Fall 2014 Oswald Winners

Received 46 submissions

**Biological Sciences:**

1st Place: Sarah Patterson, Junior, Chemical & Biopharmaceutical Engineering major
Title: Combining Radiation and Hyperthermia Methods for the in vitro Cancer Treatment of Multicellular Tumor Spheroids
Radiation is a common form of cancer treatment. However, with radiation therapy comes extreme side effects for patients such as hair loss, fatigue, infertility, blistering at the treatment site, nausea, and vomiting. Hyperthermia, a supplemental cancer therapeutic which exposes cells to an elevated temperature between 42-45°C, has been shown in conventional in vitro monolayer studies to enhance the effects of radiation. These 2-dimensional cell culture models are insufficient representations of in vivo tumors. 3-dimensional (3D) multicellular tumor spheroids are more appropriate in vitro models; they retain the architectural and morphological characteristics of their tumor counterparts, and are helping to bridge the gap between cell-based in vitro studies and animal studies. This investigation aims to evaluate the efficacy of radiation therapy alone and in combination with hyperthermia using a multicellular tumor spheroid model. It is hypothesized that the two will combine to reveal a synergistic effect, meaning that the combination of treatments will result in a more-than-additive decrease in viability compared to the modalities alone. A synergistic effect of combined treatment would indisputably prove that parallel to a high dose of radiation, a lower dosage could be used in conjunction with hyperthermia to result in the same cell death. Thus, the severity of side effects of radiation treatment could ultimately be reduced in the clinical setting, well-represented by the 3D multicellular spheroid in vitro model.

2nd Place: None

**Design:**

1st Place: Morgan Black, Senior, Interior Design major
Title: Artful Adaptation | Empowerment Through Expression
This project was an evidence-based exploration of the implications of art in a pediatric healthcare environment. Working to create an interactive, art-minded space that empowers and inspires its users by employing flexible design solutions and rethinking art in healthcare settings, form will meet function to capture the beauty in practicality, reimagining functional objects to bring change to the built environment. By keeping patients, caregivers, families, visitors, and staff in mind the design will allow the transitional space to continually meet a wide array of user needs. Utilizing art as a vehicle, the space will allow for self-expression in an environment designed to comfort patients, families, and visitors while maximizing efficiency for caregivers, medical professionals, and other staff.
2nd Place: Jessica Funke, Senior, Interior Design major

Title: Touchpoint

A patient’s hospital room is not the beginning of the road to recovery, but merely a touchpoint in the long road that begins at diagnosis. A hospital environment can make a huge impact on the recovery of a patient. Pediatric cardiology patients spend a relatively short amount of time in the hospital environment. It is imperative to design spaces that promote high quality of care while reducing or preventing extended length of stay. Providing the patient with an environment of relaxation and healing while also integrating space for family promotes a healthy, positive touchpoint within their journey to recovery.

Honorable Mention: Brittany Holian, Senior, Interior Design & Business major

Title: Set Change: An Interactive Renewal

The New Patient Room of Healthcare: Inviting positive distractions through visual stimuli, personalization, and fun to the pediatric cardiology environment while defining psychologically secure areas is a welcomed change. Patients will engage in a flexible and interactive environment, completely in their control. Rooms will be comfortable and zoned like set designs, with each user feeling at home in his or her area while working in community with one another. Personalization will suit the patient’s mood, style, and health needs. By utilizing new technology and decentralized work stations, the patient room design will incorporate the necessary equipment behind the scenes, allowing the users to heal and be part of creative, engaging, and customizable experiences he or she directs. Encouraging visitor, patient, and caregiver interaction through mobile arts and learning opportunities, as well as providing space and time for private time, the patient room and hospital environment will be become a community, safe and welcoming growth, development, and healing.

Honorable Mention: Qianhui Miao, Senior, Landscape Architecture

Title: Let It Grow

The site is adjacent to Nicholasville Road and Cooper Drive. The only two buildings within this site are Cooper House and solar Decathlon House. To meet the adaptive living and educational environment, the site was proposed to develop to be more sustainable, accessible, and energy-efficient. The proposal was set to rearrange the land use, build up the waste water treatment system, and enhance the social and cultural interaction. The purpose of this project was to demonstrate how agricultural landscape can become part of the urbanized environment and how sustainable identity can be built through an ordinary productive landscape.

Fine Arts:

1st Place: Travis Klondike, Senior, Landscape Architecture major

Title: West of Ninth

West of Ninth is a vision plan for the redevelopment of Louisville’s West End. For decades there has been an implied barrier between Louisville's resilient downtown, and the communities that exist to the west. The production of this video was purposed for the marketing of this vision, and utilized a wide variety of techniques in its making. Seen in this five minute video is the combination of videography, monologue, aerial videography, and 3D animation - all of which come together in order to help promote the future of this urban design project.

2nd Place: Phillip Barnett, Junior, Communications major

Title: For the Love of Barbie Allen: A Modern Child Ballad

The short film, For the Love of Barbie Allen: A Modern Child Ballad, is the modern retelling of one of the most widespread Child Ballads, Child 84. Sweet William becomes Will and Barbara Allen becomes Barbie Allen as the two undergo the breakdown of what was once a strong, intimate relationship. In less than ten days, the film was conceived, written, filmed, and edited by University of Kentucky students. For the Love of Barbie Allen examines
the human condition and the destructive power of love and jealousy. While parts of the story are altered, the core of the ballad rings true and is clearly still relevant. Though modern American relationships are quite distinct from their Scots-Irish ancestors, one thing will always remain constant: true love has the ability to build a person up and tear them down in the same breath.

Honorable Mention: Liza Bustle, Senior, Biology major
Title: A Production on the Production of Cortisol: Glucocorticoids Made Personal
This research explores the collaborative products resulting from the amalgamation of science and art, particularly in the biological and dance realms. In doing so, the analytical processes of the two fields are compared, showing the difference in the mindset that accompanies the creative processes associated with each field. The project visualizes the physiological impacts of stress and cortisol on the human body through choreography set on students with science majors, showing both the internal and external effects of these hormone pathways. This intersection between biology and dance has impacted society by breaking the traditional molds of how scientists and artists should function, enlightening colleagues in each discipline by providing knowledge from different perspectives. This connection between the two fields unites the mind, body, and movement while allowing the opposing disciplines to coexist harmoniously, fueling creation in each area.

Humanities: Creative

1st Place: Katie Cross, Senior, English Major
Title: Nature, Roundabout
This collection of poetry deals with nature—the environment, scenic landscapes, the beauty of science, and even human nature. At its heart, it reveals and expresses the nature of various relationships and interactions between humans and the world in which we live. These poems, many of which are ekphrastic, are mainly written in free verse, with one being a pantoum. They draw inspiration from my own life as well as from various artworks. Moreover, the topics covered range from real ladybugs to the VW Beetle, and included are the occasional references to Kentucky, Eastern spiritual practices, and Watchmen.

2nd Place: Emily Furnish, Vocal Music & Chemistry major
Title: The Yard
The Yard is the brief story about a girl, her memory, and what remains.

Humanities: Critical Research

1st Place: Autumn Murphy, Senior, English major
Title: The Vampires' Vampire: Investigating Blood (Racial) Prejudice in "Abraham Lincoln: Vampire Hunter"
This essay discusses the literary qualities of the 2012 film "Abraham Lincoln: Vampire Hunter," directed by Timur Bekmambetov. Like various pieces of literature, including Richard Matheson's I Am Legend, this film utilizes vampires to create a veiled discourse on racial relations. By framing the question of race in terms of impure blood, Bekmambetov both diverges and converges with the historical Abraham Lincoln's complex views on slavery and equality. By showing a version of Lincoln who is avidly anti-slavery while simultaneously vengeant against those of impure blood (vampires), Bekmambetov complicates the all-too-simplified notion of Abraham Lincoln in the
twenty-first century. The film is an important piece in the tradition of the literary vampire, and thus, it should not be dismissed as a trivial work of speculative fiction.

2nd Place: Sarah Wagner, Senior, Architecture and English major  
Title: Beyond Postmodern Architecture: Containing Infinity  
Contemporary architecture is pushing complexities of form with digital design technologies and advanced building techniques. These new and extreme possibilities in design require a reconsideration of the purpose of building. Many architects are turning to earlier principles of phenomenology to justify their designs. This work explores contemporary buildings as they relate to phenomenological narratives to come to an understanding of the ways in which architects use human experience to make sense of the complexities of contemporary building.

Honorable Mention: Emily Furnish, Senior, Vocal Music and Chemistry major  
Title: The Effects of Beethoven’s Image as a Suffering Artist on the Interpretation of His Works  
Various interpretations of Beethoven the man and Beethoven the composer have been established from the time he was alive to the present. However, the critical analyses differ depending on the critic’s balance between the examination of particular works versus personal anecdotes seen in Beethoven’s own letters or from the accounts of those who knew him. This paper explores a variety of myths that have formed about Beethoven in a more recent context and will debate which interpretations are most meaningful or prevalent to Beethoven’s reception today based on a combination of musical and biographical research.

Physical and Engineering Sciences

1st Place: Justin Cooper, Junior, Mechanical Engineering/Chemistry major  
Title: Flux Matching scheme for the Computation of Accurate Boundary Conditions on a Moving Mesh  
One of the most critical aspects of being a spacefaring civilization is the idea that once payloads have been ejected into the punishing environment of space that they must be returned to planet Earth with minimal harm. Upon entering a planetary atmosphere, a vehicle is subjected to extreme thermal environments that physically and chemically alter the structure of the spacecraft. The presented research advances the computational modeling where the most interesting and dynamic physics occur, at the ablation front. Work toward the development of a 3D moving mesh that captures arbitrary deformations in the ablating layers and couples the fluxes between fluid dynamics and the material response is presented.

2nd Place: Matthew Fahrbach, Senior, Computer Science & Mathematics major  
Title: Historical permutation statistics and Andre’s theorem  
We discuss a brief history of algebra and how it brought about the study of permutations. Then we present properties and the history of the Eulerian and Mahonian permutation statistics. Lastly, we give a detailed version of the proof of Andre's theorem that appears in Richard Stanley's Enumerative Combinatorics, Volume I.
Social Sciences

1st Place: Emily VanMeter, Senior, Political Science & French major
Title: All's Well That Ends Better: Third Party Intervention as a Challenge to Sovereignty
A crucial foreign policy decision for many political administrations (including President Obama) has been whether to intervene in civil conflicts. Political science literature has been ambiguous at best regarding the criteria required for successful intervention. One consequence of a successful intervention is the promotion of political stability, particularly leadership stability. In this paper, I examine the role of third party intervention in undermining or bolstering the stability of a state’s leadership in a post-conflict setting via capacity building and legitimacy. Examining the leadership turnover rates of all civil conflict states experiencing intervention between 1950 and 2004, I find that when multiple states that are loosely and informally allied intervene this reduces the risk of leadership turnover at a very different outcome than when single states or intergovernmental organizations intervene. This has crucial policy implications, indicating that intergovernmental organizations detract from post-conflict stability by increasing the likelihood of leadership turnover and that single-state interveners do not have as large an impact as perhaps they have previously been credited.

2nd Place: Faith VanMeter, Junior, Psychology major
Title: Potential Causes of Child Abuse: How Socio-Economic Status and Substance Use Relates to Child Abuse Rates Across America
A crucial foreign policy decision for many political administrations (including President Obama’s) has been whether or not to intervene in civil conflicts. Political science literature has been ambiguous at best regarding the criteria required for successful intervention. One consequence of a successful intervention is the promotion of political stability, particularly leadership stability. In this paper, I examine the role of third party intervention in undermining or bolstering the stability of a state’s leadership in a post-conflict setting via capacity building and legitimacy. Examining the leadership turnover rates of all civil conflict states experiencing intervention between 1950 and 2004, I find that when multiple states that are loosely and informally allied intervene this reduces the risk of leadership turnovers a very different outcome than when single states or intergovernmental organizations intervene. This has crucial policy implications, indicating that intergovernmental organizations detract from post-conflict stability by increasing the likelihood of leadership turnover and that single-state interveners do not have as large an impact as perhaps they have previously been credited.