

**KRISTA L. JACOBSEN, Ph.D.**

Current Appointment

Assistant Professor, Appointed 1 July 2011  
Distribution of Effort: 60% Research, 40% Teaching

Previous Appointment

Lecturer, 1 August 2009 – 30 June 2011

Department of Horticulture  
University of Kentucky  
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**RESEARCH**

Extramural Projects

Jacobsen, K.L. (PI), T. Coolong (co-PI). Building technical support capacity for Kentucky's high tunnel specialty crop producers. Kentucky Department of Agriculture Specialty Crops Block Grant Program. Funded, \$50,791. 2012 – 2014.

Tanaka, K. (PI), K. Jacobsen (co-PI), K. Niewolny (co-PI), S. Hodges (co-PI), M. Wilcox (co-PI), M. Velandia (co-PI), A. Wszelaki (co-PI) Mapping Sustainable Farm Systems: An Integrated Focus on Upper South New Producers as Catalysts of "Good Stewardship." Southern SARE Research and Education Proposal. Funded, \$269,991 (includes cooperating institution budgets). 2012 – 2015. Regionally competitive.

Jacobsen, K.L. (PI), T.W. Coolong (co-PI) & M.A. Williams (co-PI). Developing Diversified High Tunnel Systems to Enhance Food Security and Specialty Crop Production in Kentucky. Kentucky Department of Agriculture Specialty Crops Block Grant Program. Funded, \$62,834. 2011-2013.

Wilson, P. (PI) & K. L. Jacobsen (collaborator). Organic Grape Production for Kentucky. Kentucky Department of Agriculture Specialty Crops Block Grant Organic Pest Management Program. Funded, \$20,000. 2011-2013.

Jacobsen, K.L. (PI), T. W. Coolong (co-PI), & M.A. Williams (co-PI). Optimizing No-Till Vegetable Production Systems for Organic Growers. Kentucky Department of Agriculture Specialty Crops Block Grant Organic Pest Management Program. Funded, \$20,000. 2010-2012.

Williams, M.A. (PI) & K.L. Jacobsen (co-Investigator). New Crop Opportunities in Sustainable Organic Production. National Institute of Food and Agriculture. Funded, \$50,003. 2010-2011.

Other

Jacobsen, K.L. (PI). Outreach Education Sponsorship for the 4<sup>th</sup> National Sustainable Agriculture Education Association Conference. Sustainable Agriculture Research and Extension (SARE). Funded, \$5,000. 2011.

Jacobsen, K.L. (PI) & M.W. Williams (co-PI). Fostering Research in Teaching and Learning in Sustainable Agriculture: Kentucky EPSCoR Conference Award. Kentucky Council on Post-Secondary Education. Funded, \$2,665. 2011.

Jacobsen, K.L., D. Parr, K. Niewolny. Supporting Education in Sustainable and Organic Agriculture: A Proposal to Fund the 4th National Sustainable Agriculture Education Association (SAEA) Conference. The Ceres Trust. Funded, \$10,000. 2011.

Participant, Multistate Hatch Project No: SCC83 Quantifying the Linkages Among Soil Health, Organic Farming, and Food. 2010 – current.

### Proposals submitted

Schramski, John, R. (PI), K. Jacobsen, J. Gaskin, E. K. Styles, D. Gattie, J.E. Brown, K. Li, F. Papavasiliou, C. Furman, E.A. Kramer, X. Liu, G.E. Boyhan (co-PI's). Sustainability of Scale: Identify Secure Food Delivery Systems in the Southeast Through Integrated Life Cycle, Market, Land-Use, and Social Network Analysis. NIFA-AFRI: Food Security. Total request: \$4,888,598.00; UK Subcontract: \$258,463. Not funded, 2012. Ranked High Priority.

Schramski, John, R. (PI), M. Bomford, J. Gaskin, D. Gattie, S. Hawkins, K. Jacobsen, C. Kazanci, K. Li, K. Mulder, E.K. Styles (co-PI's). Energy in Organic Agriculture: Modeling and Case Studies for Research and Extension. NIFA:OREI. Total request: \$1,980,123; UK Subcontract: \$239,517. Not funded, 2012. Ranked High Priority.

Schramski, J. (PI), D. Gattie, K.L. Jacobsen, K. Mulder, C. Kazanci, K. Li, M. Williams (co-PI's) Energy in Sustainable Agriculture: Modeling and Case Studies for Research and Extension. NIFA Organic Agriculture Research and Extension Initiative. Total request: \$1,800,000; UK Subcontract: \$267,000. Not funded, 2011. Ranked Medium Priority.

### Graduate Student Advising

Victoria Anderson, M.S., Plant and Soil Sciences (Advisor), *in progress*.

Alex Hessler, M.S., Integrated Plant and Soil Sciences (Advisor), *in progress*.

Kavita Mizin, M.S., Integrated Plant and Soil Sciences (Advisor), *in progress*.

Graduate student committee membership: 4 (2012).

## **TEACHING AND ADVISING**

### Courses Taught

#### *Fall 2012*

SAG 101: Introduction to Sustainable Agriculture (31 students). *In progress*.

PLS/SAG 386: Plant Production Systems (33 students). *In progress*.

#### *Spring 2012*

GEN 300: Agroecology (100% Jacobsen, 18 students). Course Mean: 3.9; Teaching Mean: 4.0.

SAG 201: Cultural Perspectives on Sustainability (38 students). Course mean: 3.7; Teaching Mean: 3.9.

#### *Fall 2011*

SAG 101: Introduction to Sustainable Agriculture (15 students). Course Mean: 3.7; Teaching Mean: 3.7.

PLS 386: Plant Production Systems. (Co-taught with Dr. Mark Williams (50% Jacobsen, 50% Williams; 33 students). Course Mean: 4.0; Teaching Mean: 4.0.

#### *Spring 2011*

GEN 300: Agroecology (Co-taught with Dr. Rebecca McCulley (75% Jacobsen, 25% McCulley; 14 students). Course Mean: 3.8; Teaching Mean: 3.8.

SAG 201: Cultural Perspectives on Sustainability (24 students). Course Mean: 3.9; Teaching Mean: 3.9.

HON 115: World Food Issues II (8 students). Course Mean: 4.0; Teaching Mean: 4.0.

### Undergraduate Advising

Fall 2012: 20 SAG advisees

Spring 2012: 13 SAG advisees

Fall 2011: 13 SAG major advisees

### Activities with Students Outside of the Classroom

*Slow Foods Student Club* – Faculty Advisor, February 2011 – present.

*Students Engaged in Agricultural Discovery (SEAD) Student Club* – Provide technical support on Gaines Center Community Garden Activities. January 2012 – present.

*Shawneetown/Cooperstown Community Gardens* – Provide technical support and site preparation for community gardens on campus for these Student Sustainability Council-funded activities. Supervise/mentor paid garden interns throughout the growing season. Spring 2011 - present.

*Service Learning Activities* – Coordinate logistics for a number of service learning activities and field trips to local farms and food based organizations in throughout the Bluegrass Region for SAG majors and students in SAG classes (average 1 per month for Fall semester). Fall 2011 – present.

### Activities to Improve Teaching and Learning

*Sustainable Agriculture Education Association* - Organized the 4<sup>th</sup> National Sustainable Agriculture Education Association (SAEA) at the University of Kentucky in August, 2011. (Conference Committee Co-Chair).

Organized a “State of Sustainable Agriculture Education at Land Grant Universities” pre-conference workshop in conjunction with the SAEA conference. The outcomes of this workshop have been published in a special edition of the *Journal of Agriculture, Food Systems and Community Development* (May 2012; see publications for details).

Elected to the SAEA Steering Council (March 2012) for a 2 year term. National leadership in this group is facilitating collaboration with peer programs at institutions across the country. Activities include exchange of best practices in teaching and learning in sustainable agriculture, collaboration on grants to build education abroad networks, and involvement to develop a peer-reviewed scholarly journal for Sustainable Agriculture Education.

*Globalizing Agriculture Education Project* – Faculty participant in this International Science and Education (USDA) project (Keiko Tanaka, PI) effort to develop agriculture-issues curriculum in an international context. Developed of Introductory Sustainable Agriculture teaching modules for general use in COA undergraduate courses with a team of COA faculty dedicated to increasing student awareness of global agricultural issues. Currently developing Education Abroad course for Summer 2013, “Tropical Agroecology and Sustainable Development in Indonesia.”

## **EXTENSION & OUTREACH**

*Development of the UK High Tunnel Research Facility* – this applied research facility was developed in 2011-2012. Extension objectives during the review period include: demonstration of movable and stationary high tunnels, development of model crop rotations for diversified vegetable and fruit production focused in improving variety of year-round direct marketed crops, and yield and variety trials for organic high tunnel production.

## PUBLICATIONS

### Refereed journal articles

- Carrillo, Y., C. F. Jordan, K. L. Jacobsen, K.G. Mitchell, & P. Raber. 2011. Shoot pruning of a hedgerow perennial legume alters the availability and temporal dynamics of root-derived nitrogen in a subtropical setting. *Plant and Soil* 345(1-2): 59-69.
- Jacobsen, K.L., K.L. Niewolny, M.S. Schroeder-Moreno, M. Van Horn, A.H. Harmon, Y.H. Chen Faslow, M. Williams, D. Parr. 2012. Sustainable Agriculture Undergraduate Degree Programs: A Land-Grant University Mission. *Journal of Agriculture, Food Systems and Community Development*. *Published online 27 May 2012*.  
<http://dx.doi.org/10.5304/jafscd.2012.023.004>, pp. 1–14
- Niewolny, K.L., J.M. Grossman, C.J. Byker, J.L. Helms, S.F. Clark, J.A. Cotton, K.L. Jacobsen. 2012. Sustainable Agriculture Education and Civic Engagement: The Significance of Community-University Partnerships in the New Agricultural Paradigm. *Journal of Agriculture, Food Systems and Community Development*. *Published online 23 May 2012*.  
<http://dx.doi.org/10.5304/jafscd.2012.023.005>, pp. 1–15

### Extension Publications

- Jacobsen, K.L. Organic Gardening: Kentucky Master Gardener Manual Chapter 18. 2012. University of Kentucky College of Agriculture Cooperative Extension Service Publication No. HO100. <http://www.ca.uky.edu/agc/pubs/ho/ho100/ho100.pdf>

### Peer-Reviewed Book Chapters

- Tanaka, K., M. Williams, K. Jacobsen and M. Mullen. 2012. Sustainably Growing Farmers of the Future: Undergraduate Curriculum in Sustainable Agriculture at the University of Kentucky. In Bartels, K. and K. Parker, *Teaching Sustainability / Teaching Sustainably*. Stylus Publishing, Herndon, VA.

### Other

- Reviewer, Organic Crop Production Crop Profile. 2011. Crop Diversification & Biofuel Research & Education Center.  
<http://www.uky.edu/Ag/CDBREC/introsheets/organicproduction.pdf>

### Publications Under Review

- Schramski, J.R., K. Jacobsen, T. Smith, M. Williams, T.M. Thompson. Energetics of Organic Agriculture: Case Study of a Diversified, Organic Vegetable Production System in Kentucky. *Agriculture, Ecosystems and Environment*. *Submitted August 13, 2012*.

## MEETINGS

- Jordan, C. F., K. Jacobsen and Y. Carrillo. 2011. Alley Cropping in the Southeast. Poster. 12<sup>th</sup> North American Agroforestry Conference. University of Georgia, Athens, GA.
- Schramski, J., K. Jacobsen and T. Smith. The Coupling of Human and Natural Systems: Agroecological Energy Systems Modelling and Case Study of a Diversified Organic Vegetable Farm in Kentucky, USA. 18th Biennial International Society of Ecological Modeling Conference, Beijing, China. September 20-23, 2011.

Smith, T., K. Jacobsen, J. Schramski. 2012. Energetics of Organic Agriculture: Case Study of Community Supported Agriculture in Kentucky. Degrowth in the Americas Conference, Montreal, Canada. May 13-19<sup>th</sup>, 2012.

Schroeder-Moreno, M. and K. Jacobsen. Developing International Learning Opportunities in Sustainable Agriculture – What and How Do We Want Students to Learn? Sustainable Agriculture Education Association National Conference, Corvallis, Oregon. September 9-10<sup>th</sup>, 2012.

Tanaka, K., K. Niewolny, K. Jacobsen, L. Brislen. Mapping Sustainability, Farming Sustainably: Mapping Approach in the Study of Sustainable Farming Systems. XIII World Congress of Rural Sociology, Lisbon, Portugal. July 29<sup>th</sup> - August 4<sup>th</sup>, 2012.

Radio interviews – 1

Popular press print interviews – 2

County meetings – 3

Field days – 2

UK Organic Farming Unit tours - 12

## **SERVICE AND RECOGNITION**

### Outreach and Service

Bluegrass Domestic Violence Program Farming Project- I am providing technical support to the farm manager and BDVP staff to develop a working market garden and horticultural therapy gardens at this residential facility for women and children. I recruited and was the faculty mentor for a SAG undergraduate intern on the site to work with the farm manager during Summer 2011, and have provided high tunnel and market garden construction and technical assistance since operations began in Spring 2011.

### Invited Seminars

Seminar on Biodiversity, Climate Change, Food, Energy and Sustainability: How to integrate into education curriculum and lessons learned. University of Lampung, Bandar Lampung, Sumatra, Indonesia. June, 2012.

### Committee Involvement

Sustainable Agriculture Curriculum Steering Committee Member (September 2009 to present)

Sustainable Agriculture and Food Systems Working Group Member (September 2009 to present)

### Elected Positions

UK College of Agriculture Faculty Council (2012 – present)

National Sustainable Agriculture Education Association Steering Council Member (2012 – present)

### Reviewer Service

Journals (number of reviews during performance review period): Plant and Soil (2); International Journal of Pest Management (1); Sustainable Agriculture Research (1), Journal of Horticultural Science & Biotechnology (1).

## RESEARCH STATEMENT

My research program is most concisely described as examining sustainable and organic specialty cropping systems through an agroecological lens. Specifically, my group investigates how rotation, diversification, cover crops and conservation tillage affect soil quality, nutrient cycling, plant productivity and economic viability at various farming scales. In the paragraphs below I describe the foci, recent accomplishments, and trajectory of my program.

1) *The High Tunnel Research Facility at the Organic Farming Unit:* This work focuses on development and study of diversified crop rotations in high tunnels (unheated greenhouses), with the goal of year-round specialty crop production that preserves soil quality and minimizes input costs. We incorporate agro-ecological farming approaches, such as cover cropping, intense crop rotations, and the use of integrated nutrient management approaches. This facility was constructed during the review period, and is comprised of 6, 30' x 72' high tunnels, including design-build of 3 movable high tunnels designed to be accessible to Kentucky growers with varied site considerations, farm infrastructure, and available capital. This was a significant undertaking, and to our knowledge, it is the only movable tunnel demonstration site of its kind in the country. After 1.5 y of site development and piloting of management techniques, we have refined experimental design and management strategies. Future (*funded*) research directions include development of nutrient budgets and organic fertility recommendations for year-round diversified crop production, enterprise budgets, and future multi-state, federally-competitive proposals. This project is directly tied into extension activities through my collaborations with Dr. Tim Coolong (co-PI), and is funded through Kentucky Department of Agriculture Specialty Crop Block Grant funding. Dr. Coolong and I are currently developing joint NRCS and Agriculture Agent training sessions on high tunnel production and management (November 2012), designed to build connections between service providers throughout the state to better enhance support for growers on production and funding mechanisms. This is of keen grower interest with the passage of a new cost share program with the NRCS that funded the construction of over 200 high tunnels across the Commonwealth in 2012.

2) *Developing conservation tillage systems for direct market specialty crop production:* Objectives of this research area are to examine the effects of alternative residue management on nitrogen dynamics, weed suppression and production economics (labor and inputs) at various scales of organic production. We have completed a 2 year study of organic conservation tillage systems in agronomic systems with sweet corn and winter squash, and evaluated the effects of organic no-till, conservation tillage, and conventional tillage on crop yields, weed biomass and on-farm labor requirements. Research initiated in the 2012 growing season is focused on the development of conservation tillage for the small-scale, diversified grower, integrating living mulches and walk-behind tractor technologies. Based on grower interest and the scale of specialty crop production in Kentucky, future directions for the conservation tillage work will be focused on small-scale systems that are management intensive. Rigorous soil inorganic nitrogen data and plant production data from the 2012 year will be used to inform near future work to examine living mulch systems using competition thresholds/modeling and synchrony of nutrient release with uptake in concert with management activities to refine these systems.

3) *Evaluation of energy use and productivity of diversified organic vegetable systems:* Small- to medium-scale diversified, direct market vegetable farming systems are a growing trend, in part due to the increased public interest in local foods. However, the energetic inputs and outputs of these systems relative to more conventional specialty crop production systems is relatively understudied. Recent work with an energy modeling team at the University of Georgia

(PI, Dr. John Schramski) has utilized case study data from the UK CSA to examine energy use in mid-scale organic farming systems relative to conventional and low-input organic systems. Accomplishments in the review period include 2 international conferences and submission of a peer-reviewed publication, as well as development of proposals for federally competitive programs. Future directions include re-submission of energy-related work to NIFA programs, and comparisons of energy use along a spectrum of intensive to extensive agricultural organic systems utilized at the UK Organic Farming Unit.

### **TEACHING STATEMENT**

The objectives of my teaching program span areas of resident instruction, undergraduate curriculum development, involvement in national teaching organizations, and graduate student mentorship. In the past 2 years of instruction, my courses have seen increases in student numbers while maintaining relatively high course evaluations. But more importantly, I feel I am starting to hone a facilitation style that is conducive to a positive classroom environment that is open to the expression of varied opinions and active exploration of ideas. During the review period, I have been active in curriculum development within the Sustainable Agriculture Undergraduate Degree (SAG) program, including having a new course adopted into the SAG core curriculum (Agroecology), as well as piloting SAG 201 through as a UK Core course. Near future instructional plans include building on the tradition of high-quality, student-centered instruction in the SAG with the development of a summer Education Abroad course to Indonesia that will serve SAG/ COA majors, as well as serve recruit into the SAG program.

In August 2011, the UK SAG and COA hosted the 4<sup>th</sup> National Sustainable Agriculture Education Association (SAEA) conference, the only national-level organization focused on teaching and learning in sustainable agriculture education. The conference was a significant milestone for the SAG program, and highlighted our ability to be leaders among Land Grant Universities (LGUs) in this field. I was the primary faculty coordinator in these efforts and developed a pre-conference workshop for LGUs that are in an advanced state of sustainable agriculture programmatic development (established majors and minors in sustainable agriculture). This workshop was a highly productive resource exchange and development of national needs. It generated publication of 4 journal articles in a special edition of the Journal of Agriculture, Food Systems and Community Development focused on issues of sustainable agriculture in higher education. In addition to some authorship and workshop development credit, these activities prompted the SAEA to nominate me for a leadership position in the organization. I hope to use this position to further develop the UK SAG program's network of national colleagues and infuse our program with broad and novel perspectives on sustainable agriculture education. Near future plans include working to develop a peer-reviewed journal devoted to scholarly research in teaching and learning in sustainable agriculture education.

Finally, having moved to a tenure-track, research-dominated position during this review period, much of my teaching and mentorship efforts have shifted towards building a cohesive lab group with students that are eloquent advocates of their work in sustainable and organic agriculture. While I would say that I am still learning on how best manage a vibrant lab team, I strive to provide opportunities for curiosity-driven scientific exploration and professional development through public presentation of research (conference attendance, speaking at field days, in front of classes, etc.). My near-term focus is, perhaps myopically, on advancement of graduate students toward their graduation and their contributions to my productivity in a pre-tenure position. However, in the long term (3-5 years), I would be keen to develop a Sustainable Agriculture emphasis within the Integrated Plant and Soil Sciences Degree Program.