

Feb 9th, 3:00 PM - 4:30 PM

Poster Session 2

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3:00-4:30 PM
(Learning Commons: Northwest Atrium)
Poster Session 2

1) Growth of ZnO Nanorods by Hydrothermal Method

By Sushil Khadka (Mentor: Dr. Helmut Baumgart)

Electrical Engineering

ZnO nanostructures are very attractive for high-efficiency short-wavelength optoelectronic nanodevices owing to their wide band-gap (3.37 eV) with large excitonic binding energy (≈ 60 meV), high mechanical and thermal stabilities, good electrical conductivity while being optically transparent and piezoelectricity. Growth of various one-dimensional (1D) ZnO nanostructures, such as nanorods, nanowires and nanobelts has been reported using various growth methods. However, it is still a significant challenge to obtain controllable growth of ordered nanorods for specific device applications, such as in solar cells, nano-lasers, optical storage, nanoscale heterojunctions, sensors and detectors etc. Various methods have been utilized to grow ZnO nanostructures on different substrates. Among all the available processes, wet chemical approaches, such as hydrothermal growth of ZnO nanostructures, is one of the most commonly used synthesis methods. ZnO seed layers were deposited by combining a sol gel process and a spin coating technique. The sol gel was prepared by using zinc acetate in a 2-methoxyethanol (solvent) and monoethanolamine (stabilizer). The spin coating was carried out on the indium tin oxide (ITO) glass at 3000 rpm for a time span of 20 seconds. The ZnO Nanorods were successfully grown as nanostructures from a fine grain ZnO seed layer by means of heating an aqueous solution of zinc nitrate hexahydrate and hexamethylenetetramine in a water bath at low temperature in the range of 65-90°C. It was shown that a dense array of ZnO nanorods was well-aligned and nanorod growth was successfully achieved based on a sol gel seed layer covered ITO glass substrate.

2) Signal Preemption Optimization

By Tien Nahn (Mentor: Dr. ManWo Ng)

Engineering

Signal preemption allows emergency vehicles to reach destinations quickly and increases safety when emergency vehicles cross intersections. The installation of preemption equipment at intersections requires significant investments. For this reason, only a subset of intersections can be equipped. In this research, we develop an optimization model to determine the optimal locations for signal preemption equipment installation. A simulated annealing algorithm is developed, and compared with existing optimization algorithms in a commercial software package.

3) Alternative Methods to Develop Reconfigurable Models

By Richard Hartman, & Daniel Broznak

(Mentor: Dr. Holly Handley)

Engineering

The objective of this project is to compare techniques and strategies to create flexible, rapidly configurable models to evaluate human performance. These models can be reconfigured to evaluate different task sequences or team size, as well as to represent a varying operational environments. This research will use the Command, Control, and Communication: Techniques for Reliable Assessment of Concept Execution (C3TRACE) tool to design alternate methodologies to create reconfigurable models. Resulting models can then be evaluated on the tradeoffs between model complexity and ease of reconfigurability, with the strengths, weaknesses and appropriate applications of each modeling approach identified.

4) Kinematics of a Painting Gesture in Aphasia?

Sarah Pomy & Haroon Osmanzada (Mentors: Dr. Stacie Ringleb & Dr. Anastasia M. Raymer)

Engineering

Patients with aphasia as a result of stroke have difficulty speaking and they may have altered movement patterns. One speech rehabilitation strategy is to perform gestures of the word that the aphasic patient cannot produce. The long term goal of this project is to determine if the gesture based speech therapy will improve the upper extremity kinematics in these patients. The first step toward this goal is to understand the differences in kinematics between healthy and aphasic participants. Data were collected from five aphasic and five age and gender matched participants performing a painting gesture. Kinematics of the shoulder, elbow and wrist were compared.

5) Prostaglandin-Mediated Ovulation: Blood Vessel Formation in the Follicle

Laysa Hedjar and Dr. Diane M. Duffy (Mentor)

Physiological Sciences

Ovulation requires formation of new blood vessels (angiogenesis) within the follicle. Prostaglandins are paracrine mediators produced within the follicle and are necessary for ovulation. Prostaglandin PGE2 acts via its 4 EP receptors to stimulate signal transduction pathways within target cells. This study was performed to provide preliminary support for the concept that each EP receptor has a unique role in regulating angiogenesis in the ovulatory follicle. Adult female cynomolgus monkeys were treated with gonadotropins to promote follicle development and initiate events leading to ovulation. A surgical procedure was performed to inject the follicle with vehicle; the COX inhibitor indomethacin (which blocks prostaglandin production); indomethacin+PGE2; or indomethacin+ an EP-specific agonist. The ovary was removed 48 hours after injection. Immunocytochemistry was performed to detect von Willebrand factor (vWF), which marks endothelial cells surrounding vessels. Follicles given indomethacin+PGE2 were similar to vehicle-injected follicles: vWF+ cells extended from the basement membrane to the follicle antrum. Follicles given indomethacin+EP1 agonist had sparse vWF+ cells in the granulosa cell layer. Follicles given indomethacin+EP2 agonist were similar to follicles given indomethacin+EP1 agonist, except with more apparent vessel lumens. Follicles given indomethacin+EP3 agonist had few vWF+ cells migrating a short distance into the granulosa cell layer. Acquisition and analysis of indomethacin+EP4 agonist injected follicles is ongoing. No single EP receptor restores all aspects of PGE2-stimulated angiogenesis in the ovulatory follicle. Future studies could examine combinations of EP. Ultimately, this information could lead to development of treatments which block ovulation (potential contraceptives) or promote ovulation (treatments for infertility).

6) Searching for the Lost Fonts of Old Dominion University Abrams/Wheeler Collection

By Leslie Renn (Ken Daley & Heather Bryant)

This project was a combination of research, design, and creative work in the field of Letterpress Printmaking. Specifically, the project focused on researching and cataloguing a collection of late 19th and early 20th century unidentified moveable type from the Abrams/Wheeler collection of lead foundry and wood type that was acquired by the Old Dominion University Letterpress Print Shop from a trade museum in Pensacola, Florida. The project also included the design and creation of type specimen sheets for the type that was successfully identified and catalogued. Ultimately, the goal of this project was to initiate a dialogue that would promote and encourage an interest in the craft, provide a relevant, visual context to the historic Gutenberg invention, and foster the viability of letterpress as a useful medium for the written word. This research is relevant to history, literature, the arts, and industry, and it is a great asset to the scholarship of the academic community at Old Dominion University because it provides new information to existing materials.

The Development of an Undergraduate Research Apprenticeship Program (URAP): Outcomes of an Interdisciplinary Methodology and Research Center (IMaRC) Posters 6-11

7) The Journey of our Research Apprentices: Data from the Interdisciplinary Methodology and Research Center (IMaRC) Undergraduate Research Apprenticeship Program (URAP)

By Logan Self, Kevin Cullen, Ashley Henry, Alexey Popov, John Delos Reyes, Shelby Davis, Evie Hempler, Edneshia Mann, Miguel A. Padilla (Mentor), and Robin J. Lewis (Mentor)

This poster summarizes the activities of the Undergraduate Research Apprenticeship Program (URAP) from its inception. Descriptive data are presented about the students who participated in the URAP and the disciplines represented. The various developmental activities that comprised the URAP are summarized. Aggregate data regarding student research outcomes (e.g. conference presentations, publications, independent research projects, graduate school applications) are also presented as well as student satisfaction data.

8) The Land of Our Ancestors: Property Rights, Social Resistance, and Biofuel Energy Production in Madagascar

By Sherry Beeler & Terrance Ratliff, & Dr. Benjamin Neimark (Mentor)

Political Science & Geography

This study focuses on a well-known biofuel battleground in Madagascar, highlighting a case-study of successful social resistance against contemporary 'land grabbing.' Development economists advocate for formal property rights to secure tenure and stimulate agricultural investment in land and markets, and while foreign aid projects are beginning to address land rights in Madagascar, most of its agricultural zones remain under extremely complex tenure systems of overlapping state and customary claims. Yet, as competing visions of land securitization take hold; significant questions remain regarding whether there is adequate alternative for protecting rural Malagasy from dispossession of livelihood resources under biofuel production.

9) Sexual Minority Women's Transition to Parenthood: How Legal Barriers Relate to Relationship Strain

By Evie L. Hempler, Edneshia V. Mann, Tyler B. Mason, and Dr. Robin J. Lewis (Mentor)

Psychology

This research project focused on legal barriers and relationship strain experienced by sexual minority women (SMW) couples in the transition to parenthood. Ninety-seven self-identified lesbian women were recruited from 26 U.S. states that have not legalized same-sex marriage or second-parent adoption. Preliminary data analysis revealed that the mean age of the participant was 31 years, almost two-thirds (63.8%) had a college degree, and about half lived in an urban area. Researchers will present qualitative data identifying themes representing the experiences of lesbian parents living within states that have yet to legalize same-sex marriage and second parent adoption.

10) Female Athletes' Confidence and Experiences

By Shelby Davis, Tyler B. Mason, and Dr. Robin J. Lewis (Mentor)

Psychology

Disclosure of sexual orientation, sport confidence (individual self-confidence and team efficacy), and Sexual Orientation Microaggressions (SOMS) were examined in N =78 lesbian and bisexual NCAA Division I, II, and III collegiate athletes. There was an inverse relationship between SOMS and disclosure; as SOMS increased disclosure decreased. There was also an inverse relationship between SOMS and self-confidence; as SOMS increase, self-confidence decreased. These findings suggest that lesbian and bisexual women who experience SOMS are less likely to disclose sexual orientation and have less sport self-confidence. This may have implications for athletic performance.

11) Relationship of Work Characteristics and Job Outcomes

By Ashley Henry, Kevin Cullen, Logan Self, and Dr. Miguel A. Padilla (Mentor)

Psychology

Many factors influence faculty satisfaction and productivity in academia. Here, 1472 faculty from 47 US doctoral research universities participated. Preliminary results indicate that distributive justice, perceived organizational support, and autonomy predict burnout and job satisfaction. In particular, the present study suggests that distributive justice and perceived organizational support were more important to females, whereas autonomy was more important to males. Faculty are the focus because little is known about these factors in academia, and faculty wellbeing is important due to their everyday interactions/influence on students. Future research can delve deeper into some of the underlying causes of these relationships.

12) Risk versus Risk Perceptions: How Ideology Mediates Perceptions of Vulnerability

By Krista Andrews and Dr. Jesse Richman (Mentor)

Political Science

We examine how ideology interacts with personal vulnerability to shape perceptions of risk from global warming and sea level rise. We analyze multiple years of original survey data from coastal residents with varying degrees of personal vulnerability to sea level rise due to global warming. The results show that personal vulnerability leads to more polarized attitudes towards risks from global warming and sea level rise, with conservatives and liberals responding in distinctly different ways to the same personal circumstances. These results have important implications both for global policy response and the capacity to respond to personal risk.