it, and imagining alternative futures in human and nonhuman collectives to come.
- COVID statement
    - Over the past two years, nature has imposed on humanity a new order in a way that we have not in our lifetimes experienced. Parts of the world are opening again after a global lockdown. In other parts of the world, recovery seems stillborn. In the Global North, universities and colleges are holding in-person classes, while aggressive variants of the Coronavirus continue to threaten even vaccinated individuals. No matter where in the world one finds oneself, any progress we have made confronting the myriad problems forcing themselves upon us feels, at best, tentative. To help us to understand what we have been through – what we are going through, how we can survive and, even, flourish in the new normal before us, the Environmental Humanities are more important today than ever before. Faculties, students, people everywhere are both exhausted and traumatized by the impact the pandemic has had on their mental and physical health. The virus has had such a universal impact on the peoples of

the world, no singular discipline is capable of truly addressing the human situation we are living through now. The trans-disciplinary approach that defines the Environmental Humanities provides the most robust and necessary means by which to analyze, to imagine, even, the moral and natural landscape ahead of us.

ENVIRONMENTAL HUMANITIES AT UK

(*to be written in collaboration with faculty cluster*)

- The Promise of EH (see https://www.uky.edu/~rsand1/environmentalhumanities/)
    - faculty enrichment
        - Faculty Cluster
            - amplify strengths at UK
                - CHSS
                - Gaines Center
                - Faculty Sustainability Council
                - Sustainability Programs
                    - A&S
                        - ENS
                    - CAFE
                        - NRES
                        - Sustainable Ag
                - Chellgren Center
        - Research:
            - EH Journals
            - EH Book series
        - Bridges
            - Association for the Study of Literature and Environment
            - Philosophers for Sustainability
    - pedagogical opportunity
        - develop curriculum
            - undergraduate certificate
            - graduate student development
        - teaching across disciplines and methods
            - integration with UK Museum
    - community engagement
        - land-grant mission
            - model: agricultural extension
        - KY Humanities
- Granting Sources
    - Andrew Mellon Foundation
    - NEH
        - Planning Grants

ENVIRONMENTAL HUMANITIES AT UK'S BENCHMARK INSTITUTIONS

Benchmarks defined

The benchmark schools as defined herein are taken from two distinct lists. First, the UK Office of University Assessment (OUA) lists eleven schools as UK Benchmarks Institutions. In order to provide the richest resource for this study, we have also included the list of UK Benchmark Institutions as defined in the 2012 Environmental and Sustainability Studies program proposal to the UK Senate. The inclusion of this list allows us a deep but focused review of EH programming at UK benchmarks. Indeed, review of these institutions EH initiatives provides especially fruitful insight into the creative, intersectional, and robust curricular, research, and engagement opportunities afforded to an institution like UK which promotes the Environmental Humanities at their own institution.

University of Kentucky Benchmark Institutions		
List as defined by UK's Office of Univ. Assessment	**List as defined in the ENS proposal to UK Senate***	**SEC Academic Conference (for sake of comparison)**
1. University of Arizona	*1. University of Arizona*	a) University of Alabama
2. University of California-Davis	2. University of California - Los Angeles	b) University of Arkansas
3. University of Florida	3. University of Georgia	c) Auburn University
4. University of Iowa	4. University of Illinois	d) University of Florida
5. University of Michigan-Ann Arbor	*5. University of Iowa*	e) University of Georgia
6. Michigan State University	6. University of Maryland	f) Louisiana State University
7. University of Minnesota-Twin Cities	*7. University of Michigan-Ann Arbor*	g) University of Mississippi
8. University of Missouri-Columbia	*8. Michigan State University*	h) Mississippi State University
9. University of North Carolina at Chapel Hill	9. University of Minnesota-Twin Cities	i) University of Missouri-Columbia
10. Ohio State University-Main Campus	*10. University of North Carolina at Chapel Hill*	j) University of South Carolina
11. University of Wisconsin-Madison	11. North Carolina State	k) University of Tennessee - Knoxville
	12. Ohio State University-Main Campus	l) Texas A&M
	13. Pennsylvania State University	m) Vanderbilt University
	14. Purdue University	
	15. Texas A&M	
	16. University of Virginia	
	17. University of Washington	
	18. University of Wisconsin-Madison	
* Italicized entries in ENS list are schools listed in the UK Office of Assessment list of benchmark institutions.		

Survey of Benchmarks - Types of Initiatives

Review of the UK Benchmark Institutions uncovered 5 distinct types of EH initiatives undertaken by these schools.

1. the faculty cluster,
2. project-based EH initiatives,
3. program-based EH initiatives,
4. the curriculum approach to EH
5. and multi-modal approaches

The Faculty Cluster

In 2008, UC Davis inaugurated an EH faculty supercluster funded internally by a $5,000 grant from the 20th Anniversary-UC Presidential Humanities Initiative Program. This first grant resulted in a two-day conference on May 7th and 8th, 2009 titled "California, the University, and the Environment."[1] In 2012, ostensibly led by faculty involved in this supercluster, the University inaugurated the UC Davis Mellon Research Initiative titled "Environments & Societies" This initiative sought " to undertake the broad rethinking of human-nature interactions that are critical to meeting the environmental challenges of our era."[2] The primary deliverable of this initiative was an especially active colloquia series that continued through spring 2017.[3] Meetings centered around the work of faculty from diverse disciplines across the country. Papers were submitted in advance and workshopped with UC Davis faculty and graduate students.[4] Since 2017, no organized programs or initiatives appear under the Environmental Humanities rubric at UC Davis. At this time, the faculty supercluster appears to exist in name only.

The Project-Based EH Initiative

In 2019, four land-grant colleges, the University of Florida, the University of Georgia, Louisiana State University, and the University of North Carolina at Chapel Hill partnered together with an alliance of regional stakeholders to establish the "Coasts, Climates, the Humanities, and the Environment Consortium (CHECC)." Funded by a two-year $150,000 grant from the Andrew W. Mellon Foundation, this initiative began by establishing two clusters associated with the land-grant mission of these universities: "Coasts, Archives and Climates" and "Coastal Futures and the Public Humanities." CHECC though the office of The Wilson Center for Humanities & Arts at the University of Georgia hosted its first member meeting of September 26, 2019, titled "Coastal Thinking: A Conversation." Two other meeting have taken place, but the planned series of partner conversations was interrupted by the Coronavirus pandemic. During their first years, CHECC has undertaken two regional public humanities projects. The first, the "Atlas of Meaning" sets out to map the geography of the Terrebonne Parish, Louisiana as defined by local experts in the communities living and working there. "This atlas of meaning will expose the neglected but fundamental humanities elements that can provide vital clues for culturally situated adaptive pathways in a perilous environmental

[1] http://environmentalhumanities.ucdavis.edu/conference/about.htm
[2] http://environmentsandsocieties.ucdavis.edu/
[3] http://environmentsandsocieties.ucdavis.edu/colloquiumschedule/
[4] http://ecologywithoutnature.blogspot.com/2011/12/environments-and-societies-at-uc-davis.html

setting."[5] Directed by the University of North Carolina-Chapel Hill, the second project, titled the " Voices of Resilience and Recovery in Robeson County," Due to the disruptions caused by the Coronavirus pandemic, this project is restarting now. The "Voices of Resilience" projects seeks to document and amplify the stories of differentiated communities impacted by the hurricanes in Robeson County, NC, particularly Hurricanes Matthew and Florence in Robeson County. At present the project aims, first, to document the life-experiences using a participatory photographic project employing Photovoice. Second, the initiative will produce a number of performance workshops among a number of distinct constituencies in the county. Robeson County is one of the most racially diverse in North Carolina and includes among its members of the Lumbee Tribe. The project identifies for objectives: (i) personify the data on climate change impacts, (ii) incentivize manufacturers, developers, and farmers, (iii) facilitate policy discussion across difference, and (iv) give voice and space and ignite agency among impacted constituencies.[6]

The Program-Based EH Initiative

The University of Minnesota has established an exciting program-based Environmental Humanities Initiative, funded by a grant from the College of Liberal Arts. The institute of Environmental Humanities is consciously intersectional and has provided an especially robust slate of talks, colloquia, and graduate student roundtables since at least spring 2017 ranging over Indigenous studies, political ecology, food studies, cultural geography, animal studies, and cultural anthropology. "Environmental humanities scholars also seek to bridge the divide between academic analysis and practice in the public sphere."[7] This EH Initiative is geared for the most part at the graduate level, but the University actively promotes Environmental Humanities undergraduate level coursework as well. The University of Minnesota is home to at least four distinct programs and initiatives supporting the pursuit of the Environmental Humanities. he cross-campus, interdisciplinary Institute for the Environment promotes the study and implementation of sustainability and consciously promotes partnerships with business, investment, media, government, academic and the nonprofit sectors. The university-wide Institute of Advanced Study which provide funding support for faculty and graduate interdisciplinary research which engages the wider community. The Religion, Philosophy, and the Environment Initiative was developed to understand the roles played by religions, religious practices, religious epistemologies, and religious ideologies in the changing human-environment relationship but appears currently dormant. And lastly, the CREATE initiative, funded by the University of Minnesota's Grand Challenges Research Initiative, promotes research into problems at the intersection of environment and equity. The Environmental Humanities Initiative at the University of Minnesota proffers an exciting confluence of research, third-party engagement, and inclusive practice around the idea of the Environmental humanities.

[55] https://willson.uga.edu/public-partners/coasts-climates-the-humanities-and-the-environment-consortium/atlas-of-meaning/?highlight=terrebonne

[6] https://willson.uga.edu/public-partners/coasts-climates-the-humanities-and-the-environment-consortium/voices-of-resilience-and-recovery-in-robeson-county/?highlight=robeson

[7] https://envhum.umn.edu/

The Curriculum Approach

Of the all the benchmark institutions studied, the Nelson Institute for Environmental Studies at the University of Wisconsin-Madison has developed the most fully integrated Environmental Humanities program into their curricular landscape. The Center for Culture, History, and Environment (CHE) within the Nelson Institute for Environmental Studies, offers both a graduate certificate and a Ph.D. minor. The graduate/professional certificate requires 12-13 credit hours from at least two of the main divisions of the UW-Madison curricula, i.e., the humanities, the social sciences, and the natural sciences. The certificate includes a required 3-credit interdisciplinary methods graduate seminar as core, and students define a thematic sequence for the remaining courses. [8] The Ph.D. minor requires a 9-credit sequence of courses defined by student interest and drawing from two distinct divisions.[9] CHE hosts lunchtime environmental colloquia every semester, produces *Edge Effects* – a CHE graduate student digital magazine,[10] organizes a CHE graduate seminar every spring (in addition to the required methods course for the certificate), sponsors collaborative place-based multidisciplinary workshops annually, and hosts or sponsors campus-wide workshops continually. Fundamentally, CHE provides a transdisciplinary home to graduate students, faculty, and associates from across the university and the local and regional community. CHE is truly "at the forefront of some of the most exciting humanities and social science scholarship on the entangle histories of nature and culture."[11]

Multi-Modal Approaches

The University of Arizona promotes the Environmental Humanities through a variety of initiatives within the Arizona Environment network. These initiatives appear rather to be the product of work by fine arts, design, history, literature, philosophy, and cultural studies faculty working for the most part independently. The University of Iowa created a Spatial and Environmental Humanities Working Group within the Obermann Center for Advanced Studies. In 2016-27, the university established the Spatial and Environmental Humanities Working Group; and a number of faculty currently list Environmental Humanities as an area of expertise. Environmental Humanities at the University of Michigan appears to have been especially active during the 2018-19 academic year, named the Year of Humanities and Environments by the university. Humanities faculty at that time organized a day-long conference titled "Concepts for the Environmental Humanities." Currently, the University of Michigan hosts a graduate level Animal Studies and Environmental Humanities Interest Group under the leadership of Dr. Antoine Traisnel, Assistant Professor of Comparative Literature and of English Language and Literature. An Environmental Humanities initiative at Ohio State University, which was funded for two years (2016-2018) by the Humanities & Arts Discovery Themes, appears to be moribund now. At Michigan State University, a number of faculty list EH and ecocriticism as an area of interest, but there appears to be no organized cluster of initiative. And the University of

[8] https://guide.wisc.edu/graduate/environmental-studies/culture-history-environment-graduate-professional-certificate/index.html#requirementstext

[9] https://guide.wisc.edu/graduate/environmental-studies/culture-history-environment-doctoral-minor/index.html#requirementstext

[10] https://edgeeffects.net/

[11] https://che.nelson.wisc.edu/

Missouri has no apparent faculty cluster or initiative in the Environmental Humanities. However, the Executive Director of Missouri Humanities Council and Adjunct Professor of penned a letter indicating a new Environmental Humanities initiative in 2020.[12]

When considering the rich collaboration EH initiatives have with sustainability efforts and programming, the Environmental Humanities initiative at the University of Virginia stands out. On the one hand, UVA offers a Graduate Certificate in Environmental Humanities. A 12-hour certificate, " the Certificate in Environmental Humanities trains graduate students to integrate methods of the humanities into cross-disciplinary environmental research."[13] With 9 core faculty, the UVA EH program mentors graduates students from all across all disciplines. The EH Programs lists four active related initiatives. The first, the Coastal Futures Conservancy promotes long-term ecological research. It is unclear if this initiative, funded by an NSF grant is still active, or if it has been subsumed within the currently active Virginia Coastal Reserve (VCR) long-term ecological research project supported by the NSF. Second, the Mapping Indigenous Worlds project is a Mellon Global South Humanities Lab at the University of Virginia. " Especially fecund, "the Mapping Indigenous Worlds Lab comprises four overlapping work clusters: 'Representing Space and Place: Maps, Images and Narratives"; 'Curation: Arts and Music'; 'Care: Environment, Language, and Heritage'; and 'Collaborative Community Engagements'."[14] Third, The Sanctuary Lab at UVA studies the impact of global climate change on sacred landscapes. The Lab's research focus is typically defined annually has focused or will focus on four distinct sanctuaries: (i)Yellowstone National Park (2018), (ii) Bhutan 2019, the Jordan River (2022), and (iv) the Virginia Coastal Reserve. This last ecological zone is ongoing and appears to be identical to the VCR research project mentioned above. Lastly, the Water Futures Initiative is an initiative taking place under the UVA Environmental Resilience Institute. The wide array of research opportunities afforded by UVA's EH initiative, its strong core faculty, and its robust public-private partnerships offer a model for long-term EH planning.

A special mention should be made of UCLA's EH initiative. At UCLA Professors Ursula Heise and Jon Christensen and postdoc Michelle Niemann organized and hosted the Sawyer Seminar on the Environmental Humanities during the 2014-15 AY. This seminar. Funded by the Mellon Foundation, the Sawyer series included of nine monthly seminars and resulted in the publication of the Routledge Companion to the Environmental Humanities, © 2017. UCLA has a strong English Department within which work numerous scholars in ecocriticism and the environmental humanities.

The University of Georgia has been mentioned already as it is a partner member in the "Coasts, Climates, the Humanities, and the Environment Consortium" with the Universities of Florida, Louisiana State, and North Carolina-Chapel Hill. UGA's special status among equals in this CCHEC partnership is of special note, as the Consortium's logistical home is located at UGA in the Wilson Center for Humanities and the Arts. In addition to CCHEC, however, UGA also boasts the Ecocriticsm/Environmental Working group. "Texas A&M is one of only 17 universities in the United States with the triple designation of land-grant, sea-grant, and space-grant

[12] https://mohumanities.org/ss-2020-letter-from-ed/
[13] https://eh-uva.net/graduate-certificate/
[14] https://uva.theopenscholar.com/mapping-indigenous-worlds/about

university.[15] Hence the work of the Glasscock Center for Humanities Research provides a model for other land-grant institutional efforts to integrate EH into their land-grant mission. The University of Illinois offers a cluster of undergraduate courses related to Environmental Humanities. The cluster seems to fulfill part of an undergraduate certificate in Bio-Humanities at Illinois, funded by the Andrew W. Mellon Foundation. The EH course cluster was offered AY 2019-20, and it is unclear if this remains a vital option. Pennsylvania State University, while having no cluster dedicated to environmental humanities, does host the Rock Ethics Institute. This dynamic institute has a long and influential history of humanities research both nationally and internationally, and sustainability is an identified topic of concern within the Institute.

Summary of Benchmarks Study

- Strong faculty engagement essential to success
- Research driven pedagogy
- Conferences & Paper Workshops which bring unique and influential voices to campus that can substantively engage UK faculty and grad students (paper workshops)
- Regional research partnerships, especially SEC schools, other land-grant institutions
- Multi-faceted engagement with local and regional constituencies, especially of minority and native stakeholders

RECOMMENDATIONS

- **short term**
    - connect with Cooperative for Humanities and Social Sciences[16] as incubator to new initiative
    - form EH faculty cluster:
        - pedagogy focus
            - curriculum development
            - reading groups
        - research focus
            - writing groups
            - conference organizing
        - engagement focus
            - public/private programming
            - active public education
    - plan and implement a Nearly Carbon-Neutral (NCN)[17] conference or colloquia
        - theme: #ecologies
        - TEK
        - #blackecologies
- **medium term**

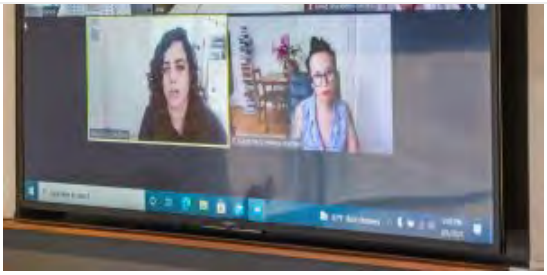
[15] https://liberalarts.tamu.edu/glasscock/hlss/
[16] https://chss.as.uky.edu/
[17] https://hiltner.english.ucsb.edu/index.php/ncnc-guide/

    - develop undergraduate and graduate curriculum
        - undergraduate certificate
            - consult with ENS program to amplify that program
        - graduate student development
            - hire graduate assistant to help coordinate colloquia
    - produce a textbook: published either with Routledge or Cambridge
        - EH pedagogy
        - #ecologies
- **long term**
    - establish regional EH Center at UK
        - Andrew W. Mellon Grant
        - NEH Humanities Connections - Planning Grant

2021 Colby Summer Institute in Environmental Humanities: A Week of Inspiration and Collaboration

From August 1st to 7th, 2021, the Center for the Arts and Humanities held the second annual Colby Summer Institute in Environmental Humanities. It was a week of innovation and sharing, of new perspectives discovered and new friendships forged. The three lecturers were powerful speakers and gifted leaders, and the twenty six participants contributed to a dynamic and engaging week. We could not have asked for a better group, or a more successful institute.

The Summer Institute was funded by a generous donation from the Andrew W. Mellon Foundation, and was organized by Special Assistant to the Provost for Humanities Initiatives and Professor of Classics Kerill O'Neill, Assistant Professor of English Christopher Walker, and Environmental Humanities Program Coordinator Ayla Fudala.



be postponed for a year due to the Covid-19 pandemic. It was held in hybrid format so that those unable to travel due to COVID-related concerns could still participate. To ensure the safety of everyone involved, proof of vaccination was required from all participants, seminar leaders, and associated staff. Remote participants joined the seminars, lectures, and workshops via zoom.

The eighteen in-person participants hailed from as far away as Peru and Germany, and some of our nine remote participants called in from Turkey and Wales. This year's guest lecturers were **Stacy Alaimo**, Professor of English and Core Faculty Member in Environmental Studies at the University of Oregon, **Bishnupriya Ghosh**, Professor of English and Global Studies at the University of California, Santa Barbara, and **Imre Szeman**, Professor of Communication Arts at the University of Waterloo, Canada. There was also a spotlight lecture by **Krushil Watene**, Associate Professor of Humanities Media and Creative Communications at Massey University, who called in from New Zealand.

Stacy Alaimo

Bishnupriya Ghosh

Imre Szeman

Seminar leaders and participants arrived in Waterville on the evening of Sunday, August 1st, and got to know one another over a pizza dinner in the Chace Forum of Alfond Commons, the downtown dormitory where participants were lodged and where the majority of the week's events took place.

Monday August 2nd was the first full day, and started out with an engaging seminar class led by Professor Stacy Alaimo on her special area of interest, "Science Studies and the Blue Humanities". Next came the breakout workshops, during which participants were divided into three groups, one led by each seminar

Bishnupriya Ghosh (pictured right) gave a public lecture titled *The Blood Files: Epidemic, Medium, Milieu*. Ghosh explored the field of blood studies, touching on topics ranging from the medical study of blood, to artists who used blood as their medium. Monday concluded with the Opening Dinner, during which participants, seminar leaders, organizers, and affiliated Colby faculty came together in conversation.

Tuesday began with a seminar class by Professor Ghosh, titled "Microbial Life and the Media Question." The afternoon public lecture, given by Professor Imre Szeman (pictured left), was titled *Solar Life*, and discussed the various political, economic, and environmental implications of the potential transition to a solar powered society. That

environmental folklore, and its persecution by British colonists.

On Wednesday, participants and leaders took a day trip to Allen Island, a beautiful island off the Maine coast that is managed by the Up East Foundation, an organization created by the famous Wyeth family of painters. After taking a boat from Port Clyde to the island, participants were given an introduction to the island's history by Colby student Liam Cotter '24 , and met the island's friendly resident dog, Cody. Participants then walked to the south end of the island, passing fields full of monarch butterflies, ponds dotted with water lilies, and venerable yellow birches. Once participants arrived at the other end of the island, lunch was provided. Then some participants chose to join birder Louis Bevier for a guided tour through the forest. A number of birds were spotted, including a trilling hermit thrush and a bald eagle standing guard over a beach filled with seals. Participants returned to Waterville, and the day ended with a party at the home of organizer Kerill O'Neill, where everyone discussed their work and enjoyed one another's company.

Thursday followed the same schedule as Monday and Tuesday, starting with a seminar led by Professor Szeman titled "Extractivism: On the Cultures of Resource Extraction." Then participants split into their breakout groups to workshop their works in progress. The final public lecture, given by Professor Alaimo (pictured right), was titled "*Out of our Depths: Science, Aesthetics, and Global Visions of the Deep Sea*." This lecture reviewed depictions of the deep ocean in contemporary society, discussing the parallels often drawn between deep sea exploration and space exploration, and between the often

which penetrate the unknown. That evening, participants walked to Railroad Square Cinema, where they watched the 2020 black and white film *Gunda (Viktor Kossakovsky)*, which paints a portrait of the secret lives of farm animals.

On Friday, the day began with two writing workshops: one on nonfiction, led by Professor of English Michael Burke, and one on creative writing, led by Assistant Professor of English Sarah Braunstein. Participants and leaders alike chose a workshop, and the quality of the writing produced in these short sessions, as well as the willingness of participants to share their work, was astonishing. That afternoon, participants went up to campus for a guided tour of the arboretum. Everyone was split into two groups, one led by Oak Professor of Biological Sciences Judy Stone, and another led by Assistant Professor of

Colby Outing Club. Then participants walked to the Colby Museum of Art, where they were given a tour of the exhibitions by Linde Family Foundation Curator of Academic Engagement Jessamine Batario, with an emphasis on pieces with environmental themes. After the tour was complete, the group walked to Johnson Pond, where a lobster bake was waiting. Everyone enjoyed the satisfying labor of cracking open their lobsters as the sun set over the pond.

After a closing discussion on Saturday morning, participants and seminar leaders departed, making their farewells to the friends they had made over the course of the Summer Institute. It is always difficult to say goodbye, but we know that the spirit of academic communion and interdisciplinary

Article written by Ayla Fudala, Environmental Humanities Program Coordinator

A project of

Colby CENTER FOR THE ARTS AND HUMANITIES

Colby ENVIRONMENTAL STUDIES

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University of Kentucky | College of Agriculture, Food and Environment
Center for Student Success

May 4, 2022

MEMORANDUM

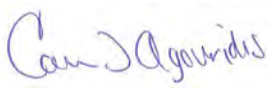
TO: Mark Williams, Horticulture, SC Chair
Krista Jacobsen, Horticulture, DUS
Makenzie Barr, Dietetics and Human Nutrition
David Gonthier, Entomology
Erin Haramoto, Plant and Soil Sciences
Ann Leed, Animal and Food Sciences
Karen Rignall, Community and Leadership Development
Robert Sandmeyer, Philosophy
Stacy Vincent, Community and Leadership Development

FROM: Carmen Agouridis, Associate Dean for Instruction

RE: Appointment to Steering Committee for the BS program in Sustainable Agriculture and Community Food Systems in the College of Agriculture, Food and Environment.

C: Dean Cox and Interim Dean Brady; Chairs Coffey, Harrison, Look, McCulley, Palli, Stephenson, and Williams

Thank you for agreeing to serve as members of this Steering Committee for the 2022-2023 academic year under the leadership of SC Chair Mark Williams and DUS Krista Jacobsen. Dean Cox and I very much appreciate your service to this important and impactful undergraduate program.



UK
UNIVERSITY OF
KENTUCKY

UKAg
College of Agriculture
Office of Academic Programs
N6 Agricultural Science Building North
Lexington, KY 40546-0091
859 257-3469
www.ca.uky.edu/students

October 31, 2011

MEMORANDUM

TO: Ben Abell, South Farm and CSA Manager
Michael Bomford, Kentucky State University
Krista Jacobsen, Horticulture
Mark Williams, Horticulture, DUS
Keiko Tanaka, Community and Leadership Development
Lee Meyer, Agricultural Economics, Chair
Sarah Lovett, SAG program graduate
Rebecca McCulley, Plant and Soil Sciences
Alison Gustafson, Nutrition and Food Science
Robert Sandmeyer, Philosophy

FROM: Larry Grabau, Associate Dean for Instruction

RE: Your appointment to the Steering Committee for the Individualized Program in Sustainable Agriculture for AY 2011-12 in the College of Agriculture.

C: Deans Smith, Tsegaye ; Chairs Houtz, Hansen, Maynard, Pfeiffer, Bastin, Bradshaw.

Thank you for agreeing to serve as members of this Steering Committee for the 2011-2012 Academic Year under the leadership of SC Chair Lee Meyer and DUS Mark Williams. Dean Smith and I very much appreciate your service to this emerging undergraduate program.

Faculty Sustainability Council

The Faculty Sustainability Council (FSC) is a technical advisory group to the President's Sustainability Advisory Committee (PSAC) charged in early 2017 with:

1. Review the efforts of benchmarks and national leaders at integrating sustainability with their curriculum and research
2. Evaluate strengths, weaknesses, opportunities and challenges of the current of state of sustainability in the curriculum and research at UK
3. Propose short, medium and long-term goals for better supporting and promoting this integration
4. Set in place an assessment and evaluation process

The FSC completed their report in June of 2018 and presented it to the Provost in July. Sustainability in Research and Instruction at the University of Kentucky: Challenges and Goals. (/sustainability/sites/www.uky.edu.sustainability/files/FacultySustainabilityCouncil_Dra

In the fall of 2018, Provost Blackwell recharged the FSC with the implementation of these goals outlined by the report over the next three years:

- Facilitate Interdisciplinary Research and Instructional Efforts
- Ensure that All UK Students Experience Sustainability in their Academic Careers
- Become a Recognized Leading Institution in Sustainability

Composition and Membership (2018-2021)

- Fazleena Badurdeen*, Mechanical Engineering, College of Engineering
- Emily Bergeron, Historic Preservation, College of Design
- Betsy Beymer-Farris, Geography, Arts and Sciences

- Greg Davis*, Pathology and Laboratory Medicine, College of Medicine (
- Alyssa Eckman, Integrated Strategic Communication, College of Communication and Information
- Wally Ferrier*, Management, Gatton College of Business and Economics
- Krista Jacobsen*, Horticulture, College of Agriculture, Food and Environment
- Robert Jensen, School of Art and Visual Studies, College of Fine Arts
- Lee Meyer*, Agricultural Economics, College of Agriculture, Food and Environment
- Margaret Mohr-Schroeder*, STEM Education, College of Education
- John Peloza, Marketing and Supply Chain, Gatton College of Business and Economics
- Kelly Pennell, Kentucky Water Resources Research Institute and Tracy Farmer Institute for Sustainability and the Environment
- Eric Reece*, English, Arts and Sciences
- Jeff Rice, Writing, Rhetoric and Digital Studies, College of Arts and Sciences
- Ali Rossi, Community and Leadership Development/GEN 100 Program, College of Agriculture, Food and Environment
- Bob Sandmeyer*, Philosophy, Arts and Sciences
- Helen Turner*, Interior Design, College of Design
- Mark Swanson*, Health, Behavior and Society, Public Health
- Kevin Yeager*, Earth and Environmental Sciences, Arts and Sciences
- Larry Holloway, Vice Provost

*Indicates prior FSC membership during initial 2017 – 2018 charge

(https://www.arborday.org/programs/treecampususa/)

Sustainability in Research and Instruction at the University of Kentucky: Challenges and Goals

Prepared by the Provost's Faculty Sustainability Council
June, 2018

Executive Summary

The Faculty Sustainability Council, at the request of the Provost and with the support of the University Senate Council, was charged to investigate the curricular, research and other academic dimensions of sustainability and make recommendations. Over 18 months of work, the Council identified strengths, key barriers, and goals and objectives to better leverage the integration of sustainability across our teaching and research missions. We are confident that pursuing these goals will help UK achieve its mission of being the University *for* Kentucky, be of pragmatic value in recruiting and retaining passionate faculty and students, help leverage opportunities for grant-supported research and to serve clientele in outreach programs.

A strong academic sustainability program will provide critical support for the objectives in the UK strategic plan. Specifically, a strong integration of sustainability into academic programs positions UK to:

- *Recruit high caliber students interested in solving real-world problems.* According the to the Princeton Review's annual Hopes and Worries[1] survey, a majority (64%) of respondents said having information about colleges' commitment to environmental issues (a critical component of sustainability) would contribute "strongly," "very much," or "somewhat" to their application/attendance decisions.
- *Retain outstanding faculty who are passionate and motivated in this area*. Our benchmark institutions offer a variety of certificates, courses, and university-wide learning outcomes relating to sustainability or sustainable development. Our process highlighted the demand by faculty across the Colleges for a richer culture of sustainability scholarship.
- *Expand research competiveness in high profile, extramural funding efforts*. The National Science Foundation, US Department of Agriculture, and National Institutes of Health are increasingly orienting toward highly interdisciplinary, transformative research programs to address society's grand challenges, which explicitly and implicitly incorporate sustainability research themes.

This report summarizes the current strengths and opportunities relative to the integration of sustainability in the curricula and research at the University of Kentucky. We also provide details on the most significant challenges to enhance integration and provide goals relative to these with short, medium and long term outcomes. There are strong synergies between the goals described herein, the University's Strategic Plan[2], and the recent Graduate School Blue Ribbon Panel report.

Challenges:

- Structural Barriers to Interdisciplinary Programs
- Lack of Support for Interdisciplinary Teaching
- Sustainability is not a Clear Academic Priority

Goals:

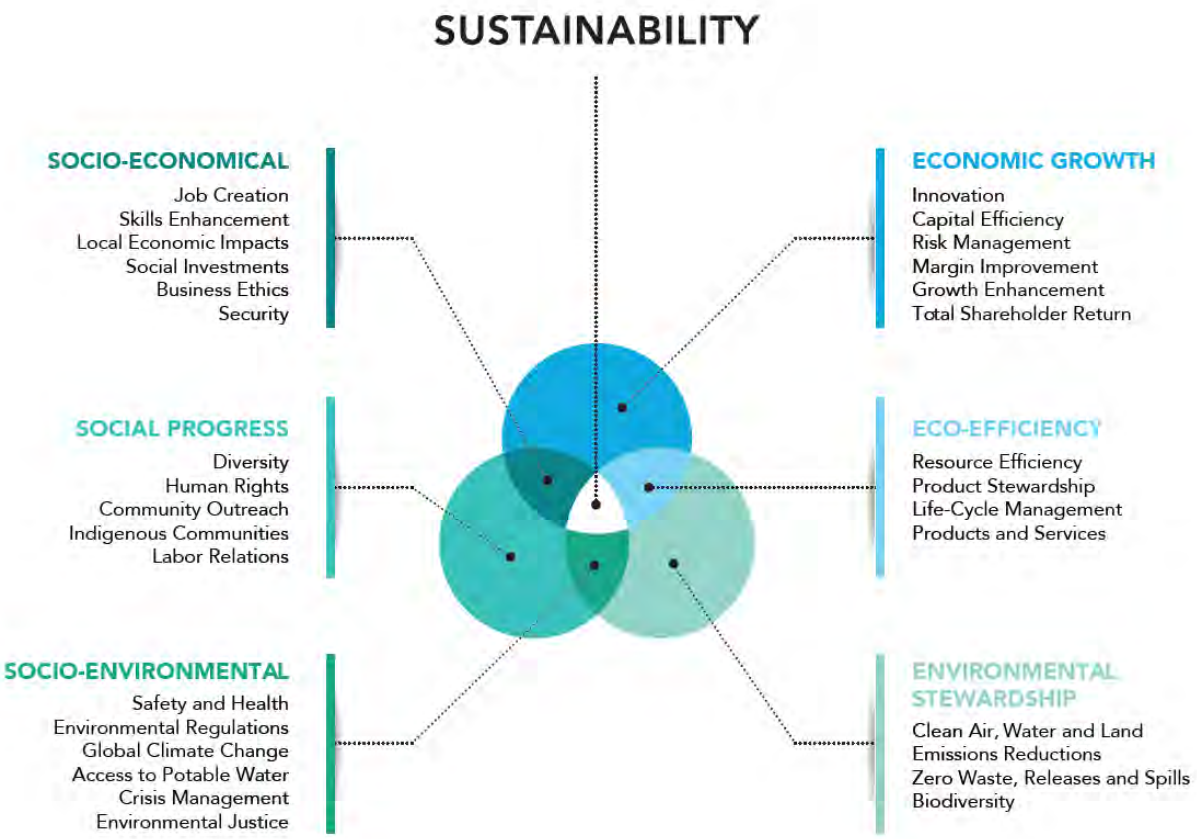
- Facilitate Interdisciplinary Research and Instructional Efforts
- Ensure that All UK Students Experience Sustainability in their Academic Careers
- Become a Recognized Leading Institution in Sustainability

[1] https://www.princetonreview.com/college-rankings/college-hopes-worries
[2] http://www.uky.edu/sotu/2015-2020-strategic-plan

Defining Sustainability

Symbolically and pragmatically, the Faculty Sustainability Council felt it was important to start this work with a definition of sustainability appropriate to our context. The definition provided below guides this report and was endorsed by the President's Sustainability Advisory Council, the Tracy Farmer Institute for Sustainability and the Environment, and the Student Sustainability Council.

> *"Sustainability implies that the activities of the University of Kentucky are ecologically sound, socially just, and economically viable, and that they will continue to be so for future generations. A sustainability focus encourages the integration of these principles in curricula, research, and outreach. This principled approach to operational practices and intellectual pursuits prepares students and empowers the campus community to support sustainable development in the Commonwealth and beyond."*



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Background & Charge

The President's Sustainability Advisory Council[3] (PSAC), established in 2008, is charged with focusing and coordinating the University's activities within the broad meaning of sustainability. Dialogue between the President and this committee, originally on the topic of greenhouse gas emissions, highlighted the need for a faculty-led effort to assess the integration of sustainability in the instructional and research areas of the university. Many faculty and units are engaged in sustainability-oriented instruction and research, however, there has been no University-wide mechanism on UK's campus to bring focus or coordinate these efforts. In response, the PSAC leaders worked with the Provost and University Senate Council, to create a Faculty Sustainability Council (FSC)[4] charged with an 18-month task to:

- Review the efforts of benchmarks and national leaders at integrating sustainability with their curriculum and research;
- Evaluate strengths, weaknesses, opportunities and challenges of the current of state of sustainability in the curriculum and research at UK;
- Propose short, medium and long-term goals for better supporting and promoting this integration;
- Establish an assessment and evaluation process.

Provost Tracy instructed the Council to "take a strong leadership role, starting with a thorough discussion of what sustainability is in the academic programs of a leading land grant university," adding "– we are called upon to answer still lingering questions while daring to pioneer the questions yet asked." Considering, but not limited by other institutions' actions, he expressed the desire for the Council to consider whether the current attention directed at sustainability education and research was visible, appropriately supported, and exemplary.

[3] https://www.uky.edu/sustainability/presidents-sustainability-advisory-committee
[4] The names and departmental affiliation of the FSC members are included in Appendix A of this document.

Process

Over 18 months, the FSC held monthly meetings to discuss findings and develop a sustainability strategy. Meetings included guests from across campus to inform the Council on efforts that might be allied directly with or could help shape recommendations to strategically align with other initiatives on campus.

This meeting structure, informed by ad hoc experts and ongoing discussions with campus academic leadership, led to a thorough review of our climate for sustainability internal to UK academics, as well as discussion of initiatives by benchmark institutions and national leaders.

Avenues of investigation of sustainability research and teaching in higher education considered the following internal and external factors:

- Internal
    - "Case studies" of previous efforts to evaluate and/or integrate sustainability into UK coursework;
    - Sustainability efforts within our facilities and operations that include opportunities for academic integration; and
    - Organizational changes to undergraduate and graduate programs that create opportunities for interdisciplinary sustainability curriculum.
- External
    - Strategic organizational efforts to create institutional structures, such as sustainability institutes and administrative positions (e.g. Associate/Assistant Provost), to support cross-college collaboration on sustainability curriculum and research;
    - High-level initiatives such as hiring and internal funding mechanisms to bring focus and resources to sustainability issues.

In Spring 2018, FSC leaders presented an overview of the process and sought feedback on draft recommendations from the University Senate Academic Planning and Priorities Committee, the University Senate Council, and Provost Blackwell. The goals, recommendations, and evaluation measures shaped by these discussions are presented in the Recommendations section of this report.

Current Climate for Sustainability at UK

Our Strengths

Administrative Support. Notable efforts to foster University-wide coordination around sustainability include the President's Sustainability Advisory Council, the Provost's Faculty Sustainability Advisory Council, and the UK Healthcare Sustainability Steering Committee[5]. The mission of the FSC demonstrates the explicit desire and commitment at the University of Kentucky both to bolster existing interdisciplinary degree programs and to increase the educational opportunities for the study of sustainability across campus and at all educational levels. The FSC exists because a combination of faculty/staff interest, a presidential challenge, and the support of the Provost and UK Senate.

Additional administrative support is evident in the myriad of allied strategic efforts, including the UK Greenhouse Gas Emissions Reduction Plan[6], Sustainability Strategic Plan[7], and ongoing funding of the Sustainability Challenge Grant Program[8]. These efforts are described further in the "Existing Campus Initiatives" section below.

Instructional and Research Programs. The University of Kentucky has worked conscientiously for over a decade to develop interdisciplinary education across its campus. Many colleges across campus have courses, faculty and research programs with connections to sustainability. Three undergraduate degree programs currently exist at UK with a focus specifically on sustainability, though many departments and degree programs emphasize sustainability. The College of Agriculture, Food, and Environment offers two Bachelor of Science degree programs, Sustainable Agriculture (SAG)[9] and Natural Resources and Environmental Science (NRES)[10]. The College of Arts and Sciences offers a Bachelor of Arts degree in Environmental and Sustainability Studies[11] (ENS).

Faculty across the colleges have been consistently successful in obtaining competitive extramural funding for sustainability-oriented research through federal institutions such as the US Department of Agriculture, the National Science Foundation, the US Department of Energy, and the National Institutes of Health. Several UK Centers and Institutes support sustainability-oriented research and academic integration. These include the Tracy Farmer Institute for Sustainability and the Environment[12] (ISE) and the Center for Applied Energy Research (CAER)[13], housed in the Vice President for Research, the Food Connection, housed in the College of Agriculture, Food and Environment, and the Institute for Sustainable Manufacturing[14], housed in the College of Engineering.

Efforts to systematically assess and track sustainability in academic programs and research at UK are included in our regular reporting through the Association for the Advancement of Sustainability in

[5] http://www.uky.edu/sustainability/uk-healthcare-sustainability-steering-committee
[6] http://www.uky.edu/sustainability/greenhouse-gas-emissions-reduction-commitment
[7] http://www.uky.edu/sustainability/sustainability-strategic-plan
[8] http://www.uky.edu/sustainability/sustainability-challenge-grants
[9] http://sustainableag.ca.uky.edu/
[10] https://nres.ca.uky.edu/
[11] https://ens.as.uky.edu/
[12] https://www.research2.uky.edu/tracy-farmer-institute-sustainability-and-environment
[13] http://www.caer.uky.edu/
[14] https://www.engr.uky.edu/ism/

Higher Education's (AASHE) Sustainability Tracking, Assessment & Reporting System (STARS)[15]. Highlights of research strengths reported in 2015 include nearly 250 UK faculty and staff engaged in sustainability research, across 74 departments. These results represent research efforts than include more than 20% of our faculty and over 1/3 of our departments. Instructional strengths reported in 2015 include almost 200 courses that have a sustainability component and the degree programs highlighted above. The methodology and additional results of the 2015 AASHE STARS reporting efforts in the Academic Research area are presented in Appendix B.

Faculty Motivation and Expertise. Faculty with a passion for sustainability have stepped forward, often with extra energy, to help UK make the progress that it has. Notable examples include faculty-led efforts to develop interdisciplinary, sustainability-focused undergraduate degree programs as well as a myriad of courses. They are motivated to do this work because of their passion for sustainability, and occasionally supported by extramural funding to initiate these efforts. This work has been facilitated, in part, by the ISE's "Working Groups"[16], which align faculty across the Colleges around five sustainability focus areas. The Working Groups have generated highly visible, annual events that highlight sustainability efforts on campus around the built environment, water resources, and urban forests, and have facilitated development of at least two new undergraduate certificate programs (Hunger and Food Systems and Urban Forestry).

Existing Campus Initiatives. Sustainability has blossomed at the University of Kentucky over the last decade and is now manifest in a broad set of initiatives, programs and guiding documents. The recommendations of the Faculty Sustainability Council complement several important existing initiatives, including the following.

UK Sustainability Strategic Plan (SSP). The SSP lays out a detailed vision for integrating sustainability with campus operations over the next five years with specific targets and deliverables for six key areas: 1) Materials Management 2) Energy 3) Food and Dining Services 4) Transportation 5) Buildings and Ground 6) Greenhouse Gas Emissions. The SSP was developed with the understanding that the Council would make recommendations for integrating sustainability in teaching and research. once complete, the SSP and the work of the Council will provide a comprehensive set of sustainability targets for operations, curriculum, and research.

UK Greenhouse Gas Emissions Reduction Commitment. Signed in December of 2016 by President Capilouto, this commitment set a target of a 25% reduction in campus emissions by 2025 and highlighted that the Council would explore and initiate opportunities to promote and support sustainability-related research and education. The commitment also pledges that the operational strategies deployed to reduce campus emissions will be integrated as high-impact, hands-on components of teaching, research, and service.

UK Student Sustainability Council (SSC)[17]. This student organization oversees the Environmental Stewardship Fee, a mandatory student fee that generates approximately $200,000 annually. The

[15] http://uknow.uky.edu/campus-news/uk-earns-stars-silver-rating-leadership-sustainability
[16] https://www.research2.uky.edu/tracy-farmer-institute-sustainability-and-environment
[17] http://www.uky.edu/sustainability/student-sustainability-council

SSC solicits, reviews and approves project proposals from the UK community that promote the theory, practice and reality of sustainability with a focus on student impact.

Sustainability Challenge Grant Program. This ongoing internal grant-making program, a collaborative effort of the President's Sustainability Advisory Committee, The Tracy Farmer Institute for Sustainability and the Environment and the Office of Sustainability, is designed to engage multidisciplinary teams from the University community in the creation and implementation of ideas that will promote sustainability by simultaneously advancing economic vitality, ecological integrity and social equity. It has incentivized academic integration of sustainability efforts and provided a funding and organizational mechanism that overcomes some of the institutional challenges associated with cross-college and interdisciplinary collaboration. In the first four years of the program, 26 projects have been awarded a total of $700,000 to pursue transformational, sustainability-driven projects on our campus and beyond. Funding support for the program, $200,000 annually, is provided by the Executive Vice President for Finance and Administration, the Provost, the Vice President for Research and the Student Sustainability Council.

UK Graduate School Blue Ribbon Panel.[18] The Blue Ribbon Panel (BRP) on Graduate Education identified issues which hinder UK's goal of maximizing the graduate student experience. Not surprisingly, several of these issues overlap with those related to sustainability. The BRP's final report includes recommendations which reinforce those of the FSC. Recommendation #2, which is to "Stabilize and strengthen the proposed College of Graduate Studies …" proposes to "Develop incentives and decrease barriers to innovative initiatives, including interdisciplinary programs and non-traditional methods to transfer knowledge." And, recommendation #5, which states: "Ensure university regulations provide flexibility to promote interdisciplinary studies and new initiatives" directly reinforces recommendations made by the FSC. While these recommendations are targeted toward graduate students, if implemented, they would affect faculty as well.

Annual UK Sustainability Forum. An annual campus event aimed at bringing the community together to share sustainability-related research and other scholarly endeavors and celebrate our efforts towards improving sustainability on campus and beyond. The Forum, sponsored by the Tracy Farmer Institute for Sustainability and the Environment and the Appalachian Center, occurs in early December at the Boone Center, The Forum consists of a judged poster session for undergraduate and graduate students engaged in sustainability-related scholarly activity. Two undergraduate, two graduate, and one Appalachian Center awards are given. Additionally, undergraduates involved in the Sustainability Intern program present summaries of their experiences, and current recipients of the Sustainability Challenge Grant Program are encouraged to present on the results of their funded projects. The Forum, in its current format, has been in place for four years, and draws ~80-100 individuals.

[18] http://www.uky.edu/provost/blue-ribbon-panel-graduate-education

Our Challenges

Structural Barriers to Interdisciplinary Programs. Challenges for sustainability efforts are emblematic of the challenges facing interdisciplinary degree programs in general. Cutting edge, problem-focused training that crosses college boundaries and prepares students for real-world problem solving is inhibited by traditional academic silos. These programs require shared resources and cross-unit administrative support. Our benchmark institutions have engaged this issue in a variety of ways, and many have developed, programs, courses, and university-wide learning outcomes relating to sustainability or sustainable development. Examples from our benchmark institutions are listed in Appendix C.

Currently at UK, there is no administrative unit that can house interdisciplinary educational programs that cross colleges, share ownership and resources in a way that address budgetary and administrative constraints, and for the purposes of this report, is in the "spirit" the interdisciplinary nature of sustainability. The Tracy Farmer Institute for Sustainability and the Environment (ISE) currently provides staff support and related resources for organizational, outreach, and research efforts under its mission area. However, ISE is housed under the Office of the Vice President for Research and is limited in resources and scope to administer curricular efforts. A University-level institute or initiative must include curricular efforts, and as such, requires support that falls under the Provost's purview.

Lack of Support for Interdisciplinary Teaching. Although faculty in many colleges have great passion for and expertise in developing sustainability coursework, they have received mostly passive support. As a result, progress is sporadic, occurring independently inside individual colleges. Faculty engaged in these issues are typically required to find their own resources and struggle with a structural environment which makes cross-disciplinary work problematic. Further, instructional credit should be awarded equally for teaching in interdisciplinary programs and earn equivalent credit as instruction in departmental majors.

Lack of Sustainability as a Clear Academic Priority. The FSC internal review process identified several key indicators that highlight a lack of a systemic, university-wide emphasis on sustainability. For example, although the AASHE STARS reporting has highlighted several instructional and research strengths, our institutional scores are reflective of a lack of systemic, university-wide emphasis on sustainability. In particular:

- Of the 74 ranked institutions that have 20,000+ students, UK ranks 72nd on overall score.
- On the academics' side of things, UK is 67th out of 74.
- On the research side of things, UK is 54th out of 64.

There are simple, high-return investments in incentives and assessment structure that that could significantly improve our STARS standing as well as elevate sustainability literacy and interdisciplinary thinking capacity among our students. These include ensuring students take at least one course with an associated sustainability-oriented Student Learning Outcome, ensuring all students have some exposure to sustainability opportunities during their orientation process; and, elevating the marketing of sustainability degree programs by o-marketing and coordinating between sustainability degree programs across colleges.

Scoping how sustainability is articulated from an organizational visioning perspective, the FSC reviewed the University and all publicly-available College-level strategic plans. Working from a broad, inclusive

definition of sustainability, the FSC found less than thirty sustainability-relevant passages among all strategic plans considered. Further, no consistency between colleges was found with regard to use of terminology and explicit framing of goals related to sustainability. Appendix D provides a list of sustainability-related passages by college. Clarity from university leadership on the importance of sustainability as a priority in research, instruction, and our campus as a living, learning laboratory would provide guiding language and a cohesive vision to units as they conduct their strategic planning processes.

Goals

We propose three goals in response to the challenges described above. These goals leverage strengths and synergies in sustainability-oriented academic efforts and are defined by short-term (1-2 years), medium-term (3-5 years) and long-term (6-10 years) objectives as examples of means by which goals may be operationalized. It should be noted that the Council encourages ongoing discussion with the campus community to ensure action towards these goals are inclusive and well-aligned with other strategic initiatives.

Goal 1: Facilitate Interdisciplinary Research and Instructional Efforts

UK is not alone in its struggle to break down disciplinary "silos" and address structural issues that create barriers to faculty efforts in sustainability and other interdisciplinary areas. Considering these impediments as well as the benchmarks created by other institutions leading in sustainability, the Council recommends that the university take steps to facilitate interdisciplinary research and teaching through the following:

Short-Term Objectives

- **Reward faculty for interdisciplinary research and instructional efforts.** Increasing opportunities for extramural funding, as well as growing demand for interdisciplinary curricula are drawing faculty towards critical growth areas, such as sustainability. Faculty, particularly junior-level, need assurances that their efforts in these areas are valued. This requires addressing administrative issues regarding effort and credit toward promotion and tenure, which require intentional effort and time to revise processes, administrative regulations, etc. As reviews of these issues are undertaken, we highly recommend listening to and nurturing faculty currently working in these areas, and creating a climate where successful teaching and research in interdisciplinary areas, such as sustainability, are seen as synergistic and supportive of the disciplinary expertise and home department. This might include mentoring a mentoring program for faculty as well as chairs as well as sustainability-focus development programs.
- **Hold "Town Hall" meetings to gain campus-wide dialogue and perspective on interdisciplinary barriers.** Fall 2018 is an ideal time to host a series of facilitated listening sessions, as it would capture energy from synergistic efforts such as the Graduate School Blue Ribbon report. Provost-level organization and support of such an effort would inform all of these goals and objectives, and illuminate a path forward for interdisciplinary programs, using sustainability-oriented programming as a first step in these efforts.

Medium- Term Objectives

- **Administrative Changes in Promotion and Tenure and Merit Reviews Explicitly Valuing Interdisciplinary Efforts.** These structural changes to how "statements of evidence" and

intellectual contributions are valued will benefit sustainability programming, as well as other interdisciplinary topical areas. Currently, faculty members are subject to unit-level support for these efforts. Uniform guidance at the Provost-level would institutionalize University-wide valuation of these efforts. Specific initiatives may include additional instructional credit (DOE percentage) for interdisciplinary, co-taught faculty efforts.

Long-Term Objectives

- **Establish a "School of Sustainability."** The creation of an academic unit outside of the colleges would institutionalize support, administration, and provide ongoing oversight and assessment for sustainability efforts**.**

Goal 2: All UK Students Experience Sustainability in their Academic Careers

Sustainability is inherently interdisciplinary, providing an opportunity to expose our students to broad cross-college collaborations and innovative pedagogical approaches. The Council process highlighted faculty energy and unmet demand among the faculty and students for sustainability curricular and instructional efforts.

Short-Term Objectives

- ***Support Efforts to Build Instructional Capacity for Sustainability Coursework***. Sustainability-oriented courses present unique challenges to instructors, including balancing the breadth and depth, potentially reaching beyond a faculty members disciplinary training, and others. A unique workshop, funded by a 2018 Sustainability Challenge Grant called "Teaching Sustainability, Teaching Sustainably" has provided support for instructors to generate new sustainability-oriented content and cohort building around these efforts. The Council recommends continued support for these efforts.
- ***Facilitate Co-Branding and other Resource Sharing Among Existing Sustainability Curricula.*** Unifying promotional and recruitment efforts, would help prospective students interested in sustainability find the right major, communicate how students can engage in sustainability-related coursework and strengthens faculty's collective voice. Further, it would ensure we are not duplicating efforts and are fully leveraging opportunities for shared academic experiences such as capstone courses, experiential learning activities, etc.

Medium-Term Objectives

- ***Create a Graduate-level Sustainability Certificate,*** designed to be accessible to all of the Colleges. Elements would include introductory and capstone coursework that would engage students across colleges in real-world problem solving and experiential learning activities, as well as sustainability-themed coursework within the discipline area.
- ***Examine the UK Core for Opportunities to Integrate Sustainability Learning Objectives for All Undergraduates*** – perhaps in the Community, Culture and Citizenship or Global Dynamics course opportunities in the current UK Core model.

Long-Term Objectives

- **Establish a "School of Sustainability."** As stated in Goal 1, this would provide an institutional home that could provide administrative support and an instructional home for these efforts.

Goal 3: Become a Recognized Leading Institution in Sustainability. Looking to and learning from national and international benchmarks for sustainability in higher education, the Council believes it is possible for UK to become a leading institution in sustainability. This will require supporting, promoting, enhancing, and assessing existing efforts to leverage our strengths and address our weaknesses in order to best serve our role as the University *for* Kentucky.

Short-Term Objectives

- **Celebrate our Successes and Support Allied Efforts.** We are at a unique moment where a suite of successful initiatives has created synergy and momentum for broader sustainability efforts on campus. These efforts should be celebrated, and supported for as long as they continue to provide these critical support functions. These include:
    - *The Annual Sustainability Showcase*
    - *The Sustainability Challenge Grant Program*
    - *The Sustainable Pedagogies Faculty Workshop Program*
- ***Create Ongoing Assessment Through Creation of a Permanent Faculty Sustainability Council.*** Provost Tracy directly charged this group with developing an ongoing plan to monitor sustainability efforts on campus, so that this report and others may not sit in isolation or momentum on this work be lost. As such, we recommend an ongoing Faculty Sustainability Council, with the short term charge of assessing the campus community's response to this report, perhaps through town hall meetings, and to report findings to the Provost, Senate Council and President's Sustainability Advisory Committee. In the longer term, the FSC could be charged with assessing progress toward these recommendations. These efforts may include the advocacy for/development of mechanisms to better identify sustainability-related curricula and research at UK, which in its present form is problematic and often incomplete.

Medium-Term Objectives

- **Leverage Opportunities to Align Sustainability Efforts with Strategic Planning Processes**. The University of Kentucky Strategic Plan (2015 – 2020) for Research has an overall objective to expand our scholarship, creative endeavors and research across the full range of disciplines to focus on the most important challenges of the Commonwealth. Strategic Initiatives to achieve this overall objective include investing and recognizing areas of scholarly excellence, and recruiting and retaining outstanding faculty, staff and students. Further, many colleges are undergoing strategic planning processes of their own and provide similar opportunity. These are presented in Appendix B.

Long-Term Objectives

- **Establish a "School of Sustainability."** Such a structure has been demonstrated by national and international leading edge institutions to generate nationally-recognized undergraduate and graduate programs, as well as high impact research and service.

Appendix A. Composition of the Faculty Sustainability Council

Appointments of faculty for the 2016-2018 Council were made either by the offices of the Provost, Vice President for Research, or the UK Senate, through its Academic Planning and Priorities Committee.

Members and Departmental/Unit Affiliations

President's Sustainability Advisory Council (PSAC)

Krista Jacobsen, Horticulture (PSAC and FSC co-chair)
Shane Tedder, Office of Sustainability

Tracy Farmer Institute for Sustainability and the Environment

Rebecca McCulley, Plant and Soil Science
(resigned in December, 2017 to become department chair)

Student Representative

Ben Troupe, Philosophy and Political Science

University Senate

Kevin Yeager, Earth and Environmental Science
Margaret Mohr-Schroeder, STEM Education
Bob Sandmeyer, Philosophy

Provost and Vice President for Research

Mark Swanson, Public Health
Eric Reece, English
Fazleena Badurdeen, Mechanical Engineering
Greg Davis, Medicine
Helen Turner, Interior Design
Rebecca Bromley-Trujillo, Martin School of Public Policy and Administration
Wally Ferrier, Management, Gatton College of Business and Economics
Lee Meyer, Agricultural Economics (FSC co-chair)

Ad Hoc

Robert Shapiro, Libraries
Emily Bergeron, Historic Preservation

Appendix B. 2015 UK AASHE STARS Report – Academic Research

Excerpts[19] from the Academic Research section of UK's 2015 Sustainability Tracking Assessment and Rating Systems (STARS) Report, compiled by Dr. Rebecca McCulley, TFISE Interim Director.

Overall Academic Research Score: 8.99/12.00
Overall STARS Rating: Silver
Overall STARS Score: 45.25

Reporting Fields

- *Number of the institution's faculty and/or staff engaged in sustainability research:* 249
- *Total number of the institution's faculty and/or staff engaged in research:* 1,214
- *Number of academic departments (or the equivalent) that include at least one faculty or staff member that conducts sustainability research*: 74
- *The total number of academic departments (or the equivalent) that conduct research:* 198
- *A copy of the sustainability research inventory that includes the names and department affiliations of faculty and staff engaged in sustainability research*: Sustainability Faculty List STARS.xlsx[20]

Methodology for the Research Inventory: [Dr. McCulley] performed a search in the Sponsored Project Information Files (http://www.research.uky.edu/aspnet/vsprojects/spifi/search.aspx) for the word 'sustain' in the project title, key words, or abstract, with the data limit being 'active' only. This generated 339 individual faculty with funded research projects. I then went through the abstract of each project and determined whether the work fit the STARS definition of 'sustainability research.' I marked in the spreadsheet when I thought the fit was somewhat questionable, and I eliminated those that were obviously not a fit. This generated 222 faculty with research in sustainability. Then I went through the active Tracy Farmer Institute for Sustainability & the Environment (TFISE) faculty working groups, and added any faculty that appeared there and were not already in the list. Then I checked that all faculty and staff in the 2014-2015 funded Sustainability Challenge Grant Program were included, and finally, I checked with Courtney Fisk at the Center for Applied Energy Research and added a few additional names of individuals she knows are active in sustainability research. I also included three staff members that are important to Sustainability research on our campus: Shane Tedder, Courtney Fisk, and Suzette Walling. I checked the UK Directory for the Departmental association (or institutional equivalent) for each person listed.

The website URL where information about sustainability research is available:
http://www.tfise.uky.edu/facultyofTheEnv

[19] The STARS tool and entirety of UK's Academic Research reporting may be accessed via:
https://stars.aashe.org/institutions/university-of-kentucky-ky/report/2015-10-16/AC/research/AC-9/
[20] https://stars.aashe.org/media/secure/266/6/470/2678/Sustainability%20Faculty%20List%20STARS.xlsx

Appendix C. Sustainability Programs at our Benchmark Institutions

Degree programs, coursework, and curricular highlights compiled during the FSC's External scoping process, led by Dr. Emily Bergeron, Department of Historic Preservation.

Summary. Programs at institutions other than the UK Benchmark Universities offer a variety of certificates, courses, and even university-wide learning outcomes relating to sustainability or sustainable development. The best of these programs incorporates holistic or systemic thinking and interdisciplinary/trans-disciplinary teaching and research. There is an emphasis on applied learning, community outreach, evidence-based learning, and on changing attitudes and values. This is reflected in learning outcomes that are broken down into knowledge and skills, application in academic/professional career, and personal values. Although the goal of these programs is to create students that are "agents of change", it is not uncommon for these programs to take a more superficial look at sustainability (e.g. recycling, consumption, etc.), considering only environmental issues rather than considering the triple bottom line. The University of Michigan's Graduate Certificate provides the best model for an equivalent program at UK; however, the structure of the University of Wisconsin-Madison and University of Iowa undergraduate certificate programs have incorporated excellent learning objectives and program structures as well.

Benchmark Programs

University of Michigan-Ann Arbor[21]. The University offers more than 700 courses that address sustainability. Students can choose from more than 10 undergraduate degrees, a dozen master's degrees, and 15 doctoral programs related to sustainability—as well as a wide variety of minors, concentrations, dual-major programs, and certificate options. The institution also offers a Graduate Certificate in Sustainability[22] through the School for Environment and Sustainability. The Sustainability Graduate Certificate is open to students enrolled in any University of Michigan graduate program. The certificate requires six credits of coursework in fundamental knowledge, six credits of coursework in skill development and a capstone experience, which may entail an additional 3-credit course or an approved co-curricular experiential activity. The Sustainability Knowledge Fundamentals portion focuses on foundational theory and background within a specific topic, including courses in the principles of sustainability, ethics, behavior, education, biodiversity conservation, policy, law, or other sustainability-themed courses that look at case studies. Skill Set Development courses focus on developing techniques and tools of analysis, intervention or design principles, and generally often incorporate problem sets, laboratory or field-based components, design projects, mock negotiations, or other experiences directly related to skill development. Courses are related to modeling, mapping, design, policy-making, behavior change, analytical problem solving, and otherwise acquiring experience applying different tools or techniques.

UC Davis[23]. The University offers numerous courses that address sustainability at the graduate and undergraduate levels, which have been curated for students to pick from as part of the institution's 2010 Climate Action Plan. Students also have an opportunity to take part in an Education for Sustainability Program - a seminar focused on 1) interdisciplinary lectures addressing principles of sustainability and 2) applying them to daily life. Students in this program may also participate in an Action Research Team project. Various research groups on agricultural sustainability, energy

[21] http://sustainability.umich.edu/
[22] http://seas.umich.edu/academics/grad_cert/sustainability
[23] http://sustainability.ucdavis.edu/students/classes/

efficiency, environmental studies, and transportation provide sustainability-focused programs (only one supporting a major in Sustainable Agriculture and Food Systems). UC Davis Extension and its Center for Entrepreneurship also offer a series of professional and continuing education certificates relating to energy efficiency, sustainable building design, and green entrepreneurship.

University of Iowa[24]. Iowa offers a certificate in sustainability to undergraduate students and post-baccalaureate students not enrolled in graduate or professional programs. This 24 credit certificate draws from multiple disciplines to provide knowledge and skills necessary for contributing to the development of sustainable systems. No more than three courses may be taken in a single department. According to the University, certificate students will "enhance their preparation for a variety of vocations such as researcher, corporate officer, technology specialist, farmer, government official, and grassroots advocate." The certificate is overseen by a nine- person advisory board.

Michigan State University[25]. Michigan State has multiple degrees, minors, and specializations addressing sustainability including an MA and PhD in Community Sustainability, BA in Environmental Studies and Sustainability, and a BA, MA, and PhD in Sustainable Parks Recreation and Tourism/Sustainable Tourism and Protected Area Management. The University has undergraduate minors in Environmental and Sustainability Studies, Sustainable, Agriculture and Food Systems, Sustainable Natural Resource Recreation Management, and The City: Environment, Design, and Society. It additionally has a graduate specialization in Business Concepts for Environmental Sustainability and Conservation. There are no certificates in sustainability.

University of Missouri- Columbia. The institution has a BS in Sustainable Agriculture and the College of Engineering has a mission in sustainability in food, energy, water, and sustainable cities.

University of Arizona. Sustainability at the University of Arizona is evident extensively across the campus. The institution has undergraduate degrees in Sustainable Built Environments, General, Sustainable Built Environments, Heritage Conservation Emphasis, Sustainable Built Environments: Sustainable Buildings Emphasis, Sustainable Built Environments: Sustainable Communities Emphasis, Sustainable Built Environments: Sustainable Landscapes Emphasis, Sustainable Plant Systems: Agronomy, Sustainable Plant Systems: Controlled Environment Agriculture Emphasis, and Sustainable Plant Systems: Environmental Horticulture. Additionally, 36 of the University's graduate programs in STEM fields, education, design, public policy, and planning emphasize sustainability in their degree descriptions. There are two certificates (Aquaculture and Heritage Conservation) that address sustainability; however, there is no sustainability certificate.

University of Minnesota-Twin Cities[26]. The institution has an undergraduate Sustainability Studies Minor that is open to all undergraduates and addresses the ecological, social, ethical, political, and economic forces impacting human society and the natural environment. An introductory core course provides students an overview of models for understanding sustainability using case studies to illustrate the challenges of sustainability in practice. Students choose additional electives from multidisciplinary courses with perspectives related to sustainability. Finally, a capstone project requires students to synthesize and apply knowledge to actual sustainability problems. Students complete 6 credits of required courses for the core and the capstone, and 9-12 restricted electives, for a total of 15-18 credits. There are also undergraduate degrees in Sustainable Agriculture Minor and Sustainable Systems Management.

[24] https://sustainability.uiowa.edu/teaching-a
[25] https://reg.msu.edu/AcademicPro
[26] https://www.cfans.umn.edu/academics/majors-minors

The Ohio State University. The institution offers 340 courses that focus specifically on sustainability issues and over 700 additional courses that feature sustainability topics. The university also offers a major in Environment, Economy, Development and Sustainability[27] and many colleges offer minors with a sustainability focus. There is no graduate certificate focused specifically on sustainability.

University of Wisconsin-Madison[28]. The institution has a 12 credit undergraduate certificate in sustainability that helps students develop literacy in environmental, social, and economic dimensions of sustainability, as well its inherent systems nature. Students must complete courses approved for each of the above four dimensions of sustainability and must complete an additional community engagement requirement.

University of North Carolina, Chapel Hill[29]. The institution's 12 credit undergraduate certificate provides an understanding of sustainability utilizing a "unifying approach" to human and environmental problems. Courses in the program include a variety of classes in STEM fields, policy and advocacy, planning, business, and others. One clear limitation of the program is that students who major in the B.A. or B.S. environmental degree programs are not allowed to minor in sustainability studies.

University of Florida[30]. The University of Florida has several undergraduate and graduate degree programs[31] in sustainability. The institution also offers graduate certificates in Sustainable Agroecosystems, Sustainable Construction, Sustainable Engineering, Sustainable Land Resource and Nutrient Management, and Sustainable Development Practice. There is no general graduate certificate in sustainability.

[27] https://senr.osu.edu/undergraduate/majors/environment-economy-development-and-sustainability
[28] https://www.nelson.wisc.edu/undergraduate/sustainability-certificate/index.php
[29] http://catalog.unc.edu/undergraduate/programs-study/sustainability-studies-minor/
[30] http://sustainable.ufl.edu/academics-research/
[31] http://sustainable.ufl.edu/academics-research/sustainability-degree-programs/

Appendix D. Sustainability in College-Level Strategic Plans

Passages from College Strategic Plans that include sustainability-oriented language from the FSC internal scoping process.

Summary. As discussed in the body of the FSC report, no consistency between colleges was found with regard to use of terminology and explicit framing of goals related to sustainability. From our analysis, especially given the paucity of sustainability-relevant elements expressed in these strategic plans, we offer the following conclusions and insights: 1) Although some colleges have strong, explicit elements of their curricula and research squarely positioned in domains related to sustainability, it is insufficiently and inconsistently expressed as values, ideals, or goals in their strategic plans; 2) Independent of whether some colleges actually engage in sustainability-related curricula or research, the strategic emphasis on constructs such as social responsibility, community/civic engagement, or public good are encouraging and, perhaps, imply an alignment with sustainability. However, we urge that colleges be more explicit; and 3) Many colleges emphasize collaborations with other academic units and wider range of stakeholders as a strategic goal. So, given that sustainability is inherently multidisciplinary, the expressed willingness of some colleges to widen its engagement both within and outside the university shows promise for a deeper and more comprehensive embrace of sustainability.

College	Documents	Sustainability-relevant Passages
Arts & Sciences	Academic plan 2007-2012	• Perpetually re-evaluating the assumptions, prejudices and aspirations of *one's society*, community • Biological-related undergraduate degrees are passports into a variety of postgraduate degrees in health, *environmental* and agricultural sciences • Today's fastest-growing occupations are rooted in the arts and sciences ... *environmental* scientists...college places a priority on interdisciplinary learning and career preparation
Agriculture, Food & Environment	Strategic plan	• finding solutions to improve lives today and creating a *sustainable* future • students who are competent, *responsible* • addressing needs in agriculture, *natural resources* • expanding knowledge to improve the quality of life and *sustainability* • provide a culturally aware environment for successful *engagement in a global society* • new state-of-the-art *green*, *LEED-certified* classroom building • implementation of *certified "green" technologies* for all on- and off-campus facilities
Business & Economics	Strategic plan	• Gatton Code of Conduct ….that fosters professionalism...*social responsibility* • New honors program in *Social Enterprise*

Communication & Information	Strategic plan	• Promote research that maximizes *social*, intellectual and economic opportunities • To promote *civic responsibility* • We value integrity...*social responsibility*
Design	Strategic plan	• A way of thinking that can be applied to all scales of human existence...healthcare, *soil, water and climate change* • Develop programs and certificates that include...design and *climate*, *adaptive reuse*
Education	Strategic plan	• Identify, in partnership with local and global community stakeholders, *emerging issues*, challenges
Engineering	Strategic Plan	• Expand number of faculty...in energy, manufacturing and *sustainability*
Health Sciences	Strategic plan	• Provide opportunities for...*community engagement...volunteerism*...expand our students' world views
Fine Arts	Strategic Plan	• To...affect personal, economic, and *social change* • Establish relationships...with *non-traditional external organizations* (e.g. military, healthcare, etc.)
Honors	College proposal	• *Multidisciplinary curriculum*...prepares students for advanced study and *global competency* • *Social responsibility...civic engagement* • Partnerships with other programs; *social enterprise,* SEAM, etc.
Law	Strategic plan	• Develop plan to engage students in *community initiatives* hosted by legal, civic, education, business and *non-profit sectors* • newly created Enterprise Strategy Office (ESO) will lead...implementation of strategy...*political, social, economic, technological trends*
Medicine (UK Healthcare)	Strategic plan	• physical expansion for UK HealthCare, with more than $1.6 billion invested in *new and improved facilities*
Pharmacy	Strategic plan	• Promote the *public good* through the application of our expertise and resources to meet social, economic, educational, and health challenges

UNIVERSITY OF KENTUCKY

Office of the Chair
University Senate Council
203 Main Building
Lexington, Kentucky 40506-0032
Phone: (859) 257-5872

May 20, 2015

Bob Sandmeyer
College of Arts and Sciences
Department of Philosophy

Dear Senator Sandmeyer,

I am pleased to confirm your membership in the University Senate. Thank you for serving the University in this important way. Your period of appointment is for three years, beginning August 16, 2015 and terminating on August 15, 2018.

As you may be aware, the Senate regularly meets during the academic year on the second Monday of each month, from 3 to 5 pm, in the W. T. Young Library Auditorium. The Senate's meeting dates can be found at: http://www.uky.edu/Faculty/Senate/university_senate/meeting_dates/2015-2016.htm. You will receive the minutes from the previous meeting via email within a couple weeks after the meeting. The agenda will be sent to you via email approximately six days prior to the meeting date. Please note that attendance at Senate meetings is mandatory and any conflict with regularly scheduled faculty duties, such as teaching, must either be resolved or reported to the Office of the Senate Council immediately.

The next regularly scheduled meeting is on Monday, September 14, 2015 in the Auditorium of the W. T. Young Library. **An orientation for new senators will be held two weeks prior on Monday, August 31, in the Lexmark Public Room (room 209) in the Main Building at 2 pm.** As a part of your orientation, President Eli Capilouto will also attend and speak on the value of shared governance. Please RSVP to Sheila Brothers (sbrothers@uky.edu) about attending this important informational session for new senators; seating is limited so it is best to confirm your attendance as quickly as possible.

In addition to its several advisory roles, I would like to briefly mention the importance of the University Senate as the final policy-making body of the University of Kentucky in a number of matters:

1. In matters of educational policies, such as the creation of new courses, requirements for admission and graduation, and changes to academic program content, your vote to approve/disapprove in the University Senate constitutes the final University decision.

2. In matters of creation or termination of degree-granting academic programs, the University Senate makes the controlling decision on whether such proposals will reach the Board of Trustees for its final University action.

3. In matters of policies on qualifications for student graduation with honors or for honorary degrees to others, it is only you, an elected Faculty Senator, who casts the deciding policy vote in the University Senate.

4. In several other areas, such as the creation of colleges/departments, how deans should be evaluated, and faculty membership on University-wide committees, the University Senate must be consulted by the administration.

Membership on at least one Senate committee is part of your senatorial responsibilities. http://www.uky.edu/Faculty/Senate/committees_councils/index.htm I request that you identify *at least* one Senate committee on which you would like to serve until your term as senator ends. On the list of committees and corresponding descriptions sent with this letter, please note your first, second and third choices. In order to facilitate the process of composing Senate committees, please submit this information to Sheila Brothers via email (sbrothers@uky.edu) **within 5 days of receipt of this letter**.

In planning your annual service to the University as senator, it is a good rule of thumb to acknowledge that each Senate meeting requires at least a similar amount of preparation time as does the transaction of the business itself. On average, membership in the University Senate takes approximately four hours per month, and service on one committee can take up to an additional four hours per month, depending upon the workload of the committee. This translates into approximately 5% effort on your DOE.

As a senator you are in an excellent position to take an active role in important educational policy decisions and convey such developments to your home college. Regular attendance at Senate meetings is essential to perform this role and is the basic requirement of all senators. This requirement is codified in the *University Senate Rules*; a Senator who accumulates three unexplained absences from Senate meetings during the academic year is subject to removal from the Senate. If for some reason you are unable to attend a Senate meeting, please contact Janie Ellis in the Office of the Senate Council (janie.ellis@uky.edu) prior to the meeting and your absence will be noted as "explained."

I look forward to meeting you at the orientation for new senators and to working with you throughout the academic year. Please be on the lookout in early fall for an invitation to a "Welcome Back" reception on September 15 at 4 pm, hosted by President Eli Capilouto at his home.

Sincerely,

Andrew Hippisley,
Chair, University Senate Council

cc: College Dean
Department Chair

Total Life Cycle Sustainability Analysis of Critical Materials in Electric Vehicle (EV) Lithium-Ion Batteries for Circular Economy

Project Synopsis

Convergent Project Team:

University of Kentucky: I.S. Jawahir – Institute for Sustainable Manufacturing (ISM) (Sustainable product design & manufacturing); F. Badurdeen – ISM and Dept. of Mech. Eng. (Systems thinking & optimization); J. Werner – Dept. of Mining Eng. (Material recovery & recycling); P. Wang – Dept. of Elect. & Comp. Eng. (Sensing & machine condition monitoring); D. Atwood - Dept. of Chemistry (Chemistry & sustainability), J. Schoop – ISM and Dept. of Mech. Eng. (Engineered Materials); K. Liu – Center for Applied Energy Research and Dept. of Mech. Eng. (Energy efficiency); J. Caudill – ISM and Dept. of Mech. Eng. (Additive manufacturing); W. Hoyt – Martin School of Public Policy and Administration (Public policy & sustainability); Bob Sandmeyer – Environmental and Sustainability Studies Program, Dept. of Philosophy (Environmental philosophy); T. Elam – Center for Computational Sciences (Project management).

Other Potential Participants:

Universities: University of Texas at Rio Grande Valley (James Li, Anil Srivastava + Others)
University of Tennessee (Tom Goldsby + Others)
Industry: Amazon, Ford, Toyota, SRC.
National Labs/Agencies: ORNL, NIST

Project Overview: This project aims to develop quantitative understanding of the total life cycle sustainability effects of the use of critical materials such as *Li, Ni* and *Co* in electric vehicle (EV) *Li*-ion batteries. This will include a comprehensive total life cycle sustainability analysis of these materials through ***all four life cycle stages (Pre-manufacturing, Manufacturing, Use and Post-use)***. A metrics-based sustainability evaluation method, with ***6Rs (Reduce, Reuse, Recycle, Recover, Redesign and Remanufacture),*** will be developed for product sustainability. The overall sustainability impacts of these materials will be used to achieve ***improved closed-loop product/process design methods for circular economy***.

Project Objectives:

(a) Developing novel 6R-based total life cycle sustainability evaluation methods for critical materials in EV *Li*-ion batteries.
(b) Evaluating total life cycle sustainability impacts of critical materials;
(c) Developing sensing and AI-based systems for the product use stage; and
(d) Developing education, training, and outreach programs.

Deliverables:

1. A validated model-based, data-driven product sustainability evaluation toolkit/dashboard for predicting EV battery performance and life cycle impacts; and
2. Comprehensive curricula (for-credit & professional) on closed-loop sustainable manufacturing with life cycle analysis of products and associated manufacturing processes.

These deliverables are ***uniquely significant*** as no such capability currently exists, nationally or internationally, and the proposed ***university-industry-government partnership*** will enable accelerated economic growth and societal prosperity, providing benefits to ***all stakeholders***.

Sandmeyer, Bob

From: Atwood, David A.
Sent: Tuesday, May 31, 2022 11:56 AM
To: Sandmeyer, Bob
Subject: Fwd: Invitation to join NSF Convergence Accelerator Proposal LoI
Attachments: LoI (Draft 3).docx

Dear Bob: Ibrahim Jawahir in Engineering is organizing an NSF proposal on the sustainability of strategic elements like lithium and cobalt (see text below and attached draft). The proposal will be holistic and address all the sustainability aspects of the metals including engineering, chemistry, policy, and the various human impacts. Ideally, the proposal will integrate these aspects to create a unique transdisciplinary project.

Would you consider working with us on the social science aspects of the eventual proposal? At this point we only need to submit a one-page letter of intent outlining the project (the latest draft is attached) and I only need your expression of interest from this email. Once the LOI is approved we will begin planning our actual contributions to the project.

Jawa managed to organize a team on short notice to create the LOI. Jawa is a magician with funding so I'm excited to be involved and hopeful that the project will be funded and ultimately demonstrate how resource sustainability should be conducted.

Best,
David

David Atwood
Lexington, KY

Begin forwarded message:

From: "Atwood, David A." <datwood@uky.edu>
Date: May 31, 2022 at 10:02:09 AM CDT
To: "Atwood, David A." <datwood@uky.edu>
Subject: Invitation to join NSF Convergence Accelerator Proposal LoI

Begin forwarded message:

From: "Jawahir, Ibrahim S." <is.jawahir@uky.edu>
Date: May 31, 2022 at 8:27:54 AM CDT
To: "Atwood, David A." <datwood@uky.edu>
Subject: Re: NSF Convergence Accelerator Proposal LoI

Dear Proposal Team,

I received excellent feedback with edits from many of you for my earlier draft. Thank you all so much.

I have incorporated all your changes/corrections in the new draft (Draft 3) - attached. This version includes additional minor edits from me too. Based on the recommendation by David, I have taken the liberty to include Professor William Hoyt from Martin School of Public Policy and Administration and Gatton School of Business and Economics. Also, included are our friends Adib Bagh and Tony Elam, both will make excellent contributions to the proposal. I have just sent them a formal invitation. Hopefully they will agree to join our proposal team. The only area of expertise missing in the draft is social science. Hopefully, we can add someone in the proposal.

We need to submit this one-page LoT later today, most likely early afternoon. If you find anything that needs to be changed. Please let me know quickly.

Thanks.

Jawa

****
Dr. I. S. Jawahir
James F. Hardymon Chair in Manufacturing Systems,
Professor of Mechanical Engineering, and
Director of Institute for Sustainable Manufacturing (ISM)
414B, CRMS Building
University of Kentucky
Lexington, KY 40506
U.S.A.

Phone: (859) 323-3239
Fax: (859) 257-1071
E-mail: is.jawahir@uky.edu
Website: http://www.engr.uky.edu/ism/

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NSF Convergence Accelerator Phases 1 and 2 for the 2022 Cohort - Tracks H, I, J

PROGRAM SOLICITATION
NSF 22-583

National Science Foundation

Directorate for Technology, Innovation and Partnerships

Letter of Intent Due Date(s) ***(required)*** (due by 5 p.m. submitter's local time):

May 31, 2022

Letter of Intent (required for Phase 1 Full Proposals only)

Full Proposal Deadline(s) (due by 5 p.m. submitter's local time):

July 20, 2022

Phase 1 Full Proposals

August 29, 2023

Phase 2 Full Proposals, only Phase 1 awardees are eligible to apply

IMPORTANT INFORMATION AND REVISION NOTES

Innovating and migrating proposal preparation and submission capabilities from FastLane to Research.gov is part of the ongoing NSF information technology modernization efforts, as described in Important Notice No. 147. In support of these efforts, research proposals submitted in response to this program solicitation must be prepared and submitted via Research.gov or via Grants.gov, and may not be prepared or submitted via FastLane.

IMPORTANT INFORMATION

A key aspect of Convergence Accelerator projects is the innovation curriculum that requires a significant time investment and frequent participation of all partners such as academia, industry, non-profit, government, and other sectors under the guidance of coaches (see section V and a link to a sample curriculum can be found here). The curriculum includes a team science and human-centered design approach that rapidly moves projects towards deliverables in both Phase 1 and Phase 2 that will have broad scale national impact.

REVISION NOTES

The substantive changes in this FY 2022 solicitation include:

- A Letter of Intent is required for all Phase 1 Full Proposals.
- Meetings, including those associated with the innovation curriculum, Pitch Presentations, and Expo reflect changes in format resulting from the COVID-19 pandemic and rules associated with in-person and/or virtual meetings.
- In Full Proposals, *Letters of Collaboration* are now submitted in a standard format. The participation of any unfunded collaborators in the project must be substantive and their roles and responsibilities should be clearly described in appropriate Sections of the Project Description.
- This solicitation and the corresponding BAA support both US-only proposals and proposals with international partnerships. For Track I only, this solicitation includes a collaboration with The Commonwealth Scientific and Industrial Research Organisation (CSIRO), an Australian Government agency responsible for scientific research. Participants who would like to qualify for CSIRO funding will submit their proposals as a single proposal, with the US Lead PIs submitting to NSF and the Australian Participants sharing information with CSIRO as described in the solicitation and the corresponding BAA.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 22-1), which is effective for proposals submitted, or due, on or after October 4, 2021.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

NSF Convergence Accelerator Phases 1 and 2 for the 2022 Cohort - Tracks H, I, J

Synopsis of Program:

The National Science Foundation (NSF) Convergence Accelerator program addresses national-scale societal challenges through use-inspired convergence research. Using a convergence approach and innovation processes like human-centered design, user discovery, and team science and integration of multidisciplinary research, the Convergence Accelerator program seeks to transition basic research and discovery into practice — to solve high-impact societal challenges aligned with specific research themes (tracks).

NSF Convergence Accelerator tracks are chosen in concordance with the themes identified during the program's ideation process that have the potential for significant national impact. The NSF Convergence Accelerator implements a two-phase program. Both phases are described in this solicitation and are covered by this single solicitation and corresponding Broad Agency Announcement. The link to the corresponding Broad Agency Announcement can be found at https://sam.gov/opp/cad229a574774c038559d0c9fc22d9b4/view. The purpose of this parallel funding opportunity is to provide increased opportunities for proposals that are led by non-academic entities. Proposals that are led by Institutions of Higher Education (IHEs), non-profits, independent museums, observatories, research labs, professional societies and similar organizations should respond to this solicitation. Proposals led by for-profit or similar organizations should respond to the BAA. Phase 1 awardees receive resources to further develop their convergence research ideas and to identify important partnerships and resources to accelerate their projects. Phase 2 awardees receive significant resources leading to deliverable research prototypes and sustainability plans.

This solicitation for FY 2022 invites proposals for the following Track Topics:

Track H: Enhancing Opportunities for Persons with Disabilities

The NSF Convergence Accelerator's Track H: Enhancing Opportunities for Persons with Disabilities (PWDs) will serve as a platform to bring together researchers, practitioners, and stakeholders from a wide range of disciplines and sectors to work on use-inspired solutions to enhance quality of life and employment access and opportunities for PWDs.

Track I: Sustainable Materials for Global Challenges

The objective of the NSF Convergence Accelerator's Track I: Sustainable Materials for Global Challenges will be to converge advances in fundamental materials science with materials design and manufacturing methods in an effort to couple their end-use and full life-cycle considerations for environmentally- and economically-sustainable materials and products.

Track J: Food & Nutrition Security

The overarching goal of the NSF Convergence Accelerator's Track J: Food & Nutrition Security will be to accelerate convergence across food and nutrition sectors to address intertwined challenges in supporting population health, combating climate change, and addressing the nutritional needs of the most vulnerable by empowering youth, women, and disadvantaged communities.

It must be evident how the proposed work will be integrated to achieve success of the entire track. Each proposal should include a description of how the proposed project will contribute to an integrated environment that will deliver beneficial outputs for the track. It should also be clear how the projects will convergently align with the overarching goal of each track rather than as independent projects.

Proposers are required to submit a Letter of Intent in order to submit a Phase 1 Full Proposal. The information required in the Letter of Intent is described in Section V.

Letters of Intent should identity a team with the appropriate mix of disciplinary and cross-sector expertise required to build a convergence research effort. Letters of Intent must identify one or more deliverables, how those research outputs could impact society at scale, and the team that will be formed to carry this out.

Phase 1 proposals must describe the deliverables, a research plan, and the process of team formation that will help lead to a proof-of-concept during Phase 1.

If selected, Phase 1 awards may receive funding up to $750,000 for 12 months duration, of which nine months includes intense hands-on activities, centering around the Program's innovation curriculum, and three months of other activities, such as participation in the NSF Convergence Accelerator Pitch Presentations and Expo.

During the nine-month intensive planning phase, teams will participate in a curriculum that will assist them in strengthening team convergence and accelerating the identified idea toward Phase 2. The curriculum provides modules on innovation processes, including human-centered design, user discovery, team science, and integration of multidisciplinary partnerships. Teams will also be provided with coaches who will support them in Phase 1 and who may continue with them into Phase 2 if the teams choose to continue with the same coach. Alternatively, the teams can request to work with a different coach.

Only awardees of Phase 1 awards under this solicitation may submit a Phase 2 proposal. Phase 2 proposals must outline a 24-month research and development plan that transitions research into practice through convergence activities, multi-sector partnerships, and collaboration with other partners and end-users.

If selected for Phase 2, teams will be expected to apply program fundamentals and innovation processes gained in Phase 1 to enhance partnerships, develop a solution prototype, and build a sustainability model to continue societal impact beyond NSF support.

Phase 2 awards may be up to $5 million for 24 months. Phase 2 proposals must clearly describe deliverables that will be produced within 24 months. The Phase 2 teams must include partnerships critical for success and end-users (e.g., industry, Institutions of Higher Education (IHEs), non-profits, government, and others), each with a specific role(s) in deliverable development and facilitating the transition of research outputs into practical uses. Successful Phase 2 proposals will be funded initially for 12 months, with a second year being provided on the basis of an assessment of performance (see below).

Each Phase 2 team's progress will be assessed during the year through approximately four virtual and/or in-person meetings with NSF program staff. At the end of 12 months, overall progress will be evaluated based on a report and presentation that the team presents to a panel of internal and/or external reviewers. The review panel will include NSF reviewers and staff, and competing teams only. Phase 2 teams that show significant progress during the first year in accordance with the agreed timetable of milestones and deliverables will receive funding

for a second year. Phase 2 teams must plan on completing the effort within 24 months. No-cost extensions are **not** permitted except under clearly documented exceptional circumstances. Grantees must first contact the cognizant Program Officer prior to submitting a request.

The NSF Convergence Accelerator program is committed to research that derives expertise from and provides broad benefits to everyone. The program places a very strong emphasis on broadening participation by encouraging proposals from, and partnerships with, minority-serving institutions (e.g., Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities, Hispanic Serving Institutions, Alaska Native-Serving Institutions, Native Hawaiian-Serving Institutions, Asian American and Native American Pacific Islander-serving Institutions, and Native-American-serving non-tribal Institutions, see also U.S. Department of Education), and other organizations.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Douglas Maughan, telephone: (703) 292-2497, email: dmaughan@nsf.gov
- Lara A. Campbell, telephone: (703) 292-7049, email: lcampbel@nsf.gov
- Aurali E. Dade, telephone: (703) 292-7049, email: adade@nsf.gov
- Pradeep P. Fulay, telephone: (703) 292-2445, email: pfulay@nsf.gov
- Ibrahim Mohedas, telephone: (703) 292-4329, email: imohedas@nsf.gov
- Linda Molnar, telephone: (703) 292-8316, email: lmolnar@nsf.gov
- Michael Pozmantier, telephone: (703) 292-4475, email: mpozmant@nsf.gov
- Michael Reksulak, telephone: (703) 292-8326, email: mreksula@nsf.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.084 --- NSF Technology, Innovation and Partnerships

Award Information

Anticipated Type of Award: Standard Grant or Cooperative Agreement

Estimated Number of Awards: 36 to 48

NSF expects to make up to 48 Phase 1 awards across all topics as a result of this solicitation and the corresponding BAA.

NSF expects to make 4-5 Phase 2 awards for each topic as a result of this solicitation and the corresponding BAA.

Anticipated Funding Amount: $36,000,000

Anticipated funding for $36,000,000, pending availability of funds, to support Phase 1 awards. Proposers may request up to $750,000 for Phase 1.

The estimated funding level for Phase 2 awards depends on the availability of funds and the number of Phase 1 awards. Phase 2 proposals may request up to $3,000,000 for year 1 and up to $5,000,000 in total for the 24-month Phase 2 project.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- For-profit organizations: U.S. commercial organizations, especially small businesses with strong capabilities in scientific or engineering research or education.

Who May Serve as PI:

The PI and any co-PIs must hold an appointment at an organization that is eligible to submit as described under "Who May Submit Proposals." At least one PI or co-PI from a Phase 1 award must be included as a PI or co-PI on a Phase 2 proposal based on that Phase 1 award. The same individual who served as PI for the Phase 1 award does not have to be PI for the Phase 2 proposal. Any change of PI and co-PI should be fully explained in the proposal.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or co-PI:

Phase 1 proposals
An individual may serve as PI or co-PI on no more than two Phase 1 proposals. Submissions to the BAA are included in this number. However, it is unlikely that multiple Phase 1 awards would be made to organizations that included the same PI or co-PI on separate proposals.

Phase 2 proposals

Anyone may serve as a PI or co-PI on only one Phase 2 proposal. This limitation includes PIs and co-PIs listed for the proposing organization or any subaward submitted as part of the proposal. There are no restrictions or limits on serving as other Senior Personnel.

See section IV. below for additional eligibility information.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is required. Please see the full text of this solicitation for further information.
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**
  - Full Proposals submitted via Research.gov: *NSF Proposal and Award Policies and Procedures Guide* (PAPPG) guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.
  - Full Proposals submitted via Grants.gov: *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov* guidelines apply (Note: The *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide).

B. Budgetary Information

- **Cost Sharing Requirements:**

  Inclusion of voluntary committed cost sharing is prohibited.

- **Indirect Cost (F&A) Limitations:**

  Not Applicable

- **Other Budgetary Limitations:**

  Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Letter of Intent Due Date(s) *(required)*** (due by 5 p.m. submitter's local time):

  May 31, 2022

  Letter of Intent (required for Phase 1 Full Proposals only)

- **Full Proposal Deadline(s)** (due by 5 p.m. submitter's local time):

  July 20, 2022

  Phase 1 Full Proposals

  August 29, 2023

  Phase 2 Full Proposals, only Phase 1 awardees are eligible to apply

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria. Additional merit review criteria apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions:

Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements:

Standard NSF reporting requirements apply.

TABLE OF CONTENTS

I. INTRODUCTION

Research is often driven by a compelling societal or scientific challenge; however, it may take the researcher community years to develop a solution. To deliver tangible solutions that have a societal impact and at a faster pace, the NSF Convergence Accelerator brings together multiple disciplines, expertise, and partnerships from academia, industry, non-profit, government, and other sectors together to develop solutions to solve national grand challenges through convergence research.

Convergence Research is a critical mechanism for solving many vexing research problems, especially those stemming from complex societal and/or scientific challenges. In this NSF Convergence Accelerator Phase 1 and Phase 2 solicitation for FY 2022, NSF seeks to support and facilitate research that advances ideas from concept to deliverables within each of the convergence research topics (tracks).

The NSF Convergence Accelerator Phases 1 and 2 for the 2022 Cohort - Tracks H, I, J solicitation consists of three tracks as follows:

Track H: Enhancing Opportunities for Persons with Disabilities

Track I: Sustainable Materials for Global Challenges

Track J: Food & Nutrition Security

The NSF Convergence Accelerator seeks to support use-inspired research and enable the accelerated transition of that research into benefits for society through a two-phase process.

Phase 1: Learning + Applying the Convergence Accelerator Fundamentals, Convergence Research Planning

Phase 1 is for funding up to $750,000 for 12 months duration. It supports nine months of planning effort to further develop the initial concept, identify new team members, participate in the innovation curriculum, and develop an initial prototype. The innovation curriculum consists of training with professional coaches in human-centered design, team science activities, inter-team communications, pitch preparation, developing a Public Executive Summary and presentation coaching — all of which are essential components of the Convergence Accelerator's model. This training helps the teams better prepare to be successful in the next phase. In addition, this provides the teams with presentations by (and access to) experts on anticipated use cases for government, industry, and society, in general.

At the end of Phase 1, teams will spend the remaining three months presenting to a pitch review panel as part of their Phase 2 proposal and participating in the NSF Convergence Accelerator Expo (Expo) and other activities.

Phase 1 efforts will focus on research plan development, team formation leading to a proof-of-concept and will include NSF convenings for training and cross-cohort collaboration. The Phase 1 innovation curriculum is a significant time investment with frequent participation of all partners under the guidance of coaches.

Phase 2: Continued Application of the Convergence Accelerator Fundamentals, Prototyping and Sustainability Planning

Phase 1 teams that are selected for Phase 2 through the merit review process will proceed to Phase 2, with potential funding of up to $5 Million as a cooperative agreement for 24 months. Phase 2 teams will continue to apply Convergence Accelerator fundamentals, including identifying new team members and end-user partnerships to further develop solution prototypes and to build a sustainability model to continue impact beyond NSF support.

At the 12-month mark of Phase 2, the Convergence Accelerator will review the team projects to assess and ensure each team is working towards the expected deliverables. Assessments from the reviewers will be shared with the team along with the guidance/decision for the next steps. At the end of Phase 2, teams are expected to provide/demonstrate outcomes/solutions that were part of the proposal.

II. PROGRAM DESCRIPTION

This NSF Convergence Accelerator Phase 1 and Phase 2 for the 2022 Cohort - Tracks H, I, J solicitation seeks to address the topics described in the convergence tracks identified above and detailed below. Phase 1 awards are grants for planning and preliminary prototyping of projects that leverage basic research investments. Phase 2 awards are cooperative agreements for projects that build upon the Phase 1 efforts, leading to rapid research advances to

deliver useful results and impactful solutions to society.

The guiding rationale of the NSF Convergence Accelerator is that a high level of interdisciplinarity and engagement with multiple diverse stakeholders, including researchers and the ultimate users of research products, is essential to deliver progress on scientific challenges of societal relevance — such as those embodied by the three tracks in this solicitation.

Successful NSF Convergence Accelerator proposals are expected to have four important characteristics: 1) *convergence* research approach; 2) strong, multi-organization *partnerships* involving researchers, users, and other stakeholders; 3) high probability of successful *deliverables within a 24 month period* that will ultimately benefit society (such as those discussed under the Tracks in Section II, Program Description), and 4) *strong alignment with the track goals* as described in this solicitation.

Track H: Enhancing Opportunities for Persons with Disabilities

Research Background

The NSF Convergence Accelerator's Track H: Enhancing Opportunities for Persons with Disabilities will serve as a platform to bring together researchers, practitioners, and stakeholders from a wide range of disciplines and sectors to work on use-inspired solutions to enhance the quality of life, employment access, and opportunities for people with disabilities (PWD or PWDs). The big picture goal is to enhance equity, inclusion, and accessibility for PWDs. Track H was chosen based on the results of two NSF-funded community workshops related to this topic. The reports from these workshops are Accelerating Disability Inclusion in Workplaces Through Technology Workshop and Liberate 2021: Living Better through Rehabilitative and Assistive Technology.

This track offers opportunities to community stakeholders to bring in knowledge, expertise, insights, methods, and tools from disparate areas of research including, but not limited to, engineering, manufacturing, robotics, computer/data science (including artificial intelligence (AI) and machine learning (M/L)), healthcare, social, behavioral, and economic sciences, policy, and ethics. The resulting collaborative projects must work toward ensuring the development of tangible tools, resources, hardware, or software, and/or improving the participation of PWDs in the workforce. Proposals that are driven by use-inspired research are encouraged. Proposed research must leverage convergence between disciplines; be ready for acceleration; fueled by strong public-private partnerships; and ultimately enable translation into tangible solutions that are sustainable.

PWDs represent the largest minority group in the United States (Invisible Disabilities Association) and in the world. According to the Centers for Disease Control and Prevention (CDC), about 26% of people in the United States (~ 1 in 4 adults) have a disability (Disability and Health Data System). In addition, data from the United Nations indicates that about 15% of the people in the world (~1 billion) live with some form of a disability (Factsheet on Persons with Disabilities). Disabilities may be apparent or non-apparent, temporary or permanent, and may change or develop during a person's lifetime. Disabilities can vary in type and affect a person's development, thinking, learning, hearing, mobility, vision, self-care, mental health, and other activities of daily living.

PWDs experience major barriers that can hamper their quality of life, health, and wellness, which often reflect on insufficient levels of support, services, and resources to help meet their access needs. Regardless of the type of impairment a person may have, the experience of living with a disability represents the interplay of several factors, including activity limitations, restricted participation, environmental factors, and personal factors (World Health Organization Report, 2002).

PWDs, especially women and racial and ethnic minorities, remain highly underemployed in the U.S., despite offering talents and skills that can benefit employers and workplaces. The Office of Disability Employment Policy (ODEP) in the U.S. Department of Labor notes that the labor force participation rates for people with and without disabilities in the U.S. in October 2021 were 22.4% and 67.1%, respectively. The unemployment rates for people with and without disabilities were 9.1% and 4.0%, respectively (Office of Disability Employment Policy, 2021). The scale and impact of these disparities are even greater for women and underrepresented minorities who have disabilities.

The COVID-19 pandemic has disproportionately affected women, minority communities, and PWDs. They have faced major challenges such as reduced access to vaccines, routine care and rehabilitation; job losses, including from safety issues hindering staying at and returning to work; an inability to telework effectively or at all; and insufficient work supports and accommodations. Even before the pandemic, many workers with disabilities lacked access to job accommodations, and their accommodations often failed to meet their access needs.

U.S. demographics for the employment of PWDs in different states, where they live in the community, and types of disability can vary widely. External factors can often make it harder for PWDs to attain and maintain gainful employment or involvement in the community. Some core access issues include reliable, accessible transportation, centralized services and accessible, affordable housing in a community or near workplaces (Office of Disability Employment Policy, 2021; Senate Help Committee, 2014). Services for PWDs that help support and maintain employment and community inclusion are often not centralized or not easy to access, which compounds many of these issues.

PWDs are also underrepresented in STEM. A recent report released by the National Center for Science and Engineering Statistics states that about 10% of women and 9% of men, who are scientists and engineers with at least a bachelor's degree, reported that they are not working due to chronic illnesses or disabilities. As a result, the society is deprived of a wealth of untapped talent.

Studies show that most PWDs want to engage in meaningful life activities. Recent studies and reports emphasize that expanding opportunities for PWDs can yield major economic benefits while meeting legal obligations. Many employers remain unaware of the benefits and ease of hiring workers with disabilities (EARN: Disability Inclusion in the Workplace). These studies also suggest that misconceptions about the costs and benefits of including workers with disabilities contribute to low participation in the labor force.

Employment is the likeliest means that can help improve outcomes for many PWDs, including financial security, access to protections such as health insurance, social interaction with colleagues, a sense of self-worth and purpose, and better satisfaction with quality of life. Unemployment often has a particularly detrimental impact on quality of life, mental and physical health, and the financial stability of PWDs.

Major advances in technology, both in the workplace and in the home, have helped empower job seekers and workers with disabilities who strive for upward mobility in their fields in the modern knowledge economy. The use of universal design and workplace accessibility applies equally for emerging technologies, such as artificial intelligence (AI), extended reality, autonomous vehicles, and mainstream information and communication technologies, including those used in the workplace.

This track seeks new and affordable assistive or rehabilitative technologies, products including software enabled services, or tools. This track also seeks ways to increase workforce participation of PWDs. Deep integration of, and collaboration between, disparate disciplines are needed to develop use-inspired solutions to achieve these goals.

Partnerships and Engagements: Proposals submitted to this track should integrate expertise, insights, methods, facilities, and tools from multiple disciplines. Direct participation by PWDs, their caregivers, and stakeholder organizations, those who are trained as researchers (STEM or related disciplines), and veterans

is also strongly encouraged. Leveraging resources and projects from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR), the Veterans Administration (VA), the National Institutes of Health (NIH), ODEP, and/or state and local agencies, non-profits, and industry is encouraged but not required. Involvement of these organizations will increase the likelihood of ultimately translating innovative technologies/approaches/findings into implemented solutions. Proposals should be explicit in how diversity, equity, inclusion, and accessibility will be incorporated into the overall project.

Advancing substantive innovation requires that researchers work cooperatively and collaboratively across different sectors including private industry, government, academia, advocates for PWDs, associations of employers and trades, and all types of problem solvers from all sectors of the community. Such collaborations could also help to further enhance equity, inclusion, and accessibility for PWDs.

Partnerships with state programs serving PWDs (employment advisory groups, state and local workforce boards, developmental disability and rehabilitation councils, and state and local initiatives) that will help facilitate employment opportunities are encouraged. Examples include legislatively mandated Workforce Innovation and Opportunity Act (WIOA) programs (adult program, dislocated worker program, youth program, Adult Education and Family Literacy Act Program, Wagner-Peyser Act, Vocational Rehabilitation Program, and Career and Technical Education Programs).

Tasks and Deliverables

Note: *This program is not intended to support clinical trials.*

This track seeks to fulfill its promise by accelerating the development of innovative, interconnected projects founded in creative, translational, and use-inspired innovative ideas/concepts/themes that can harness the power of partnerships to tackle the key barriers faced by PWDs.

It focuses on use-inspired, translational research that adopts the use of human-centered design and approaches. Projects must embrace and display a culture of convergence among disciplinary approaches, and must include partners from multiple sectors (e.g., colleges and universities, industry, non-profits, community organizations, and/or local, state, tribal, or federal government). Projects must articulate one or more clear deliverable(s) that will help transition research into practice with measurable impacts and benefits to society within the less than 3-year effort of a Convergence Accelerator track — 9 months of Phase 1 and two years of Phase 2. Deliverables must address challenges in enhancing the participation of PWDs in the workforce and/or developing products, services, tools that could ultimately help them.

In terms of the *primary* focus or theme, proposals submitted to this track are expected (but not required) to fall into two broad categories: (a) assistive or rehabilitative technologies to help enhance quality of life or (b) strategies for improving participation of PWDs in the workforce. As noted, race and ethnic background, gender, socioeconomic and LGBTQIA+ status, and societal attitudes can affect whether and how PWDs address and mitigate core barriers that hinder gainful employment and full inclusion in the community. Proposals that specifically address the needs of these groups are strongly encouraged. Projects should focus on achieving tangible and significant outcomes to empower PWDs or communities in which they interact or work. All proposals should be explicit in explaining how diversity, equity, and inclusion are incorporated into the overall project.

Outcomes

The outcomes from this effort are expected to yield key tangible benefits for PWDs. It is anticipated that the projects supported through this program will help enhance quality of life through assistive or rehabilitative products or services and approaches to reduce barriers that can hinder entering the workforce, sustaining jobs, and achieving high work performance, especially for women and underrepresented minorities with disabilities.

Developing innovative assistive or rehabilitative technologies can help improve equity, inclusion, and accessibility for PWDs of all ages. These could be based on advances in social and rehabilitation robotics, non-invasive stimulation technologies, advanced materials, additive manufacturing/3D printing, battery technologies, sensors, flexible, printed electronics, soft robotics, neuromorphic engineering, extended reality, AI/ML, autonomous vehicles, and mainstream information and communication technologies. It is expected that all solutions will emphasize the use of inclusive, affordable, and human-centered universal design. This approach can foster best and promising practices that drive good outcomes to become universally adopted and thus commercially viable, creating a broader impact for a wider range of stakeholders that comprise both people with and without disabilities. Broad topics within this track may include – but are not limited to – the ones listed below.

- Design of and enhancements to assistive technologies and access to digital and in-person spaces, hiring and workforce accommodations, training, workforce development, integrated services, work-based learning and K-16 education, and scalable and adaptive retraining tools. The use of universal design and workplace accessibility using emerging technologies, such AI and ML.
- Tools/methods/software/other resources that are based on translational approaches rooted in social sciences, behavioral sciences, ethics, and economics that could ultimately advance innovative policies and procedures that will be helpful to PWDs and the communities they interact with. Projects could also focus on the provision and coordination of services, design of accessible transportation and housing, workforce programs, and other key focuses.

Track I: Sustainable Materials for Global Challenges

Research Background

The objective of the NSF Convergence Accelerator's Track I: Sustainable Materials for Global Challenges will be to converge advances in fundamental materials science with materials design and manufacturing methods in an effort to couple their end-use and full life-cycle considerations for environmentally- and economically-sustainable materials and products. This convergence research track topic was based on the results of NSF-funded community workshops, such as Accelerating Translational Materials R&D for Global Challenges and Socioresilient Infrastructure: Precision Materials, Assemblages, and Systems. Broad topics within this track may include – but are not limited to – the ones listed below.

- Critical materials and manufacturing processes, such as microelectronics and their components; solutions for sustainable polymers in areas of high unmet need such as healthcare and packaging; and commercially viable materials for sustainable clean energy (e.g., batteries, photovoltaics, wind turbines, hydrogen) and transport.
- Full life cycle and sustainability "Systems Thinking" in materials design including the construction of inclusive, large-scale partner ecosystems and education/workforce development for sustainable design that is connected to opportunities in industry. Education (for and as) infrastructure, including scaling of innovative curricula and training for inclusive sustainable infrastructure design and job creation. This could include community/citizen science projects for socio-resilient infrastructure such as housing for displaced persons that is resilient to changing weather patterns.

The overarching goal of Track I is to accelerate convergence research across the materials discovery, development, and production sectors to address challenges in the manufacture and reuse and recycling of critical materials and products and to develop new, innovative, sustainable materials and manufacturing processes. The world is dependent on materials such as plastics and microelectronics for every aspect of life and work. These materials are integral to energy, infrastructure, healthcare, economic development, national security, etc. and while the research enterprise has previously paid significant attention to the discovery of new materials and material properties (Materials Genome Initiative), relatively little effort has been applied to a holistic approach to

materials development from the molecular level to their durable long-term applications and end-of-life challenges.

In addition, the world is at an unprecedented time when climate change is becoming an existential threat. Material production is widely acknowledged as the cause of over half of greenhouse gas (GHG) emissions. (Increased carbon footprint of materials production driven by rise in investments) The current production and use of materials are not sustainable for human beings and the planet. By taking a systems level view of materials and their production, we can address the urgent planetary crises that are facing society today (climate, nature and biodiversity, and pollution and waste). To address these crises, we must converge efforts in fundamental materials science with materials design and manufacturing methods coupled with their end use and full life cycle considerations for the environmentally and economically sustainable production and reuse and recycling of critical materials and products. This will require a rethinking of the current materials we use and the processes by which they are produced in addition to their interaction with the environment and society as a whole.

We must accelerate this convergence to achieve the capability to source and/or produce those critical minerals and materials as well as develop the sustainable (environmental and economic) discovery and production capabilities that are important to the economy, security, health, and energy resources of our Nation and globally. (Building Resilient Supply Chains)

While the plastics problem is highly recognized (The New Plastics Economy: Rethinking the future of plastics & catalysing action), prevailing commercial incentives have made it difficult to make significant progress and the problem, often referred to as a "Gordian knot", is much more complex than simple incentives might imply. New approaches and incentives are critical to future success. (Rethinking Plastics in Aotearoa New Zealand; Plastics Innovation Fund)

Our efforts in microelectronics are seen as having fallen behind and our inability to manufacture critical supply chain components and assess the supply chain itself is considered by some as a significant national security risk. However, that tide is turning as there are several new programs and bold initiatives in place to solve some of the most daunting materials issues including exciting global efforts and partnerships. (Cooperation in Quantum Science and Technology – United States Department of State)

Partnerships and Engagements: Related programs at NSF are numerous. Proposals should seek to build upon these programs by focusing on areas of research that are ready for accelerated convergence research and can produce solutions and deliverables in a three-year time period. NSF programs include, but are not limited to the following: Designing Materials to Revolutionize and Engineer our Future (DMREF) and Emerging Frontiers in Research and Innovation (EFRI) as well as centers, platforms, and foundries, including: Materials Science Research and Engineering Centers (MRSECs), Science and Technology Centers (STCs), Centers for Chemical Innovation (CCIs), Engineering Research Centers (ERCs), Industry – University Cooperative Research Centers (IUCRCs), Materials Innovation Platforms (MIPs), NSF Center for Sustainable Polymers (CSP),and Convergent Accelerated Discovery Foundries for Quantum Materials Science, Engineering and Information (Q-AMASE-i). In addition to leveraging NSF investments, projects may also leverage other Federal agency investments such as the Manufacturing USA Institutes, the Department of Energy's BOTTLE consortium, and numerous others. Proposals should be explicit in how diversity, equity, inclusion, and accessibility will be incorporated into the overall project.

Over the past year, the NSF Convergence Accelerator has supported several ideation workshops aimed at distilling meaningful solutions and deliverables for some of the most pressing materials and manufacturing needs as well as broad cross-cutting resources that can contribute to many different materials and their applications, such as:

- Accelerating Translational Materials R&D for Global Challenges
- Development of Infrastructure for Distributed Bio-Manufacturing and Bio-Readiness
- Design for Circular Economy from Molecules to the Built Environment
- Socioresilient Infrastructure: Precision Materials, Assemblages, and Systems

A key 3-year milestone was identified in each of five technical areas:

1. Materials Research Data Sharing Principles & Infrastructure: Establishment of a common US-wide data standard and data sharing infrastructure for academic, government, and industrial materials data, building on FAIR data principles 1 and providing needed metadata, annotations, and access controls.
2. Incentives for Long-term Investment & Sustainability: Creation of a multi-stakeholder effort that demonstrates the effective use of a convergence approach to de-risk solutions in an area of sustainable materials, such as polymers.
3. Full-lifecycle and Sustainability "Systems Thinking" in Materials Design: Demonstration of an open data platform and program for holistic materials research and development that incorporates interdisciplinary perspectives beyond materials science (lifecycle analysis, socio-economics, policy, environmental issues, etc.) in an area with large societal impact like materials for the built environment.
4. Construction of Inclusive, Large-scale Partner Ecosystems: Implementation and evaluation of multiple embedding mechanisms (collaboration, technology transfer, internships, sabbaticals, visiting scientists, etc.) to see which are most effective at building strong, inclusive communities of innovation that connect materials science and manufacturing.
5. Making Materials Knowledge Consumable in Design and Manufacturing: Demonstration of programs that drive enhanced data sharing between academic materials research and industry in the form of student projects, industrial internships, and joint training.

Tasks and Deliverables

NSF is seeking solutions that utilize advanced technologies for the translation of materials for global challenges. The *Sustainable Materials for Global Challenges* track focuses on use-inspired, translational research that address challenges in sustainable materials for global challenges while providing significant benefits to society. Each project should incorporate community engagement and strive to include an education or training component that connects user communities. Such connections could include, but are not limited to, citizen science, co-designing projects so they provide benefits to local communities or provide user-friendly data products and services, or creating workforce training programs.

Building upon ideas for education, which mandate three core competencies: communications, teamwork and ethics, develop educational tools and programs on sustainable materials development, including experiential elements such as internships, etc., projects should consider potential benefits to local communities from the data and insights produced by project efforts and by enabling communities to participate in project evaluation activities. Also critical for this topic are projects which focus on behavior change and environmental justice. In addition, proposals should be explicit in how diversity, equity, inclusion, and accessibility (DEIA) will be incorporated into the overall project. Projects that redefine and quantify value so that it includes broader value for the community, biodiversity, etc. are welcomed.

Specifically, solutions that address both the problem of waste remediation and conversion into useful products as well as an entire rethinking of the design and manufacturing process of new materials to prevent future pollution and waste are sought. Further, while there has been increasing attention paid to sustainability and environment issues, viable solutions, for example, in infrastructure, must be truly converged with the humanistic fields including history, social sciences, science, technology and society studies, social justice, and diversity, equity, inclusion, and accessibility. Projects need to clearly articulate a theory of change and identify how the project is going to act as an entry point to effect lasting change. (Accelerating the low carbon transition)

Potential solutions can include, but are not limited to, the creation of a circular economy that is also just and equitable providing access to natural resources and durable man-made resources. Innovative technologies which address both the sustainable production of needed products from the accumulation of waste from such materials as plastics and batteries as well as the design of entirely new ways of developing materials and products are sought. It is highly desirable to make all products (and services) "transparent" with respect to origins, production, use and end-of-life by providing accessible data and data frameworks. Efforts should also include the empowerment of the consumer to make good choices and behave in ways that support circular economies.

Further, those efforts that provide equitable access to circular financing, or how the financing, financial markets and financial actors are affected by a transition from a linear to a circular economy, will be strongly considered. Cross-cutting aspects of each effort should include the transformation of the education and training of the next generation's scientists to consider materials design, development, production, use, and fate from a transdisciplinary perspective that includes sustainable design principles, takes into account societal impact, and is also equitable and just. Concerted efforts across the fields of materials, chemistry, biology, math, physics, engineering, computer science, social, behavioral, economic, and education sciences as well as the broader materials and chemical sectors including legal, policy, design, certification, supply chain and manufacturing capabilities. Proposed solutions should be sustainable from both environmental and economic perspectives.

Outcomes

The objective of this track is to converge efforts in fundamental materials science with materials design and manufacturing methods coupled with their end use and full life cycle considerations for the environmentally and economically sustainable production of critical materials and products. Key themes and potential outcomes may include but are not limited to:

- Materials research data sharing principles & infrastructure (Materials Informatics). Software and tools to enable decision-making across the supply chain, including potential gap analysis and uncertainty analysis to support improvements in systems-level analysis packages, which use multi-disciplinary and multi-dimensional approaches such as data sharing infrastructure for inclusive co-design studios. Making materials knowledge consumable in design, manufacturing, and to all key stakeholders.
- Critical materials and manufacturing processes, such as microelectronics and their components, solutions for sustainable polymers in areas of high unmet need such as healthcare and packaging, and commercially viable materials for sustainable-clean energy (batteries, photovoltaics, wind turbines, hydrogen, etc.) & transport.
- Full-lifecycle and sustainability "Systems Thinking" in materials design including the construction of inclusive, large-scale partner ecosystems. Education and Workforce Development for sustainable design that is connected to opportunities in industry. "Education for and as infrastructure" including scaling of innovative curricula and training for inclusive sustainable infrastructure design and job creation. Community/citizen science projects for socio-resilient infrastructure such as housing for displaced persons that is climate change resilient.

For Track I ONLY:
Australia's national science agency, CSIRO, is providing sponsorship for the participation of one Australian team in Track I. All proposals that include Australian entities that wish to be eligible for CSIRO funding as partners in a US-based team are required to complete a pre-submission review to confirm fit with CSIRO Eligibility Criteria as part of the Letter of Intent. Please see https://www.csiro.au/missionsaccelerator for additional information.

Track J: Food & Nutrition Security

Research Background

The overarching goal of the NSF Convergence Accelerator's Track J: Food & Nutrition Security is to accelerate convergence across food and nutrition sectors to address intertwined challenges in supporting population health, combating climate change (Executive Order 13990, Executive Order 14008), and addressing the nutritional needs of the most vulnerable by empowering youth, women, and disadvantaged communities (Executive Order 14002). The vision for transforming America's food systems underlying this call for proposals is in alignment with goals of the United States Department of Agriculture and focuses on:

- Ensuring access to safe, healthy, and nutritious food in all communities,
- Building more resilient local and regional food systems,
- Building new markets domestically and internationally, and streams of income for farmers and producers using climate smart food and forestry practices, and
- Making consequential investments in infrastructure and clean energy capabilities in rural America.

The convergence research track topic was chosen based on the results of NSF-funded community workshops, such as Digital and Precision Agriculture and Sustainable Systems Enabling Food Security in Extreme Environments and Food Deserts Employing a Convergence of Food, Energy, Water and Systems for Societal Impact.

There exists an increasing demand for water, food, and energy resources in the world and in the United States. Concurrent with the effects of climate change and population growth, these essential resources are becoming increasingly scarce. As highlighted by the NSF-funded workshops on this topic, by 2050, water demand will increase by 55%, energy needs by 80%, and food demands by 60%. The world's population is expected to increase from 3 billion in the late 1960s to almost 10 billion by 2050, representing an increase in agricultural demand, creating an urgent need to produce more food to enable food security. Total food consumption globally is projected to increase from 2,373 kcal/person/day in about 1970 to 3,070 kcal/person/day by 2050. In addition, changes in climate, land use, resource consumption, and population growth are pushing some regions to no longer be able to support regional food requirements, contributing to large-scale human migration in parts of the world.

Food and nutrition related industries, consumption behaviors, and resources have always been important for humanity; and they are expected to play a central role over the next decades in addressing challenges related to climate change and population growth. Recognizing this opportunity, Track J of the NSF Convergence Accelerator seeks proposals to create use-inspired, integrative solutions to enable *Food & Nutrition Security*. The goal of this undertaking is to facilitate making connections between agricultural and food processing technologies, data, training, and impacted communities. In developing resilient and regenerative agricultural practices that provide societal impact, there are many obstacles and challenges to overcome. Addressing these requires deep integration and collaboration among many disciplines as well as inventive and innovative partnerships across academia, industry, the public, local/regional communities, non-profit organizations, and federal, state, and local government agencies.

Acceleration of *Food & Nutrition Security* that concomitantly advances agricultural economic interests and regenerative agriculture practices as well as a reduction in waste behavior is a challenge that requires effort and collaboration among disparate disciplines. This track has the objective to create an accessible, climate-safe, fair and just food supply chain for changing environments in interconnected rural and urban communities. It will pursue this objective by focusing on resilient and regenerative agricultural practices. The cohort of synergistic projects funded through this track will help the nation to sustainably increase access to nutritious and affordable food in ways that engage disadvantaged communities. This track will spur technology development and implementation to create good jobs and profitable, resilient businesses.

Achieving this vision requires an accelerated and concentrated effort focused on creativity; innovative ideas and technologies; the ability to collect, aggregate, process, and interpret data and information such that stakeholders from across the spectrum of users can readily obtain the information they need; and improved means to measure and monitor all aspects of the food supply chain and their interconnections. This track is intended to serve as a platform that offers an opportunity to the community to bring in expertise, insights, methods, and tools from multiple areas including, but not limited to, economics, psychology, sociology, genetic engineering, biotechnology, meteorology, hydrology, geospatial analysis, automation control systems, decisions science, nanotechnology, data science, and mathematical/computational modeling.

The resulting collaborative projects must be directed toward ensuring food and nutrition security across the nation and, ultimately, the globe. Teams will use existing datasets, coupled with data analytics, machine learning and artificial intelligence, to build upon or create predictive models and forecasting algorithms to anticipate future food deserts and propose sustainable systems that enable food security in susceptible regions, while accounting for the potential effects of climate change.

Partnerships and Engagements: Partnerships could include, but are not limited to citizen science, co-designing projects so they provide benefits to local communities or provide user-friendly data products and services or creating workforce training programs. Projects should consider potential benefits to local communities from the data and insights produced by project efforts and by enabling communities to participate in project evaluation activities. Projects that focus specifically on community engagement and education are also encouraged. Proposals should be explicit in how diversity, equity, inclusion, and accessibility will be incorporated into the overall project.

Tasks and Deliverables

This track focuses on use-inspired, translational research. Projects must embrace and display a culture of convergence among disciplinary approaches and must include partners from multiple sectors. Projects must articulate one or more clear deliverable(s) that will help transition research into practice with measurable impacts and benefits to society within the less than 3-year effort of a Convergence Accelerator track — 9 months of Phase 1 and 24 months of Phase 2. Deliverables must address challenges in resilient and regenerative agricultural and food consumption practices while providing significant benefits to society. Each project should incorporate community engagement and strive to include an education or re-training component that enables better individual and community understanding of nutrition.

Outcomes

The cohort of projects in this track will ultimately deliver novel, effective, unbiased data-driven AI tools to scale and transform our agricultural systems; economic models for increased and sustainable agriculture and nutrition security; biodiversity and climate-safe biological systems, biotech solutions in agriculture and food processing; adoption-informed automation, robotics, and transportation; and digital and precision agriculture platforms. Partnerships in this cohort will include start-ups and small business, non-profits and foundations, professional societies, scientists, engineers, and economic development organizations at all levels of governance.

Outcomes of the *Food & Nutrition Security* Track may include – but are not limited to – the following:

- Assessing, modeling, and prediction of food deserts (geographic areas with limited access to affordable and nutritious food); food security in extreme environments; and analyzing food deserts with the focus to create socially, politically, economically, and culturally acceptable solutions.
- Planning, prototyping or modeling for food optimization and minimization of waste, including the utilization of sensors, data, and networks while also addressing policy, food labels and discard behavior.
- Combining concepts and approaches from social sciences, biology, chemistry, and engineering to develop plans and methods to promote sustainable systems and enable food security and food literacy.

KEY COMPONENTS OF THE NSF CONVERGENCE ACCELERATOR

Letters of Intent, Phase 1 proposals, and Phase 2 proposals must address the following key components. See Section VI.A (solicitation specific review criteria) for more detail.

Convergence Research

Research and development efforts proposed must represent the highest level of multidisciplinary expertise in convergence research needed to encompass the full scope of the topic selected. Since transition to practice is a core goal of the Convergence Accelerator, projects need to include personnel with expertise relevant to applications and use, as well as the technologies themselves. Teams must include the necessary expertise in appropriate areas of the physical sciences, math, engineering, data and computer sciences, biological sciences, geological sciences, social and behavioral sciences, general education and science education, and other disciplines to ensure success.

Partnerships

Convergence Accelerator projects should embody use-inspired research that seeks to accelerate research to practice in ways that benefit society at a national scale. The Convergence Accelerator program seeks to encourage partnerships with many types of organizations from academia, industry, government, non-profit, and other sectors, to ensure that research efforts are use-inspired and have a clear path to transition to practice. Therefore, stakeholders from multiple types of organizations and sectors must be involved in ways that allow the project to identify and work with end users.

Letters of Intent should describe envisioned partnerships and a path to expand relationships as needed.

Phase 1 proposals must include non-academic partners who are directly engaged in the activities described and should include letters of collaboration, where necessary (refer to Section V.A.). The proposal must also describe how additional partners would be identified and recruited, as needed.

Phase 2 proposals may engage cross-cutting partners in the following ways:

- As part of the effort described in the proposal. Partners may contribute effort and/or resources that are described under Facilities, Equipment and Other Resources. The NSF review process will consider the team qualifications and resources of the full effort described in the proposal.
- As part of activities, such as the Expo 2023. These activities do not guarantee an opportunity for partnership with one or more teams, but do provide an opportunity to develop potential partnerships in collaboration with awardee teams. NSF's award-making process will not be tied to negotiation of agreements based on these partnerships and are not a requirement for a Phase 2 award.
- After awards are made. Partners or contributors may join projects through agreements developed directly with awardee organizations or NSF after an award has been made. These partnership agreements may be subject to terms and conditions of the NSF award.

Partnerships supported under this solicitation are not intended as a mechanism to conduct corporate sponsored research, though they may take advantage of

synergistic activities. While NSF encourages engagement and submissions from for-profit entities, including sharing of data, tools, expertise, or other resources, fees or profit may not be requested in NSF proposals submitted under this solicitation.

Deliverables
Proposers must clearly identify the deliverables that will result from the proposed project and describe how those outputs will benefit society at a national scale. While deliverables may take many forms (e.g., hardware, software, data, services, processes, protocols, standards, and more) projects must clearly articulate how benefits to society would result from deliverables developed by the end of Phase 2.

Track Alignment
The proposed effort must clearly match the goals described in the track description. Track alignment and contributions to track success must be clearly described. The proposer must clearly describe both the track relevance (fit within the overall track topic or specific subtopic) and, also, how the proposed work fits into the overall goals of the Track to enable the transition of convergence research into practice.

Intellectual Property
Partnerships that facilitate the research effort and transition to practice of research results are a key component of the Convergence Accelerator program. Phase 2 proposals have a required Intellectual Property Management Plan which is essential for current and future partnerships.

The disposition of rights to inventions made by small business firms, large business firms, and non-profit organizations, including universities, during NSF-assisted research is governed by Chapter 18 of Title 35 of the USC, commonly called the Bayh-Dole Act and EO12591, as amended by EO 12618. Additional information can be found in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG Chapter XI.D). Potential awardees and their partners should familiarize themselves with the information in these documents. Intellectual property (IP) developed with funds from this award is subject to the Bayh-Dole Act and should be differentiated from IP developed separately and contributed by partners. An Intellectual Property Management Plan is a required element of every proposal (see supplementary documents below), and appropriate IP agreements will be required to be in place prior to an award being made.

The Intellectual Property Management Plan should clearly describe the management of (1) any pre-existing IP that is relevant to the project and (2) IP that may be developed during the award. The Intellectual Property Management Plan should also indicate the path through which any partners who join later could access IP when appropriate and allowed.

For Track I ONLY: *Please note that CSIRO funding of Australian teams is subject to CSIRO approval of the IP Management Plan for Phase 2.*

Broadening Participation in the NSF Convergence Accelerator

NSF is committed to broadening the participation in Science, Technology, Engineering, and Mathematics (STEM) fields and research endeavors of members of underrepresented groups — including women, Blacks and African Americans, Hispanics, American Indians, Alaska Natives, Native Hawaiians, Native Pacific Islanders, and persons with disabilities.

Broadening participation is a critical element to a successful Convergence Accelerator project capturing a diverse set of perspectives, ideas, and strengths. The Convergence Accelerator focuses on key elements (e.g., end-users, impact, convergence, acceleration, and deliverables), that include capturing all team member perspectives and expertise when determining the deliverables and project impact to society at scale. All proposals (e.g., Phase 1 proposals, and Phase 2 proposals) will be assessed on Broader Impacts and Intellectual Merit.

This solicitation requires that each project, in either Phase 1 or 2, include a *Broadening Participation Plan* (under Broader Impacts) that describes activities that will be undertaken to increase the participation of underrepresented groups in the project's research efforts. Examples of ways to engage groups and/or individuals that are underrepresented may include: through the expertise of personnel, via partnerships, through work with users and user groups, via engagement with stakeholders, through use of datasets that represent information about underrepresented groups, etc.

The Broadening Participation Plan must include:

1. Context: Does the plan describe a goal using institutional or local data?
2. Intended population(s): Does the plan identify the characteristics of participants from an underrepresented group listed above, including school level (e.g., African-American undergraduates or female high-school students)?
3. Strategy: Does the plan describe activities that address the goal(s) and intended population(s)? Is there a clear role for each PI and co-PI?
4. Preparation: Does the plan describe how the PI is prepared (or will prepare or collaborate) to do the proposed work? Does the plan highlight prior experience with broadening participation?
5. Measurement: Is there a plan to measure and disseminate the outcome(s) of the activities?

We encourage partnerships that include IHEs in Established Program to Stimulate Competitive Research (EPSCoR) jurisdictions and Minority Serving Institutions (MSIs) accredited in, and having a campus located in the US, acting on behalf of their faculty members. We particularly encourage partnerships with NSF INCLUDES Alliances and/or the National Network.

More information, including potential metrics for activities and examples, can be found at the following links:

- https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505289
- https://www.nsf.gov/od/broadeningparticipation/bp.jsp
- https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf21070
- https://www.nsf.gov/mps/broadening_participation/index.jsp
- https://www.nsf.gov/cise/bpc/

III. AWARD INFORMATION

Anticipated Type of Award:

Cooperative Agreement or Standard Grant

Estimated Number of Awards: 36 to 48

NSF expects to make up to 48 Phase 1 awards across all topics as a result of this solicitation and the corresponding BAA.

NSF expects to make 4-5 Phase 2 awards for each topic as a result of this solicitation and the corresponding BAA.

Anticipated Funding Amount: $36,000,000

Anticipated funding is $36,000,000, pending availability of funds, to support Phase 1 awards. Proposers may request up to $750,000 for Phase 1.

The estimated funding level for Phase 2 awards depends on the availability of funds and the number of Phase 1 awards. Phase 2 proposals may request up to $3,000,000 for year 1 and up to $5,000,000 in total for the 24-month Phase 2 project.

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- For-profit organizations: U.S. commercial organizations, especially small businesses with strong capabilities in scientific or engineering research or education.

Who May Serve as PI:

The PI and any co-PIs must hold an appointment at an organization that is eligible to submit as described under "Who May Submit Proposals." At least one PI or co-PI from a Phase 1 award must be included as a PI or co-PI on a Phase 2 proposal based on that Phase 1 award. The same individual who served as PI for the Phase 1 award does not have to be PI for the Phase 2 proposal. Any change of PI and co-PI should be fully explained in the proposal.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or co-PI:

Phase 1 proposals
An individual may serve as PI or co-PI on no more than two Phase 1 proposals. Submissions to the BAA are included in this number. However, it is unlikely that multiple Phase 1 awards would be made to organizations that included the same PI or co-PI on separate proposals.

Phase 2 proposals
Anyone may serve as a PI or co-PI on only one Phase 2 proposal. This limitation includes PIs and co-PIs listed for the proposing organization or any subaward submitted as part of the proposal. There are no restrictions or limits on serving as other Senior Personnel.

See section IV. below for additional eligibility information.

Additional Eligibility Info:

For Track I ONLY:

NSF anticipates the following possible scenarios for Track I proposal preparation and submission. These scenarios are:

1. *Proposals submitted with solely U.S. entities.*
2. *Proposals submitted by a U.S. lead from academia with Australian participants. These proposals could also be submitted through the BAA. The Australian participants may be funded through CSIRO.*
3. *Proposals submitted by a U.S. lead from industry, non-profits, etc. with Australian participants. The Australian participants may be funded through CSIRO.*
4. *Proposals submitted by an Australian lead with U.S. participants from academia, industry, etc.* ***This type of proposal must be submitted through the BAA.*** *If this type of proposal is recommended for award after the NSF-managed review process described below and CSIRO funds the Australian participants, then NSF will fund only the U.S. participants.*

Phase 2 proposals
Eligibility to submit a Phase 2 proposal is limited to proposers who receive a Phase 1 Award under this solicitation. The organization that received the Phase 1 award does not have to be the proposing (lead) organization for the Phase 2 proposal, however they must have been part of the Phase 1 team. Any change of proposing organization from Phase 1 should be explained in the proposal.

Only one Phase 2 proposal may be submitted per Phase 1 award.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent *(required)*:

Letters of Intent for Phase 1 are required and must be submitted via Research.gov, even if full proposals will be submitted via Grants.gov.

Letters of Intent must be submitted by 5:00 p.m. submitter's local time on the due date indicated elsewhere in this solicitation.

Letters of Intent are non-binding with respect to the team members, title, and specific goals of the research, but the track and thrust area(s) of the research in the Phase 1 proposal must match what was stated in the Letter of Intent. The Letters of Intent will not be used as pre-approval mechanisms for the submission of proposals, and no feedback will be provided to submitters. The Letters of Intent will be used by NSF to assess requirements for proposal review. For more information on Letters of Intent, please review the NSF PAPPG. Note that no Supplementary Documents are allowed.

Letters of Intent should identity a team with the appropriate mix of disciplinary and cross-sector expertise required to build a convergence research effort. Letters of Intent must identify one or more deliverables, how those research outputs could impact society at scale, and the team that will be formed to carry this out.

No project will be considered for an award without a Letter of Intent. Letters of Intent are not reviewed; however, in order to submit a Phase 1 proposal, the proposer must submit a Letter of Intent. Letters of Intent shall not exceed one page and include the following:

- Title that includes "NSF Convergence Accelerator and the track identifier (H, I or J)".
- Names, departmental and organizational affiliations, and expertise of the Principal Investigator and Co-Principal Investigators. For proposals with intent to involve multiple organizations and partnerships, the same information should be provided for all sub-awardees to the extent it is known at the time.
- A brief description of the specific goals of the proposal and how the proposed convergence research and broad partnerships will lead to a deliverable that would be refined during Phase 1 and describe how the deliverable would impact society at a national scale.

For Track I only:

The letter of intent for Track I projects that include Australian participants must be simultaneously submitted to NSF as described above and to CSIRO at globalapplications@csiro.au. Projects that include Australian Participants to be funded through CSIRO should consult https://www.csiro.au/missionsaccelerator for additional information.

Letter of Intent Preparation Instructions:

When submitting a Letter of Intent through Research.gov in response to this Program Solicitation please note the conditions outlined below:

- Submission by an Authorized Organizational Representative (AOR) is not required when submitting Letters of Intent.
- A Minimum of 0 and Maximum of 4 Other Senior Project Personnel are permitted
- A Minimum of 0 and Maximum of 4 Other Participating Organizations are permitted
- Submission of multiple Letters of Intent is permitted

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Research.gov or Grants.gov.

- Full Proposals submitted via Research.gov: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal and Award Policies and Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov. The Prepare New Proposal setup will prompt you for the program solicitation number.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

See PAPPG Chapter II.C.2 for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the PAPPG instructions.

Collaborative proposals submitted as separate submissions from multiple organizations will not be accepted.

Phase 1 Full Proposals

Phase 1 efforts will focus on research plan development and team formation leading to a proof-of-concept and will include NSF-organized convenings for training and cross-cohort collaboration. The Phase 1 innovation curriculum is a significant time investment with frequent participation of all partners under the guidance of coaches (a link to a sample curriculum can be found here).

Letters of Intent (LOI) are required for all Phase 1 proposals in response to this solicitation. A Phase 1 proposal submitted without a corresponding LOI will be returned without review.

Proposal Title: The title of the proposal must begin with "NSF Convergence Accelerator Track" followed by the track identifier (H, I, or J) followed by a colon (e.g., NSF Convergence Accelerator Track (H, I, or J): Project Title). The rest of the title of the proposal should describe the project in concise, informative language, without use of acronyms, so that a technically literate reader can understand the project. The title should emphasize the science and engineering work to be undertaken and be suitable for use in the public press. The title does not need to be the same as the Letter of Intent, but it should reference the Letter of

Intent if the title is not the same.

Personnel Listed on the Cover Sheet: Provide complete information requested on the cover sheet for the PI and up to four co-PIs.

Project Summary: Prepare as described in the PAPPG.

Project Description:

Project descriptions are a maximum of 15 pages and must contain a separate "Broader Impacts" section. Results from prior NSF support must be discussed (see PAPPG for guidelines).

The project description should include the following sections in the following order (a through f):

Objectives and Significance of the Proposed Activity

a. **Convergence Research**: Explain how the work conducted in Phase 1 represents research at the highest level of integration and interdisciplinarity. Explain how your project uses a convergence research approach, including discussing the intellectually distinct disciplines and areas of expertise needed. Discuss how you will identify additional areas of expertise that may be needed.

   Proposing teams MUST be comprised of researchers and stakeholders from different disciplines that can help catalyze the proposed scientific discovery and accelerate the transition of that innovation into practical use. Phase 1 teams can involve different partners than were mentioned in the Letter of Intent. However, at least one of the PI or co-PIs in the Phase 1 proposal must have been identified as a PI or co-PI in the Letter of Intent.

b. **Partnerships including a Roles and Responsibilities Table**: Describe how stakeholders from multiple kinds of organizations, including academic and non-academic partners, are poised to form deep and diverse partnerships in support of the proposed use-inspired research. Every team is expected to include at least two types of organizations (e.g., industry, government, academia). Describe the roles of different partners and team members in developing deliverables. The Roles and Responsibilities Table should also clearly identify the roles and responsibilities of all individuals and major groups and entities included in the project. The inclusion of a qualified project manager for effective oversight is strongly encouraged for Phase 1 proposals.
c. **Coordination Plan**: Describe a mechanism for how collaboration and team effectiveness will be promoted.
d. **Deliverables**: Describe potential future deliverables should the project continue beyond Phase 1 and describe the timeline for those deliverables. Phase 2 will end ~March 2026 and your deliverables are expected at that time. You should also discuss preliminary deliverables that will be developed in Phase 1. Explain why there is a high probability that this plan will be achieved.
e. **Track Alignment**: Explain fully the alignment to the track in this solicitation (H, I, or J) and how the proposed work in Phase 1 will assist in the success of the entire track.
f. **Broader Impacts**: This section must include a Broadening Participation Plan. As broadening participation is an important aspect of the Convergence Accelerator program (see Section II) the Broader Impacts Section MUST include a separate sub-section outlining a specific plan for broadening participation.

Supplementary Documents:

The proposal should include applicable supplementary documents as instructed in the PAPPG. The following items are to be provided as additional supplementary documents and do not count against the 15-page limit for the project description.

If submitting via Research.gov, the Data Management Plan should be uploaded to the Data Management Plan section and the Postdoctoral Researcher Mentoring Plan should be uploaded to the Postdoctoral Mentoring Plan section. Both documents should be included as Other Supplementary Documents in Grants.gov.

Letters of Collaboration:

Letters of support or endorsement for the project are not acceptable and will be cause for return without review.

Individuals whose role is discussed in the Project Description as providing assistance or collaboration to the project that is substantive in nature (but are not included in the budget, refer to PAPPG Chapter II.C.2.d.iv. Unfunded Collaborations) must verify their participation and role with a document in the following format.

To: Convergence Accelerator Program Director(s),

By signing below, I acknowledge that I will provide the assistance or collaborate as indicated in the proposal, entitled "_____" with _____ as the Principal Investigator. I agree to undertake the tasks assigned to me, as described in the proposal, and I commit to provide or make available the resources described in the proposal.

Signed: _____ Print Name:_____

Date: _____ Organization:_____

There is no limit on the number of letters of collaboration.

Priority will be place on the quality and significance of the collaboration and the role and involvement of the collaborator must be evident from relevant sections of the project description.

Data Management Plan: (*up to two pages*) In addition to the general elements of the data management plan described in the PAPPG, proposals should address within the Data Management Plan their plans for data-sharing across their team, across the track with other teams, and with the general public, during the project and after its completion as well.

Postdoctoral Researcher Mentoring Plan: (*up to one page*) As described in PAPPG Chapter II.C.2.j, each proposal that requests funding to support postdoctoral researchers must upload a description of the mentoring activities that will be provided for such individuals. Note that the Convergence Accelerator program differs in duration and goals from traditional academic research efforts. The Postdoctoral Researcher Mentoring Plan should reflect how mentoring will be appropriate for the specific roles of postdoctoral researchers in this project effort.

Consolidated Personnel List. The Consolidated Personnel List is a spreadsheet with all key personnel, subaward and collaborations listed. The spreadsheet template can be downloaded by clicking here. Please read the instructions carefully. Using the Excel file template, compile information for all persons identified in the proposal as: "PI/PD or co-PI/PD" (i.e., those listed on the cover page); "Other Senior Personnel"; "Subawardee Personnel"; or "Other Personnel" who have a biographical sketch included in the proposal; or "Collaborators" (Letters of Collaboration). Only one spreadsheet should be submitted per proposal and be converted into a PDF document. The file name should be "Consolidated Personnel List". Once completed, the file should be uploaded as a supplementary document. The purpose of this document is to assist the program in the management of reviewer selection. There are likely to be additional individuals and organizations in the COA (see single copy documents below) that are not included in the Personnel List Spreadsheet. If you are unsure of whether to include someone in the Personnel List Spreadsheet, err on the side of including the person.

Single Copy Documents. Single Copy Documents are used by NSF staff, but are not available to the reviewers.

- **Collaborators & Other Affiliations (COA) Information.** As detailed in the PAPPG (II.C.1.e), information regarding collaborators and other affiliations must be provided for each individual who has a biographical sketch in this proposal. The COA information must be provided through use of the COA template.
- **Suggested Reviewers and Reviewers Not to Include (optional).**

Phase 2 Full Proposals

Proposal Title: The title of the proposal must begin with NSF Convergence Accelerator Track" followed by the track identifier (H, I, or J) followed by a colon (e.g., NSF Convergence Accelerator Track (H, I, or J): Project Title). The rest of the title of the proposal should describe the project in concise, informative language, without use of acronyms, so that a technically literate reader can understand the project. The title should emphasize the science and engineering work to be undertaken and be suitable for use in the public press. The title does not need to be the same as the Phase 1 proposal title.

Personnel Listed on the Cover Sheet: Provide complete information requested on the cover sheet for the PI and up to four co-PIs.

Project Summary: Prepare as described in the PAPPG.

Project Description:

Project descriptions are a maximum of 20 pages. Proposals should clearly describe the specific role and contribution of each team member or group. Proposals should describe how the proposer will organize collaboration among project members to promote team effectiveness, taking into account lessons learned from Phase 1 activities, such as human-centered design, user interviews, team science techniques, as well as domain-specific activities.

Proposing teams MUST be comprised of researchers and stakeholders from different disciplines that can help catalyze the proposed scientific discovery and accelerate the transition of that innovation into practical use. Phase 2 teams can involve different partners than were part of the Phase 1 proposal. However, at least one of the PI or co-PIs in the Phase 2 proposal must have served as a PI or co-PI for that project in Phase 1. Any exception to this must be discussed with NSF in advance of proposal submission.

Results from prior NSF support must be discussed including work conducted during Phase 1 (see PAPPG for guidelines). The proposal must also include the following Sections in the following order (a through j):

Objectives and Significance of the Proposed Activity

a. **Convergence Research**: Explain how the work conducted in Phase 1 and the work proposed in Phase 2 represent research at the highest level of integration and interdisciplinarity.
b. **Partnerships including a Roles and Responsibilities Table**: Describe how stakeholders from multiple kinds of organizations, including academic and non-academic partners, form deep and diverse partnerships in support of the proposed use-inspired research. Proposers should include a qualified project manager for effective oversight in Phase 2 projects.
c. **Coordination Plan** (up to two pages): Each proposal must contain a *Convergence Coordination and Management Plan* that describes how the project will be managed across disciplines, institutions, and stakeholder entities over time. This plan should identify specific convergence activities that will enable cross-disciplinary and cross-sectoral integration of teams, such as mentoring and/or professional development/training to support convergent outcomes, and the plan should provide a timeline showing principal tasks and associated interactions. The plan must address the specific roles and responsibilities of the collaborating PI, Co-PIs, other Senior Personnel, paid consultants, partners, and any other participants, and describe the timing and how tasks will be integrated over the course of the project.
d. **Phase I Portfolio**: (up to two pages) Each proposal should provide discussion of the participation of the project team in the Phase 1 curriculum, meetings and webinars, discussion of how Phase 1 efforts may have modified the project path, and documentation of any creative products or preliminary results developed during Phase 1 and how they will be incorporated into the Phase 2 work plan.
e. **Timeline of Milestones and Deliverables** (one page): Along with the Convergence Coordination and Management Plan, each proposal must provide a visual representation (e.g., Gantt chart or alternative) of key milestones during the 24-month award period, including creation of specific deliverables.
f. **Deliverables**: In alignment with the timeline above state clearly what are the planned, tangible deliverables, along with milestones, during the 24-month award period as well as after 24 months of funding. Explain why there is a high probability that this plan will be achieved.
g. **Track Alignment**: Explain the close match to the track in this solicitation (H, I, or J) and how the proposed work in Phase 2 will assist in the success of the entire track. Each proposal should include a description of how the proposed project will contribute to an integrated environment that will deliver beneficial outputs for the track. It should be evident how the projects will convergently align with the overarching goal of each track rather than as independent projects. This Section should also describe the types of activities undertaken that directly promote track integration.
h. **Intellectual Property (IP) Management Plan** (up to three pages): Partnerships that facilitate the research effort and transition to practice of research results are a key element of the Convergence Accelerator program and a clear Intellectual Property Management Plan is essential for current and future partnerships. Both ownership and management of IP should be addressed in the Intellectual Property Management Plan.

   The Intellectual Property Management Plan should include:

   1. IP contributed by partners included in this proposal,
   2. IP that may be developed during the project, and
   3. a plan for access to IP from (1) and (2) by potential future partners.

   Current and future partners may include, but are not limited to, institutions of higher education, non-profit organizations such as foundations or community organizations, for-profit organizations such as companies or investment groups, local/state/federal government, and others. The Intellectual Property Management Plan must articulate how potential future partners will access intellectual property within the project. Appropriate agreements must be in place before an award is made. Similarly, commitments from partner organizations for sharing of resources (such as data, research

instrumentation, or any other required elements for carrying out the proposed work) should be described and formal agreements must be in place before an award is made. The Intellectual Property Management Plan is protected by the Privacy Act (as is the full proposal) and is the type of non-public information that NSF typically will not release beyond the closed, confidential review process, even under FOIA or other request. The Intellectual Property Management Plan will NOT be shared with organizations attending the Expo, but appropriate information that can be shared should be included in the Public Executive Summary document.

i. **Broader Impacts** (up to two pages): This section must include a Broadening Participation Plan. This solicitation requests that each proposal include, as part of the Broader Impacts Section, a Broadening Participation Plan that describes activities that will be undertaken to increase the participation of underrepresented groups in the project's research and development efforts. Examples of ways to engage groups and/or individuals that are typically underrepresented could include: through the expertise of personnel, via partnerships, through work with users and user groups, via engagement with stakeholders, through use of datasets that represent information about underrepresented groups, etc. The Broadening Participation Plans should include: (1) the context of the proposed broadening participation activity(ies), (2) the intended participants for the activity(ies), (3) the plan of activities over the project duration, (4) prior experience (if any) with broadening participation, and/or intended plan for preparation/training of project members in broadening participation, and (5) plans for the measurement and dissemination of outcomes in broadening participation.
j. **Public Executive Summary** (public document, for open sharing): (up to two pages) Because the NSF is interested in catalyzing partnerships with industry, foundations, the investment community, and others in Phase 2, the proposal must include a Public Executive Summary that will be posted publicly and shared with potential NSF partners prior to the Expo. A Public Executive Summary is developed during Phase 1 with the help of your coaches. This Section is the only element of the Phase 2 proposal that will be shared with attendees at the Expo and may also be posted publicly on the NSF Convergence Accelerator website. At a minimum, the Public Executive Summary should include the following: (1) Summary of the project's objectives and deliverables; (2) Current status of the intellectual property associated with the project; (3) Summary of the Intellectual Property Management Plan; (4) A description of the current industry partners and how they are participating in the current Phase 1 activities and their expected participation in Phase 2; (5) A clear and concise description of how the proposed project is different from other research and a comparison to other similar work the team is aware of; and (6) A description of the timeline for proposed milestones and deliverables of the project. The Public Executive Summary may include other information to help potential NSF-catalyzed partners decide about possible co-funding or provision of resources to the project. Potential partners will not receive any additional documentation from NSF other than the Public Executive Summary, but additional information may be requested from the proposer. The Public Executive Summary must not include proprietary information.

Supplementary Documents:

The proposal should include applicable supplementary documents as instructed in the PAPPG. The following items are to be provided as additional supplementary documents and do not count against the 20-page limit for the project description.

If submitting via Research.gov, the Data Management Plan should be uploaded to the Data Management Plan section and the Postdoctoral Researcher Mentoring Plan should be uploaded to the Postdoctoral Mentoring Plan section. Both documents should be included as Other Supplementary Documents in Grants.gov.

Letters of Collaboration:

Support or endorsement letters are not acceptable and will be cause for return without review.

Individuals whose role is discussed in the Project Description as providing assistance or collaboration to the project that is substantive in nature (but are not included in the budget, refer to PAPPG Section II.C.2.d.iv. Unfunded Collaborations) must verify their participation and role with a document in the following format.

To: Convergence Accelerator Program Director(s),

By signing below, I acknowledge that I will provide the assistance or collaborate as indicated in the proposal, entitled "_____" with _____ as the Principal Investigator. I agree to undertake the tasks assigned to me, as described in the proposal, and I commit to provide or make available the resources described in the proposal.

Signed: _____ Print Name:_____

Date: _____ Organization:_____

There is no limit on the number of letters of collaboration.

The role and involvement of the collaborator must be evident from relevant Sections of the project description.

Data Management Plan (*up to two pages*): In addition to the general elements of the data management plan described in the PAPPG, proposals should address within the Data Management Plan their plans for data-sharing across their team, across the track with other teams, and with the general public, during the project and after its completion as well.

Postdoctoral Researcher Mentoring Plan (*up to one page*): As described in PAPPG Chapter II.C.2.j, each proposal that requests funding to support postdoctoral researchers must upload a description of the mentoring activities that will be provided for such individuals. Note that the Convergence Accelerator program differs in duration and goals from traditional academic research efforts. The Postdoctoral Researcher Mentoring Plan is expected to reflect a mentoring plan that is will be appropriate for the specific roles of postdoctoral researchers in this project effort.

Consolidated Personnel List: The Consolidated Personnel List is a spreadsheet with all key personnel, subaward and collaborations listed. The spreadsheet template can be downloaded by clicking here. Please read the instructions carefully. Using the Excel file template, compile information for all persons identified in the proposal as: "PI/PD or co-PI/PD" (i.e., those listed on the cover page); "Other Senior Personnel"; "Subawardee Personnel"; or "Other Personnel" who have a biographical sketch included in the proposal; or "Collaborators" (Letters of Collaboration). Only one spreadsheet should be submitted per proposal and be converted into a PDF document. The file name should be "Consolidated Personnel List". Once completed, the file should be uploaded as a supplementary document. The purpose of this document is to assist the program in the management of reviewer selection. There are likely to be additional individuals and organizations in the COA (see single copy documents below) that are not included in the Personnel List Spreadsheet. If you are unsure of whether to include someone in the Personnel List Spreadsheet, err on the side of including the person.

Single Copy Documents: Single Copy Documents are used by NSF staff, but are not available to the reviewers.

- **Collaborators & Other Affiliations (COA) Information**: As detailed in the PAPPG (II.C.1.e), information regarding collaborators and other affiliations must be provided for each individual who has a biographical sketch in this proposal. The COA information must be provided through use of the COA

template.

- **Suggested Reviewers and Reviewers Not to Include (optional).**

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Other budgetary limitations apply. Please see the full text of this solicitation for further information.

Budget Preparation Instructions:

After submitting a Letter of Intent, proposers may submit a Phase 1 full proposal. Phase 1 awards are limited to $750,000 for a one-year period of performance.

For Track I ONLY:
Budgets for those parts of Phase 1 proposals conducted by the Australian participants and to be funded by CSIRO are not to exceed 255,000 AUD of the possible total 750,000 USD dollars budget limit for Phase 1 proposals.

Phase 2 proposals should include a two-year budget. The budget for year 1 should not exceed $3,000,000 for the first year and the total budget for the two-year project should not exceed $5,000,000. Teams that show significant progress during the first year, in accordance with the agreed timetable of milestones and deliverables, may receive funding for a second year. Teams should plan on completing the effort within two years; no-cost extensions will be authorized only in extraordinary circumstances.

Budgets for all projects must include funding for Senior Personnel to attend at least three meetings per year in the Washington, DC area.

Because a **significant level of personnel effort** is **expected** in order to achieve deliverables that benefit the American people in two years, PIs, Co-PIs and other Senior Personnel **may request more than two months of salary support**. The *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter II.C.2.g.(i)(a) contains NSF's policy on Senior Personnel salaries and wages. Any compensation for Senior Personnel in excess of two months must be disclosed in the proposal budget, justified in the budget justification, and must be specifically approved by NSF in the award notice budget.

Not less than 5% of the overall budget amount (including direct and indirect costs) should be set aside for collaboration among Phase 2 projects for *track integration* and potential cross-track activities. The **Proposal** should describe the types of activities that are proposed to be undertaken to promote track integration, and/or other cross-track activities. After the awards are made, Phase 2 projects in each track will have the opportunity to interact and refine their plans for these activities, with approval from NSF.

Although many proposals to this solicitation will include the participation of for-profit entities, note that NSF award budgets may not include profit or fee as line items.

Contributions from Partners should be described in the Facilities, Equipment and Other Resources Section of the proposal which is described in *NSF Proposal & Award Policies & Procedures Guide (PAPPG) Chapter II.C.2.i*. It is not appropriate in this Section to list funding amounts that may be contributed by partners. Instead, proposers should describe what facilities, equipment and other resources will be possible based on contributions (financial and otherwise) from any partners. Voluntary committed cost sharing is prohibited *NSF Proposal & Award Policies & Procedures Guide (PAPPG) Chapter II.C.2.g.xii*.

C. Due Dates

- **Letter of Intent Due Date(s) *(required)*** (due by 5 p.m. submitter's local time):

  May 31, 2022

  Letter of Intent (required for Phase 1 Full Proposals only)

- **Full Proposal Deadline(s)** (due by 5 p.m. submitter's local time):

  July 20, 2022

  Phase 1 Full Proposals

  August 29, 2023

  Phase 2 Full Proposals, only Phase 1 awardees are eligible to apply.

D. Research.gov / Grants.gov Requirements

For Proposals Submitted Via Research.gov:

To prepare and submit a proposal via Research.gov, see detailed technical instructions available at: https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html. For Research.gov user support, call the Research.gov Help Desk at 1-800-673-6188 or e-mail rgov@nsf.gov. The Research.gov Help Desk answers general technical questions related to the use of the Research.gov system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: https://www.grants.gov/web/grants/applicants.html. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

Proposers that submitted via Research.gov may use Research.gov to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in PAPPG Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: https://www.nsf.gov/bfa/dias/policy/merit_review/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Leading the World in Discovery and Innovation, STEM Talent Development and the Delivery of Benefits from Research - NSF Strategic Plan for Fiscal Years (FY) 2022 - 2026*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (PAPPG Chapter II.C.2.d(i). contains additional information for use by proposers in development of the Project Description section of the proposal). Reviewers are strongly encouraged to review the criteria, including PAPPG Chapter II.C.2.d(i), prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
    a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
    b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and other underrepresented groups in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

Phase 1 Full Proposal
In addition to the Intellectual Merit and Broader Impacts criteria, reviewers will be asked to address the following questions:

- Convergence Research
    - Does the Project Description represent research at the highest level of interdisciplinarity and synergy, justifying this investment in supporting a convergence research team?
- Partnership
    - Does the Project Description make a strong case that stakeholders from multiple kinds of organizations, including academic and non-academic partners are poised to form a deep and diverse partnership that supports the use-inspired research proposed?
- Deliverables
    - Is the convergence research team likely to achieve results in Phase 1 that lead to development of a strong Phase 2 proposal?
- Track Alignment
    - Is the proposed research appropriate, i.e., is there a close match to one of the tracks in this solicitation (H, I, J)?
    - Do the proposed ideas differ markedly from research supported by other NSF programs, initiatives, Big Ideas or other NSF funding mechanisms?

Phase 2 Full Proposal
In addition to the Intellectual Merit and Broader Impacts criteria, reviewers will be asked to address the following questions:

- Convergence Research
    - Do the Project Description, Convergence and Partnerships, Coordination Plan, and Phase 1 Portfolio represent research at the highest level of integration and interdisciplinarity, justifying this investment in supporting a convergence research team?
- Partnership
    - Does the Project Description make a strong case that stakeholders from multiple kinds of organizations, including academic and non-academic partners are poised to form a deep and diverse partnership that supports the use-inspired research proposed?
- Deliverables
    - Does the Project Description, Coordination Plan, and Timeline of Milestones and Deliverables indicate a high probability of deliverables within a 24-month period that will ultimately benefit society?
- Track Alignment and Track Integration
    - Is the proposed research appropriate, i.e., is there a close match to one of the tracks in this solicitation (H, I, J)?
    - Do the proposed ideas differ markedly from research supported by other NSF programs, initiatives, Big Ideas or other NSF funding mechanisms?
    - Is there convincing evidence of how the effort in Phase 2 will contribute to the success of the entire track and support potential track integration efforts?

Phase 2 Full Proposals only will go through an additional Review Process as described below:

Oral Pitch Presentation and Pitch Review Panel

Following the NSF proposal review panels, the Convergence Accelerator will execute a virtual or in-person oral *pitch review presentation as part of the evaluation process and will also hold a public Convergence Accelerator Expo 2023 (Expo).* The pitch review will consist of a separate review panel for Tracks H, I, and J.

The pitch review panel will follow NSF merit review guidelines with the review panel made up of members from academia, industry, and other sectors. The pitch review will include NSF reviewers and staff, and competing teams only. The review criteria for the pitch session are the same as those applied to the written proposal and described above. Intellectual Merit and Broader Impacts continue to be the key review criteria along with the solicitation specific review criteria: Convergence, Partnerships, Deliverables, and Track Alignment.

Schedule and Location for Pitch Presentations
The NSF Convergence Accelerator will notify all proposers of the schedule for the virtual or in-person oral pitch presentations and provide necessary details as they become available. Pitch presentations will either be virtual or in-person. If in-person, the pitch presentation will likely be held in or near Washington, DC., at a location near the NSF. Pitch presentations must comply with these instructions and any additional instructions that the NSF may provide prior to the presentation. The date of the pitch review will be approximately 2-4 weeks after the full proposal due date.

Participation and Attendance in the Pitch Session
A proposer's oral pitch presentation team may include the presenter and up to four other team members. Representatives may be from any of the Convergence Accelerator team members. The presenter must be a person regularly engaged with the project, such as the PI, a co-PI, or a Senior Personnel member. It is not required that the PI be the presenter, but the presenter cannot be a person engaged just to make the pitch.

Format of the Pitch Session
The Pitch Presentations will occur as follows: The presenter will have approximately 10 minutes to present their proposed Convergence Accelerator Phase 2 approach to the review panel. An additional amount of time will be allocated for the NSF pitch review panel to ask questions of the presenter and team following their 10-minute pitch. The question-and-answer period does not count against the oral Pitch Presentation time limit.

Expected Pitch Content
The oral pitch presentation should address the following:

1. Introduce the team number and name, names and titles of presenting personnel and their project roles and provide a brief (one sentence) description of the Phase 2 project.
2. Provide a brief summary of the Convergence Accelerator Phase 1 project that includes:
    - The initial objectives of the project when it was funded.
    - Key learnings during the Phase 1 project and how they resulted in revision to project plans and deliverables and informed the Phase 2 application.
    - Any outcomes or outputs from the Phase 1 project.
3. Provide a brief summary of the proposed Convergence Accelerator Phase 2 project that includes:
    - A clear description of the innovation and problem it is solving.
    - The broader social impact of the project, including potential applications if the Phase 2 effort is successful.
    - The objectives for the project.
    - The key deliverables and expected outcomes (concrete and measurable).
    - The capacity and capabilities of the team to execute the project including management, staffing and necessary technical and other skills.
    - The current and expected partners making firm commitments that will help the team achieve the project goals. This may include collaborations with other teams.
    - A description of the project elements and activities that will contribute to integrating efforts among or across projects to achieve track success.
4. Any additional topics provided by the NSF prior to the oral Pitch Presentation.

The above topics should successfully address the Merit Review Criteria of Intellectual Merit and Broader Impacts, as well as the solicitation specific criteria, set forth previously in this solicitation.

Convergence Accelerator Expo 2023
The Convergence Accelerator Expo (Expo) is a separate public event that provides the teams the opportunity to pitch and demonstrate their project and answer questions from an invited audience of potential partner organizations from industry, foundations, other government agencies, and other members of the investment community, as well as the broader public (press, etc.). The Expo will be presented to an invited audience of other potential funders and funding organizations from industry, foundations, other government agencies, and other members of the investment community, as well as the broader public (press, etc.). The Expo will be held as an in-person event, virtual, or a combination of the two depending on restrictions on in-person meetings. The Expo presentation format will be determined by the Expo format (e.g., in-person, virtual or a combination of the two). The formats may be a timed pitch with Q&A or an exhibit booth, virtual or in person to be operated by the team, or some combination of these. Additional Expo information will be provided when the Public Executive Summaries are made available on the NSF Convergence Accelerator website.

The date of the Expo will be held approximately 4-6 weeks after the full proposal due date and 2-4 weeks after the pitch panel review.

Note: Teams are encouraged to prepare different presentations, one for the Pitch Review and another for the Expo.

Presentation Media
Proposers shall prepare all materials to be used in the oral presentations using electronic presentation tools. The proposer shall provide electronic copies of the oral pitch presentation one week in advance of the presentation.

Overall Evaluation for Phase 2 awards
NSF will develop a list of recommended Phase 2 awards based on all review information available, including the written proposal reviews and the pitch presentation reviews. Proposing teams can choose if and how to engage with any organization that seeks to interact with them directly. Proposers potentially receiving support via those agreements will have a role in defining the list of materials that would be shared with any organizations providing support. NSF will consider the extent to which these interactions complement NSF goals, seem likely to assist project success, are desired by the project team, and seem likely to increase the success of the overall track.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review.

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will generally be completed and submitted by each reviewer and/or panel. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements or the Division of Acquisition and Cooperative Support for review of business, financial, and policy implications. After an administrative review has occurred, Grants and Agreements Officers perform the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by an NSF Grants and Agreements Officer. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award notice, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

Special Award Conditions:

Phase 1
This is a standard grant award. However, the innovation curriculum requires a significant time investment and frequent participation of all partners under the guidance of coaches (a link to a sample curriculum can be found here). Projects must ensure that they have set aside the necessary time for these activities. There is also significant engagement and oversight by the NSF Convergence Accelerator Program Directors during Phase 1 activities.

For Track I ONLY:
In the event that a proposal with an Australian participant is selected by NSF for funding, the Australian Participant will submit the proposal to CSIRO so that CSIRO can proceed with the funding of the Australian portion of the award.

Phase 2
NSF Convergence Accelerator Phase 2 awards will be made as cooperative agreements. The cooperative agreement awards will include Special Conditions relating to the period of performance, statement of work, awardee responsibilities, NSF responsibilities, joint NSF-awardee responsibilities, funding and funding schedule, reporting requirements, Senior Personnel, and other conditions. Within the first approximately 30 days of the Award, all Senior Personnel will be required to participate in an approximately two-day meeting at NSF or virtually. In addition, Senior Personnel will be required to attend an evaluation meeting for approximately two days at NSF or virtually near the end of year one. The purpose of the evaluation meeting is to assess progress the awardees have made towards advancing project goals via a well-functioning interdisciplinary and multi-organization team. Each awardee team will prepare briefing material (expected to be 10 pages or less) describing its accomplishments and make a short presentation which will be followed by questions and answers. The reviewers will evaluate the team's progress towards its stated goals and, in particular, progress towards creating deliverables. Taking into account reviewers' input, NSF will

decide whether the team will receive funding for the second year. As noted in "Budget Preparation Instructions," budgets for all projects must include funding for Senior Personnel to attend three meetings per year at NSF or virtually. At least one of these meetings each year is likely to focus on track integration.

No-cost extensions are **not** permitted except under clearly documented exceptional circumstances. Grantees must first contact the cognizant Program Officer prior to submitting a request.

Awardees will be required to include appropriate acknowledgment of NSF support (and partners if appropriate) under the NSF Convergence Accelerator in any publication (including World Wide Web pages) of any material based on or developed under the project, in the following terms:

"This material is based upon work supported by the National Science Foundation Convergence Accelerator under Award No. (Grantee enters NSF award number.)"

Awardees also will be required to orally acknowledge NSF support using the language specified above during all news media interviews, including popular media such as radio, television and news magazines.

Any cooperative agreement awarded in response to this solicitation will contain the following term and condition:

Ensuring Adequate COVID-19 Safety Protocols

(a) This clause implements Section 3(b) of Executive Order 14042, Ensuring Adequate COVID Safety Protocols for Federal Contractors, dated September 9, 2021 (published in the Federal Register on September 14, 2021, 86 FR 50985). Note that the Department of Labor has included "cooperative agreements" within the definition of "contract-like instrument" in its rule referenced at Section 2(e) of this Executive Order, which provides:

For purposes of this order, the term "contract or contract-like instrument" shall have the meaning set forth in the Department of Labor's proposed rule, "Increasing the Minimum Wage for Federal Contractors, " 86 Fed. Reg. 38816, 38887 (July 22, 2021). If the Department of Labor issues a final rule relating to that proposed rule, that term shall have the meaning set forth in that final rule.

(b) The awardee must comply with all guidance, including guidance conveyed through Frequently Asked Questions, as amended during the performance of this award, for awardee workplace locations published by the Safer Federal Workforce Task Force (Task Force Guidance) at https://www.saferfederalworkforce.gov/contractors/.

(c) *Subawards*. The awardee must include the substance of this clause, including this paragraph (c), in subawards at any tier that exceed the simplified acquisition threshold, as defined in Federal Acquisition Regulation 2.101 on the date of subaward, and are for services, including construction, performed in whole or in part within the United States or its outlying areas. That threshold is presently $250,000.

(d) *Definition*. As used in this clause, *United States or its outlying areas* means:

(1) The fifty States;

(2) The District of Columbia;

(3) The commonwealths of Puerto Rico and the Northern Mariana Islands;

(4) The territories of American Samoa, Guam, and the United States Virgin Islands; and

(5) The minor outlying islands of Baker Island, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Midway Islands, Navassa Island, Palmyra Atoll, and Wake Atoll.

(e) The Foundation will take no action to enforce this article, where the place of performance identified in the award is in a U.S. state or outlying area subject to a court order prohibiting the application of requirements pursuant to the Executive Order (hereinafter, "Excluded State or Outlying Area". A current list of such Excluded States and Outlying Areas is maintained at https://www.saferfederalworkforce.gov/contractors/.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Douglas Maughan, telephone: (703) 292-2497, email: dmaughan@nsf.gov
- Lara A. Campbell, telephone: (703) 292-7049, email: lcampbel@nsf.gov
- Aurali E. Dade, telephone: (703) 292-7049, email: adade@nsf.gov
- Pradeep P. Fulay, telephone: (703) 292-2445, email: pfulay@nsf.gov
- Ibrahim Mohedas, telephone: (703) 292-4329, email: imohedas@nsf.gov
- Linda Molnar, telephone: (703) 292-8316, email: lmolnar@nsf.gov
- Michael Pozmantier, telephone: (703) 292-4475, email: mpozmant@nsf.gov
- Michael Reksulak, telephone: (703) 292-8326, email: mreksula@nsf.gov

For questions related to the use of FastLane or Research.gov, contact:

- FastLane and Research.gov Help Desk: 1-800-673-6188
- FastLane Help Desk e-mail: fastlane@nsf.gov
- Research.gov Help Desk e-mail: rgov@nsf.gov

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on NSF's website.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this mechanism. Further information on Grants.gov may be obtained at https://www.grants.gov.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

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