



University Undergraduate Research Conference

April 18, 2014 Graduate Life Center

www.research.undergraduate.vt.edu

Welcome to Virginia Tech's Spring Undergraduate Research Conference. This event is a celebration of the creative and scholarly accomplishments of undergraduate students campus-wide. Our program features the work of over 100 students from 36 different academic programs. The oral presentations, posters, performances and panel discussions taking place throughout the day reflect the quality and diversity of undergraduate research at Virginia Tech. Many of the projects are the result of collaborations among several students.

An event such as this requires tremendous behind-the-scenes support. I am most grateful to Ms. Anita Dodson for her tireless work in planning, organizing and executing today's conference. Thanks to the Howard Hughes Medical Institute Sciencering Program and to the Fralin Life Sciences Institute for financial support. And most importantly, thanks to the many faculty and graduate students who have mentored our undergraduate researchers. I hope you enjoy the day and take pride in what our students have accomplished.

Jill C. Sible, Ph.D.

Assistant Provost for Undergraduate Education

Professor of Biological Sciences

SCHEDULE AT A GLANCE

8:00 am - 9:00 am Poster set-up

9:00 am - 10:30 am Poster Session I

Session 1: All Disciplines

10:30 am - 12:00 pm Oral Presentation Session I

Session 2: Liberal Arts & Human Sciences, Psychology

Session 3: Liberal Arts & Human Sciences, Psychology,
Business, Architecture & Urban Studies

Session 4: STEM, Business

12:00 pm - 1:00 pm Lunch

12:30 pm - 1:00 pm Special Performance

Linux Laptop Orchestra

1:00 pm - 2:30 pm Poster Session II

Session 5: All Disciplines

2:00 pm - 4:00 pm Special Session

Session 6: Institutional Inequality: A Case Study- Laura Gillman's class

2:30 pm - 4:00 pm Oral Presentation Session II

Session 7: STEM

Session 8: Liberal Arts & Human Sciences

4:00 pm Closing Remarks

Table of Contents

Session schedules and list of presenters

Session 1- Poster Presentation_____8-11

Session 1- Oral Presentation_____

Session 2- Poster Presentation_____44-

Session 2- Oral Presentation_____

Abstracts: Individual Student Presenters

2014 ACC Creativity and Innovation Grants

Congratulations!

*2014 ACC Meeting of the Minds
undergraduate research conference
April 3-5, 2014*

Congratulations!

Brandon Amos
Kristen Fread
Lucas Kane
Taylor Moran
Corinne Mayer
Matthew Rosati
Elizabeth “Jade” Womack
Andrea Ledesma



*2014 National Conference on Undergraduate
Research
April 3-5, 2014*

Congratulations!

Christine Tin
Erica Lee
Gabriela Carillo



Sarajin Ali p.19
Daniel Alley p.
Ruth E. Anderson p.49
Kathleen E. Baugh p.
Colleen A. Beard p.
Alexandra K. Becker p.
Nada Berrada p.
Heather E. Bomberger p.
Amy Brandon p. 50
Peter J. Burns p.
Nicole N. Capriola p.
Gabriela Carrillo p.
Margaret L. Cashion p.
Earl K. Cherry Jr. p.
Hyun-Jun Chop.
Dylan Cooper p.
Jack DiTrapani p.
Brianna M. Early p.26
Matthew B. Eggers p.
Sarah Emsley p.
Joshua S. Enokida p.
Klingensmith E. Erin p.
Kaitlyn E. Fitzgerald p.
Olivia N. Foroughi p.
Elizabeth L. Fread p.
Zach Gajewski p.
Chelsea P. Giles p.
Mason A. Gottschalk p.
James B. Gregory p.
Megan M. Harvey p.
Isabel Hernandez p.
Jonathan E. Hittel p.
Jerilyn R. Izac p.51

Dorian Jackson p.
Chris Jacobs p.
Juhi M. John p.
Matthew W. Johnson p.
Mehdi Kargar p.82
Chelsea P. Kellinger p.52
Christine Khong p.
Chris W. Kurmel p.
Andria E. Laib p.53
Erica A. Lee p.54
Kevin L. Lee p.
Rachel A. Leeth p.
Kumiko M. Lippold p.
Alexander D. Little p.
Derek J. Litvak p.
Taylor K. Lively p.
John A. Lockwood p.55
Nicholas P. Lucchei p.
Grace V. Ma p.
Joseph Maglizzi p.
James R. Mayberry p.
William A. Mills p.
Cindy Min p.55
Bradley Mount p.
Jennifer L. Murph p.
Sawsene Nejjar p.
Jennifer Nester p.
Jennifer N. Nester p.
Lydia T. Nguyen p.
Jennifer N. Nguyen p.
Charles Nichols p.
Michelle M. Oh p.
Molly B. Oudekerk p.

Erin E. Palmer p.
Kelsey Patel p.
Caitlyn M. Patey p.
Kevin Porter p.
Raleigh W. Priddy p.
Sadah Proctor p.
Mazhar M. Rasiwala p.
Anna”Kaitlyn” Revercomb p.
LeAnn M. Rhodes p.
Jonathan E. Roberts p.
Charles M. Roco p.
Erik R. Rodriguez p.
Matthew M. Rosati p.
Allen E. Ross p.
Sarah E. Rouzer p.
Paul Sathre p.
Arianna C. Schuler Scott p.
Jessica M. Sentelle p.
Elizabeth C. Sharp p.
Kathryn A. Shepard p.
Nadya L. Sidki p.
Alysha E. Simmons p.
Brian C. Singh p.
Jarrod Singley p.
Ariel N. Smith p.
Lauren N. Snelson p.
Nneka D. Sobers p.
Mark C. Soler p.
Timothy H. Song p.
Nattasha Srikongyos p.
Kathryn L. Testut p.
Amand, G. Thoma p.
Erica M. Tiedemann p.

Christine M. Tin p.
Delia S. Tomlinson p.
Sydney F. Topp p.
Megan D. Tucker p.
Shelbie Turner p.
Cassidy A. Turner p.
Kristen M. Ulmer p.
Sydney J. Vaile p.
David Vasquez p.
Eduardo D. Villacis p.
Tyler L. Weiglein p.
Jennifer L. Wertheim p.
Jordan Wetzig p.
Trevor S. White p.
Alexzander Williams p.
Kaitlin N. Winfree p.
Suh H. Yang p.
Yue Yu p.
Nicholas Zinck p.

Special Session on Institutional Inequality

Peter J. Burns
Hyun-Jun Cho
Matthew B. Eggers
Chris Jacobs
Megan M. Harvey
Isabel Hernandez
Juhi M. John
Taylor K. Lively
Jennifer Nester
Kathryn A. Testut
Sydney F. Topp
Christine Khong
Jarrold Singley

Mentor(s): Laura Gillman

Poster Session 1

9:00-10:30

Sarajin Ali

Converting Aircraft Design Markup Language using Matlab

The goal of this research project is to apply a newly developed Aircraft Design Markup Language (ADML) to realistic models of aircraft with parametric geometry. In today's world a collaborative approach is taken when designing aircraft. An aircraft design is governed by various disciplines, such as geometry, structures, aerodynamics, propulsion, controls, and so on. Commercial aircraft design is increasingly a multidisciplinary effort taken on by many individuals around the world. It is imperative that the data is transferred between each discipline efficiently. ADML is a neutral data format that allows these disciplines to communicate in a common language. In order to minimize loss of data and avoid redundant effort in data transfer, all the data is stored using ADML, which each discipline can then use to run analyses. A MATLAB program will be written to access data from an extended markup language (XML) database. Data will be imported from an ADML database, complied with the XML standard, and exported to another text format. The exported text file would be an input to the design tool called the Virginia Tech Class Shape Transformation (VTCST), which generates a parametric representation of vehicle geometry. A successful result will be to read input data for an existing B-58 bomber aircraft model in ADML format, outputting a text file that can be run by VTCST, and then running VTCST to confirm that it can generate B-58 geometry starting from the ADML model description.

Mentor(s): Robert Canfield

Colleen A. Beard

Substrate Volumetric Moisture Content Affects Growth of Containerized Succulents

The group of plants known as “succulents” – members of the genera Aloe, Echevaria, Kalanchoe, and others – have become very popular as garden center retail items. Research on how commercial growers can best produce these plants is scarce. Our objective through this and previous studies is to optimize production inputs to maximize quality and reduce crop time. As most species are native to dry climates, growers assume succulents are best produced with minimal watering. Our work proved this assumption incorrect for most succulent taxa. For this experiment, seven popular taxa of succulents were irrigated when the substrate dried to one of three volumetric moisture content (VMC) thresholds: 15% (low), 25% (medium), and 35% (high). The VMC was measured daily with a soil moisture sensor. Growth/biomass data collected every two weeks included height and width, with shoot fresh and dry weight collected at the end of the study (10 weeks after start of treatments). Of the seven taxa grown, fresh and/or dry shoot mass was significantly less for the lowest VMC treatment for four; the VMC had no effects on final mass for the remaining three taxa. These results show restriction of irrigation water can lead to smaller finished plants for some succulent species.

Mentor(s): Holly Scoggins

Alexandra K. Becker

Emotionality, Trait Self-control, & Neuroticism Effects on
Vigilance Performance

The goal of this project was to examine performance in a cognitive task under various conditions and when specific trait levels of self-control are present. Vigilance tasks require participants to engage in cognitive processing and has shown, in past research, a decrement in performance as task duration increases. Cognitive Resource theory argues that this decrement is due to a depletion of a renewable cognitive resource over the time of the task. A proposed measure of this resource is cerebral blood flow. It is proposed, however, that ability to extend cognitive resource can be trained, like a muscle, in order to prolong performance and reduce decrement in cognitive processes. Those with higher trait levels of self-control, therefore, would be expected to have greater ability to sustain against vigilance decrement due to well-practiced use of their cognitive resources. Here, we examined high and low trait self-control (as gauged by survey data) participant's blood flow velocity and performance changes during one of two different vigilant task conditions: high emotionality or low emotionality stimulus exposure. Results show that those in the high-emotionality condition (i.e. more cognitively draining condition) performed worse when participants had low trait level control than when higher levels of control were shown.

Mentor(s): Dr. Tyler Shaw

Heather E. Bomberger

Changes in chromosome dynamics caused by merotelic kinetochore attachment

Mitosis is the process by which a cell divides and partitions the genetic material to two daughter cells. The genetic material is organized in chromosomes which are replicated prior to mitosis to form two sister chromatids that are held together until mitosis. Upon mitotic entry, specialized sites on the chromosomes, the kinetochores, establish connections with microtubules of the mitotic spindle. Correct kinetochore-microtubule attachment occurs when the two sister chromatids bind microtubules from opposite spindle poles. This leads to alignment of the chromosomes in the center of the cell, where they undergo oscillations between the spindle poles. Merotelic kinetochore attachment is an incorrect attachment that occurs when a single kinetochore binds microtubules from both spindle poles and can lead to chromosome segregation failure. The dynamics of mitotic chromosomes are believed to be important for correction of kinetochore mis-attachments. Here, we tracked the movements of both correctly and incorrectly attached kinetochores using a custom-designed MatLab program. We found that merotelic kinetochore attachment results in abnormal chromosome dynamics. These data will be used to refine a mathematical model we recently developed and investigate the role of chromosome dynamics in correction of merotelic attachments and the effect of merotelic attachment on the mitotic spindle.

Mentor(s): Daniela Cimini

Peter J. Burns

“White Trash” and Female in a Southern Community

Gabriela Carrillo

Differences in the organization and distribution of retinal terminals in the distinct thalamic nuclei

The brain is composed of billions of neurons that are connected into neural circuits via synapses. Malformation of synapses leads to a multitude of debilitating neurological disorders, therefore understanding the mechanisms underlying synaptogenesis is critically important. Connections between the retina and the brain have been particularly well characterized in terms of how synapses are targeted, formed and refined. Recent studies have shown that the distinct nuclei of the mouse visual thalamus – the dorsal lateral geniculate nucleus (dLGN), the ventral lateral geniculate nucleus (vLGN), and the intergeniculate leaflet (IGL) – are targeted by axons from different classes of retinal ganglion cells (RGCs). Given these different targeting domains and the disparate functions of the visual thalamic nuclei, we questioned whether synapses formed by retinal axons in the dLGN and vLGN are structurally and functionally distinct. Using immunohistochemistry, anterograde labeling, and genetic labeling applied with Serial Block Face Scanning Electron Microscopy (SBFSEM) we assessed both quantitative and qualitative differences in the morphology and organization of the retinal terminals within the different subnuclei of the LGN. We show that while immature retinal terminals in dLGN and vLGN appear identical, the refinement and maturation of terminals is unique in each nuclei. Based on these results we posit that comparative analysis of molecular cues in these nuclei may allow us to identify novel mechanisms that drive the formation of different types of terminals.

Mentor(s): Dr. Michael Fox

Hyun-Jun Cho

Becoming American: Examining the “1.5 Generation” Chinese American Experiences

While racial scholars have been increasingly concerned about Asian experiences in America with a focus on the “first-generation” immigrants and the “second-generation” children, scholars have been relatively excluding the “1.5 generation”, a group of people who immigrated to a new country before adolescence. In order to make an intersectional approach and seek for a better understanding of this issue, I undertake a case study research with “The Girl Who Wouldn’t Sing” written by Kit Yuen Quan, which talks about the author’s exploration of finding her identity and space in society through her life experiences as a “1.5 generation” Chinese girl in America. Among various kinds of difficulties that immigrants face, she picks particularly language difficulties and describes them as the biggest obstacle. She, additionally, clarifies how language difficulties have made her stuck in between English speakers and Chinese speakers and how they have made her live in an “uprooted and transplanted state.” I use this case study research to investigate how language difficulties affect not only the “first-generation” immigrants, but also the “1.5 generation” immigrants who have seemingly decent language skills. An additional purpose of this research is to achieve a better understanding of how language difficulties that the “1.5 generation” immigrants experience lead to further difficulties of other kinds as immigrants and disrupt their periods of adaption to a new country.

Mentor(s): Laura Gillman

Brianna M. Early

Measuring Maternal Responsivity to Children's Bids during a Frustrating Situation

Young children look to caregivers as a source of emotion regulation, often seeking support for ways to change negative emotional states (Diener and Mangelsdorf, 2000); therefore, we wanted to examine how mothers respond to their children's help seeking bids when frustrated. Children were observed during a locked box frustration task. Children were given a ring of keys, none of which opened the lock on a clear box containing a set of attractive toys. Children were left in the room with their mothers to work on opening the box for four minutes. If asked for help, mothers were told to tell children that they would help them in a minute, although not all mothers followed these instructions. Maternal responsivity to children's bids was defined as looking and/or talking to mothers during the task. For each bid, we will code maternal responses as ignoring, encouraging, script response, acknowledgment, discouraging, and/or off-topic. We will present information on the development and inter-rater reliability of our coding system. The inter-rater reliability is important because it ensures consistency throughout the data. After developing a reliable coding system, we will be able to examine how maternal responsivity relates to other aspects of parenting and children's development.

Mentor(s):Cynthia

Smith

Joshua S. Enokida

The effects of chain configuration on the thermal and mechanical properties of poly(cyclohexyldimethyl decalin)

The research project studies the roles of chain configuration on the thermal and mechanical properties of poly(cyclohexyldimethyl decaline)(PCHDMDN). Prior studies correlate main chain relaxation below the glass transition to high impact properties. These relaxations, noted as beta relaxations, can be observed using dynamic deformation techniques such as rheology or DMA. The saturated rings in the polymer backbone of PCHDMDN allow large amounts of molecular mobility. As a result, PCHDMDN is expected to outperform current high impact materials such as polycarbonate. To investigate these properties, the PCHDMDN polyesters were synthesized using a three temperature-step melt transesterification reaction in the presence of 100ppm Ti(OiPr)₄ catalyst. The polyesters studied show thermal stability up to 300 °C, as well as a glass transition temperature dependent on backbone configuration. Large beta-transitions were observed at -60 °C and -20 °C using dynamic mechanical analysis attributed to relaxations of the saturated rings in the polymer backbone of PCHDMDN. Future works include evaluating impact strength.

Mentor(s): Timothy Long

Klingensmith E. Erin

The Effect of Starch Digestibility of Two Corn Silage Varieties on Lactation Performance in Dairy Cows

The objective of this study was to investigate whether two corn silage (CS) varieties with varying amounts of floury and vitreous endosperm had different rates of starch digestion in the rumen. Two multiparous, ruminally cannulated dry cows were fed lactating high cow TMR ad libitum. Dried and ground CS samples from periods 1 and 2 were sealed in duplicate polyester bags and suspended in the rumen for 2, 4, 8, 12, 24, and 36 h. A 0-h sample was immersed in 39°C water for 20 min. Starch disappearance was calculated as the difference between original starch mass and mass remaining after ruminal fermentation and expressed as a percentage of the original starch mass. The two varieties of CS did not differ for rapidly digestible starch (RDS; 24.10 vs. 26.41 P=0.99), degradation rate (DR; 0.35 vs. 0.24 P =0.79), slowly digestible starch (SDS; 67.65 vs. 68.22 P =1.00), and resistant starch (RS; 8.24 vs. 5.36 P =0.70) after 54 days storage. There were also no difference after 80 days of storage for RDS(19.06 vs. 36.71 P =0.28), DR(0.23 vs. 0.24 P =1.00), SDS(78.49 vs. 59.11 P =0.11), and RS(2.45 vs. 4.18 P =0.90). There were also no differences between storage times.

Mentor(s): Dr. Mark Hanigan

Olivia N. Foroughi

The Significance of Gender and Sexuality with Youth Violence at School

Youth violence is a serious problem within the United States school system. Prior research demonstrates that victimization is stratified by gender; however, few studies consider factors that may moderate this relationship. This study extends research on this topic by considering whether stereotypes moderate school victimization among female and male youth. It is also evident that youth who violate gender stereotypes may experience derogatory treatment. Therefore, this study explores whether violating gender stereotypes are associated with the victimization of females and males at school. The study will draw from the Education Longitudinal Study of 2002 to investigate if stereotypes linked to interscholastic sports and math related school activities moderate the relationship between violent, property, and bullying victimization at school for female and male youth. The implications for future research and policy implementation will be discussed.

Mentor(s): Anthony Peguero

Zach Gajewski

The Effect of Zooplankton Feeding on the Amphibian Chytrid Fungus

Recent studies have demonstrated that *Daphnia pulex*, a species of zooplankton, can reduce mortality of amphibians by grazing on *Bd* zoospores that would settle on the amphibians. Zooplankton can rapidly graze down algae by filter feeding and can clean a green algae filled lake to a clear water lake. If zooplankton consume *Bd* zoospores as a food source, then zooplankton may potentially be used to control *Bd* densities in the environment and thus prevent infection of amphibians. In my experiment, I will examine *Cyclops bicuspidatus*, *Daphnia retrocurva* and *Daphnia pulex*. *Daphnia pulex*, a species already found to consume and reduce the zoospores in other experiments; will be used to compare the other zooplankton species to. I will primarily follow the methods established in other zooplankton experiments. I will add a known concentration of zoospores into vials containing different numbers and species of zooplankton. Each species will have 6 vials with the same concentration of zoospores but different number of zooplankton in each one, ranging from 0-10 in intervals of 2. The vials with 0 zooplankton will be used as a control. The grazing time for all treatments will be 48 hours. I will then measure the zoospore concentrations after the grazing period and calculate change in concentration from the start of the experiment. This experiment tests the ability of other zooplankton species to consume *Bd* zoospores and may provide a possible solution to the *Bd* problem.

Mentor(s): Dr. Lisa Belden

Kevin L. Lee

Sex and Race Stereotypes in Online Games and the Moderating Role of Player Skill: Updates From a Field Experiment

Clarissa La Bruno, Kevin Lee, Petey Mainardi, & Winston Wu
People are quick to make biased judgments of others when face to face. The ability to stereotype can even be seen in the realm of multiplayer online gaming. In a field experiment conducted in a popular online game as part of a series of studies of online game behaviors, a player's apparent gender, race, voice "chat" utterances, and skill level were manipulated across a large number of online matches, with online players' responses to subsequent game "fried" requests recorded as an outcome measure. Results replicated previous findings from a previous study that did not manipulate race, finding that females gain more compliance with friend requests than males, but that females gain most compliance when positive or silent while males gain most compliance when negative. Further, the current study's inclusion of a race manipulation produced a more complex higher-order three-way interaction effects between race and other variables in influencing compliance. Results in this experiment demonstrate implication of real world stereotyping attitudes and behaviors onto the real of online video games, with mechanisms of racial stereotyping in judgments particularly complex.

Mentor(s): James Ivory

Kevin L. Lee

Effects of sanitized and nonsanitized media violence on selective exposure to subsequent media content: Latest Findings

Kristina Biron, Clarissa La Bruno, Kevin Lee, Petey Mainardi, & Winston Wu Exposure to violent media may elicit powerful responses in viewers. While most research on violent media has focused on potential negative effects of violent media, this study is part of a multi-year program of research on how responses to typical “sanitized” Hollywood violence portrayals differ from responses to more realistic and unpleasant “non-sanitized” portrayals. Following up on studies examining affective and behavioral outcomes of non-sanitized vs. sanitized portrayals, the present study compares the effects of sanitized and non-sanitized media violence scenarios on viewers’ selection of additional media content. In a laboratory experiment, participants were assigned to one of three different media violence conditions in the film clips: sanitized violence, non-sanitized violence, and a control condition with no violence. Participants were then asked to rank five subsequent clips for a second viewing: nonviolent, nonviolent with active violence prevention, sanitized violence, non-sanitized violence, and violence in the form of retribution. Questionnaire measures regarding responses to both clips were also collected. Results inform an improved understanding of how sanitized and non-sanitized media violence influence both a viewer’s experience and viewers’ subsequent media use motivations.

Mentor(s): James Ivory

Kumiko M. Lippold

Spontaneous seizures and increased seizure susceptibility following deletion of neuronally-expressed Collagen XIX

Synapses are specialized zones between neurons that function as a means of communication. The development of these synapses is a highly specific process that requires the contribution of extracellular matrix molecules. These molecules can be highly mutated in the human genome and result in complex neurological disorders, such as autism, epilepsy or schizophrenia. One example is collagen XIX. Deletion of the genomic region encoding Collagen XIX has recently been linked to several cases of familial schizophrenia. Our lab previously identified collagen XIX as being expressed by interneurons, necessary for the proper formation of inhibitory synapses and mice lacking this collagen experience spontaneous seizures and catatonia. We have developed a method to quantify cortical brain activity during these seizure events using video coupled EEG and EEG/EMG recordings. In addition to monitoring spontaneous seizure activity, we have also begun testing whether collagen XIX-deficient mice have an increased susceptibility to seizure inducing drugs such as PTZ. Preliminary results demonstrate that these mutant mice experience increased seizure susceptibility, and often death, following PTZ administration, at concentrations that elicited minor seizures in wild-type control mice. Finally, we are currently testing whether collagen XIX-KO mice exhibit schizophrenic-like behaviors such as pre-pulse inhibition and nest building behaviors.

Mentor(s): Mike Fox

Nicholas P. Lucchesi, Maggie Cashion², Jonathan Roberts³, Kelsey Patel⁴

Vaccination on the Internet: A Qualitative Analysis of Website Discourses

US parents searching the internet to inform themselves about childhood vaccination commonly encounter conflicting information from pro-vaccination websites sponsored by government agencies and medical organizations and vaccine-skeptical websites sponsored by advocacy groups. With recent studies finding that anti-vaccination messages are more persuasive than pro-vaccination messages, it is increasingly important to understand how these websites function to persuade parents about vaccination decisions. To better understand the discursive functions of these websites, undergraduate members of the VT Vaccination Research Group conducted 2-phase case studies of four highly trafficked vaccine information websites (2 in favor of and 2 skeptical of vaccination). In phase 1 of the research, students used thick description, an anthropological data acquisition method of systematic observation, to gather information about the websites' user experience, graphical features, content, and interactivity. In phase 2, they used discourse analysis to analyze data gathered in phase 1. Comparing case study outcomes demonstrates that these websites invite different user experiences and emphasize different forms of evidence. Vaccine-skeptical websites focus on creating community and privilege user-generated content (personal evidence), and vaccine-positive websites focus on disseminating information and privilege scientific evidence.

Mentor(s): Dr. Bernice Hausman

Grace V. Ma

[Air Cavity Dynamics of a Cone](#)

The goal of this project is to examine the air cavities of a hydrophobic cone as it is submerged in water. While conducting this research, we examine the shape of the resulting air cavity of a cone dropped into water from a certain height. This is relevant towards determining what factors cause the shape of the air cavity of the submerged object (ie. surface tension, gravity, etc.) This is done first by coating the cone in a hydrophobic solution and then dropping the cone from a constant height while taking high speed pictures. The pictures are then examined and the shape of the air cavities are outlined using a program (matlab). The outcome of the experiment has not been determined yet as it is still in progress.

Mentor(s): Sunny Jung

James R. Mayberry

Aging Properties of Cyclically Competing Species

Aging Properties of Cyclically Competing Species – Understanding predator-prey interactions gives insight into species competition and partnership in an ecosystem. We utilize a generalized May-Leonard model, with N species attacking r other species in a cyclic manner, and study the system numerically using Monte Carlo simulations. This allows us to consider temporal and spatio-temporal quantities while varying N and r . By studying the space-time correlation, we determine the domain length as a function of time and its corresponding exponent. We discuss how excluding interacting species swapping or allowing asymmetric predation changes the studied temporal quantities. This work is supported by the US National Science Foundation through grants DMR-0904999 and DMR-1205309.

Mentor(s): Dr. Michel Pleimling

Lydia T. Nguyen

Broad Autism Phenotype Status and Categories of Stress and Impairment

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder that can be characterized by various deficits. These deficits may be present in the broader autism phenotype (BAP), which is characterized by subclinical personality traits and symptoms of ASDs in non-clinical populations. Our study uses a dimensional model of impairment to examine the relationship of degree of autism-related symptoms to more global areas of distress and dysfunction. A sample of 13 adults seeking services at a community-based training facility for clinical science psychology students completed two questionnaires as part of a standardized assessment research project: (i) Broad Autism Phenotype Questionnaire which is a measure of the phenotypic expression of autism in non-autistic clients, and the (ii) Outcome Questionnaire 45.2 which is a self-report measure to gauge a client's functional level and can be used to identify problematic areas that should be a focus of treatment. The OQ-45.2 total score and symptom distress were significantly correlated with BAPQ total ($p < .10$), but interpersonal relations and social role were not correlated with the BAPQ total or subscales. Looking at this initial data, there is a possibility that future results could inform treatment by examining if individuals with higher BAPQ scores have a different pattern of change over time on the OQ-45.2, and may suggest areas that clinicians should target when helping those with BAP traits.

Mentor(s): Dr. Lee Cooper

Jennifer N. Nguyen

Self-Regulation as a Predictor of School Readiness in Preschool Children

Self-regulation is the ability to adapt our actions to situational requirements. Recent research suggests that self-regulation is a stronger predictor of school success than child IQ. We wanted to know if self-regulation also predicted preschool readiness in math and reading. Preschool readiness is a strong indicator of how children will perform throughout the early years of school. These data are from a larger longitudinal study designed to study individual differences in cognitive development in typically developing children. Data were collected from 4-year-old children from Montgomery County and surrounding areas. Math and reading readiness were assessed with the Woodcock-Johnson tests of academic achievement. Self-regulation was assessed with a pegs task that measured the child's ability to inhibit a natural tendency to tap the pegs in order and instead follow the directions of the experimenter. We also measured commonly reported correlates of school success: child IQ and maternal education. We used multiple regression to predict math and reading readiness using self-regulation, child IQ, maternal education, and child sex. Our results showed that only self-regulation predicted both math readiness and reading readiness. Findings suggest that parents and preschools should focus on children's self-regulation skills as indicators of the potential for early school success.

Mentor(s): Martha Ann Bell

Molly B. Oudekerk

The Societal Implications of the Virginia Tech Coal Plant

I plan on studying the Virginia Tech coal plant and its effect on the students of Virginia Tech, as well as the residents of Blacksburg and the Southwest Virginia area. My goals include studying the feelings that Blacksburg residents have towards the coal plant, and whether or not those opinions call for a shift in the energy source the plant uses, or even a change in the methods the plant currently utilizes. If my findings in that portion of the study indicate that some residents would like to see a change in the plant's energy production, I would like to then consider the options the coal plant has to use a cleaner and more renewable energy source, and also consider the policy and regulatory obstacles that may prevent the coal plant from using a different source. The overall purpose of my study is to create a solution to any negative feelings that Blacksburg residents may have towards the energy production at the Virginia Tech coal plant. My method of evaluation will be to conduct one-on-one interviews with Virginia Tech students and Blacksburg residents to determine their opinions of the coal plant, followed by a secondary source evaluation to create a solution to any concerns that may arise from the residents of Blacksburg concerning the coal plant. I am not yet at the stage of results or project outcomes in my research.

Mentor(s): Brandy Faulkner

Erin E. Palmer

Parent Warmth and Negativity in Families With Oppositionally Defiant Children

Parental warmth is generally considered a protective factor, whereas parental negativity may be a risk factor for child psychopathology. This may be especially pertinent for children with Oppositional Defiant Disorder (ODD). Research indicates that parental hostility is related to children's ODD symptoms, whereas parent support/scaffolding is not. Parent-child synchrony, or the extent to which parents and children share each others' viewpoints, may help families to benefit from treatment. In the current study we examined whether parent-child synchrony prior to treatment influenced the degree of change in parent's warmth/negativity over the course of cognitive-behavioral therapy. Families (N = 109) received either Parent Management Training or Collaborative Problem Solving in an NIMH funded study for 10-12 weeks. At pre- and post-treatment, the parent-child dyad discussed a time they had fun, felt upset, and what they did last Sunday. Conversations were videotaped and coded for parent-child synchrony, parental warmth, and parental negativity (ICCs = .90). T-tests reveal that parental warmth increased from pre- to post-treatment, whereas parental negativity did not significantly change. Parent-child synchrony at pre-treatment significantly predicted post-treatment parental negativity, over and above pre-treatment negativity. Results suggest that better parent-child synchrony at the beginning of treatment helps to decrease parental negativity over the course of treatment.

Mentor(s): Dr. Julie Dunsmore

Caitlyn M. Patey

Associations of Empathy with References to Emotions and Social Relations in Responses to Life Challenges

Language use may reflect personal adjustment and social context. Use of positive emotion words is correlated with health improvement (Pennebaker & Seagal, 1999). Higher social-status individuals incorporate less self-focused terminology than those of lower social status (Study 1, Kacewicz, et. al., 2013). As part of a larger study, we hypothesized that women would use more emotion words when discussing others' life challenges and that use of emotion and social words would be positively associated with empathy for both women and men. 263 undergraduates (67.3% female) wrote responses to three scenarios involving life planning, life management, and life review. Use of emotion and social words was calculated as a percentage of total words. Participants' self-reported empathy included three subscales: perspective taking, empathic concern, and personal distress. Regression analyses were conducted, controlling for participant sex and academic level, to determine whether positive and negative emotion words and social words predicted empathy. Women reported greater perspective-taking and empathic concern than men. Use of emotion words did not predict empathy. Use of social words in the life planning response was associated with higher personal distress, and use of social words during the life review response was associated with greater empathic concern.

Mentor(s): Dr. Julie Dunsmore

Charles M. Roco

Sphalerite (ZnS) Nanoparticle Biomineralization via Sulfate Reducing Bacteria

Sphalerite (ZnS) has potential to reduce uranium, arsenic, and other radionuclides to insoluble states through microbial reduction of sulfate. Thus, revealing an opportunity for bioremediation tactics at toxic waste sites and preventing groundwater and wetland contamination. Sulfate reducing bacteria (SRB) have the capability to naturally formulate ZnS particles in anaerobic, low-temperature environments. A facile route to ZnS nanoparticle biomineralization while simulating complex natural systems is determined by using obligatory anaerobic bacterial strain *Desulfovibrio desulfuricans*. Modifications made to traditional metal toxicity medium (MTM) lower susceptibility to zinc toxicity, allowing for higher production of ZnS when compared to bacteria grown in traditional MTM. Additionally, amount of ZnS production is found to be dependent on order of operations in procedure, specifically at what stage *D. desulfuricans* is introduced to zinc. X-Ray diffraction and TEM results reveal high purity of ZnS achieved and similar crystalline structure when compared to abiotic ZnS. Cell viability and sulfate reduction tests are performed through flow cytometry to better understand the interactions during the process. Simplified, efficient production of ZnS increases the feasibility and capability of translating SRB bioremediation techniques directly to toxic waste sites.

Mentor(s): Dr. Michael F. Hochella

Brian C. Singh

An Investigation of 4-Year-Old Inhibitory Control by Gender

Inhibitory control, the ability to suppress irrelevant thoughts and behaviors, is a vital aspect of childhood development. Previously, research has shown gender differences in inhibitory control and other closely related aspects of development (Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006); (Gagne, Miller, & Goldsmith, 2013). The purpose of this study was to explore these and other gender differences in a group of typically developing 4-year-old children. Sixty-nine 4-year-old children (mean age: 4 years, 3 months; 39 boys, 30 girls) participated in an investigation of early childhood inhibitory control and its antecedents and consequences. Children participated in six games meant to measure their inhibitory control, and then completed assessments of their language, intelligence, emergent literacy and emergent mathematical capabilities. Mothers also completed a questionnaire regarding their children's temperament. Independent sample t-tests revealed gender differences such that girls scored higher than boys on the temperament factor of effortful control, emergent literacy, nonverbal intelligence, overall intelligence, and inhibitory control tasks requiring them to control bodily movements (t 's ≥ 2.185 ; p 's ≤ 0.032 ; d 's ≥ 0.54). Results will be discussed with respect to practical outcomes for male and female development in early childhood.

Mentor(s): Amanda Watson

Amanda G. Thomas¹, Raleigh W. Priddy²

Participant and Caregiver Satisfaction at Virginia Tech's Adult Day Services

Adult day services (ADS) receive increasing support as a care option for adults with functional limitations. ADS programs serve as an alternative to institutional (nursing home) care by providing community-based care during daytime hours. In doing so, ADS provides respite to family caregivers. ADS attendance can lower caregiver burden and improve well-being for participants and caregivers. Virginia Tech's ADS supports a person-centered approach to care. Practitioners of this philosophy respect the participant by acknowledging their unique life history, values, needs and preferences. With annual surveys, Virginia Tech's ADS supports this philosophy by measuring participant and caregiver satisfaction with and perceived impact of ADS. Participants and caregivers indicate satisfaction with program dimensions and agreement with statements reflecting ways the program has affected them. Data gathered from the 2013 Participant and Caregiver Satisfaction Surveys (n=16 of each) revealed a positive evaluation of ADS services and staff skills. Highly rated items reflecting impact of ADS on participants included maintaining or improving physical abilities and eating nutritious meals and snacks. Participants were less likely to indicate feeling depressed less often or learning new things. While data reflect program strengths, they also indicate room for improvement in our instrument and services.

Mentor(s): Shannon Jarrott

Megan D. Tucker

Examining Multiple Prompts Effect on Cashiers' Identification-Checking Behavior

Mentor (s): Christopher Downing

David Vasquez

Social Behavior and Disease Dynamics in House Finches

In 1994, a bacterial pathogen commonly found in chickens, *Mycoplasma gallisepticum* (MG), jumped from chickens to house finches (*Carpodacus mexicanus*), causing an epidemic in house finches over the subsequent years. MG is believed to spread through short-term indirect contact on fomites (in this case, bird feeders). My project will examine how social status within a flock influences the potential for a house finch to be a super-spreader. My independent project will characterize how social status drives bird-feeder interactions by using inert microspheres as a nontoxic, noninfectious, and less invasive model for pathogen deposition and uptake to and from bird feeders. The goal of this experiment is to test the hypothesis that dominant birds will deposit higher numbers of microbeads (Polybead Dyed Red 3.0 micron microbeads) onto the bird feeder than subordinate birds. We will record the dominance of the house finches in the flock by video recording intraspecific interactions at a food dish. To test the hypothesis that the more dominant bird will deposit more microspheres on the feeder, we will swab the feeders after 7 hours and 24 hours post inoculation. This project will help give us insight to disease transmission in wild birds.

Mentor(s): Dr. Dana Hawley

Trevor S. White

[A Neural Network Approach to Tornado Prediction Using Radar-Indicated Storm Features](#)

Prediction of tornadogenesis is one of the great problems in meteorology. Most thunderstorms with mesocyclones that go on to produce tornadoes are scanned only with stationary long-range NOAA weather radar. This study aims to use the output of the Mesocyclone Detection Algorithm (MDA) from the radar stations to predict probability of tornadogenesis, projected tornado intensity, and other key variables. This study will provide tools for researchers and National Weather Service SKY-WARN spotters in the field to make more informed decisions about what storms to monitor or study. Several neural networks will be trained using archived MDA data and confirmed tornado tracks from the National Climatic Data Center's storm event database. Python and PyBrain will be used for the neural networks, while custom software written in C# was used for initial data collection and processing. The completed neural networks will process MDA outputs in real time, transmitting its predictions directly to weather researchers in the field.

Mentor(s): Tabitha James

POSTER SESSION 2

1:00-2:30

Ruth E. Anderson

Long-Term Effect Of Herbaceous Species Cover on The Development of Soil Properties on Reclaimed Mine Site

For the purpose of mine land reclamation, the selection of vegetative cover by species is necessary for recovering land productivity potential. Our study focused on the effects of vegetation on soil development at the Powell River Research and Education Center in Wise County, VA. The study site is a previously active coal mine. The study site was established with a variety of herbaceous species in the summer of 1990. We conducted research to compare the effects of the following seven species on soil development: tall fescue, crown vetch, reed canarygrass, common *Sericea lespedeza*, AULotan *Sericea lespedeza*, switchgrass, switchgrass/AULotan, and a forested control. We considered chemical properties of the soil including nutrient content, soluble salts, CEC, soil pH, total carbon, and organic carbon. We also considered physical properties including rooting depths, soil structure, soil texture, rock fragments, and diagnostic horizons. There is a correlation between extensive rooting systems and accelerated pedogenesis in species such as common *Sericea lespedeza*, AULotan *Sericea lespedeza*, and switchgrass. Formation of moderate soil structure and a cambic diagnostic horizon was evident under the aforementioned herbaceous species. Due to the heterogeneity and microtopography of the study site, further research is necessary to determine the contributions of individual factors to variability in this study.

Mentor(s): Dr. Ozzie Abaye

Amy Brandon

Determining N-alkane Profiles in Forages to Aid in Estimating Diet Composition

Plants contain different patterns of waxes in their cell walls. When those patterns are distinct, they can be used to estimate their contribution to the diet of grazing animals. Our objective was to evaluate the use of n-alkanes – saturated hydrocarbons common in plant waxes – to delineate plants in a cattle grazing system. Plants in a 1.4 acre field originally seeded with orchard grass and alfalfa were sampled 3 times over 12 days in late spring (May). Collections were separated based on plant species and part, oven-dried and ground. N-alkane (C27, C29, C31 and C33) contents were evaluated with heated saponification and gas chromatography. N-alkane patterns were evaluated using ANOVA and multi-variate techniques. No trend in wax profiles was observed across sampling days ($P > 0.39$). N-alkane contents of orchard grass, white clover and several forbs (chicory, dandelion, thistle) were low (< 100 mg/kg dry matter) and indistinct. Seed heads (orchard and blue grass), and C27 and C29 in flowers (buttercup), had substantially higher ($P < 0.001$) n-alkane contents than their corresponding leaves and stems. Alfalfa and blue grass, in addition to seeds and flowers, could be clearly delineated based on their n-alkane profiles. However, within complex plant mixtures, additional plant waxes, such as long-chain alcohols, are likely needed if this methodology is to reliably estimate diet preferences of grazing ruminants.

Mentor(s): Ronald Lewis

Jerilyn R. Izac

Homology modeling and Ligand Interactions of fatty acid binding GPCRs

Approximately 26 million Americans suffer from diabetes and more than one third of the population of America is obese. Fatty acid binding G protein-coupled receptors (GPCRs) have peaked interest as a novel therapeutic target for treatment of type 2 diabetes (T2D) and obesity and are referred to as Free Fatty Acid Receptor 1 (FFAR1), FFAR2, FFAR3, and FFAR4. GPCRs represent the largest family of cell surface receptors found throughout the body and are associated with signaling molecules to activate various physiological processes. Using crystal structures of GPCRs with a high sequence similarity, homology models of FFAR1-4 were generated using several different aligning and modeling methods. These models were assessed using protein modeling analysis tools. Current studies focus on elucidating the binding site area for FFAR4 and determining interactions for FFAR1 to determine if essential interactions are present in our model system. Ligand interactions were found by molecular docking known agonists into the homology models. The results suggest that the homology models generated are an accurate depiction of these proteins. We concluded that these homology models of FFAR1-4 could be used targets for determining novel therapeutics for the treatment of diabetes and obesity.

Moderator(s): David Bevan

Chelsea P. Kellinger

Dynamic Computer Modeling of Nitrogen- and Phosphorous-based Nonviral Gene Delivery Small Molecules

As more knowledge about gene expression and the resulting functionality is discovered, the desire to understand genetic mutations and malfunctions increases exponentially. In order to combat these alterations, DNA can be supplemented with desired genes in a technique known as genetic therapy. Although much light has been shed on the genetic causes and cures of many diseases, there is still much to be learned about the mechanisms for genetic delivery. The DNA strand must be complexed with well-selected vectors prior to insertion; these help transport the new DNA through the body, into the cell, and escape the endosome. Recently, it has been observed that phosphonium-based vectors have many advantages over the more traditional ammonium-based vectors. This study aims to uncover the molecular dynamics of the vectors interactions with the DNA to determine the cause of the increased effectivity. To properly simulate the mechanism, both the phosphorous- and nitrogen-based vectors were designed into pentamers and were allowed to interact with a dodecameric strand of DNA. The interactions were then analyzed to determine the groups involved, the natural steadfastness and strength of the bonds, and their effect on the dodecamer conformation upon complexation. By understanding the advantages to the phosphorous-based complex, even better vectors can be designed for even lower cytotoxicity and higher efficacy, thus improving the potential of large-scale genetic therapy.

Mentor(s): Dr. David R. Bevan

Andria E. Laib

Assessing Diet Composition in Grazing Cattle Using Natural Markers

Determining feed intake in cattle is a critical first step to designing efficient and sustainable pasture-based beef systems. Because forages differ in their innate plant wax profiles, plant wax markers such as n-alkanes can potentially be used to differentiate among forage types in animal diets. Our objective was to test the utility of n-alkanes to predict diet composition within a free-grazing environment. Six heifers were trained to consume a small amount (0.6 kg) of a dyed supplement daily from a portable feeding system (PFS). In so doing, their fecal pats could be distinguished by color. Fecal samples were collected over 5 days, with forages sampled on the first and last day. Within the 1.4 acre field, orchard grass, blue grass and white clover predominated, with limited alfalfa. The n-alkane contents of the samples were evaluated with heated saponification and gas chromatography, and used to predict diet composition by least squares procedures. Four heifers ate almost exclusively orchard grass (86 to 93% of diet). However, two heifers chose less orchard grass (71 and 73%) substituting either blue grass (20%) or white clover (27%). The alfalfa content of all diets was trivial (1%). Based on this small sample, there appears to be variation in diet preferences in free-grazing cattle. Using n-alkanes and a PFS, diet compositions can be predicted with minimal disruption of grazing behavior. Scaling this methodology for use in larger herds will introduce further challenges.

Mentor(s): Ronald Lewis

Erica A. Lee

The Effects of Implicit Bias on Intergroup Anxiety and Autonomic Regulation

Intergroup contact can be both cognitively and physiologically stressful. Such stress may be indicative of future behavior in socially relevant contexts, and physiological vulnerabilities related to the regulation of autonomic, neurophysiological processes. Imbalances between situational demands and cognitive resources in the social situation can affect perceptions of threat or challenge, subsequent anxiety, and cardiovascular (CV) response. Implicit race bias, automatic attitudes which are associated with particular racial groups may influence anxiety elicited in the intergroup situation. Further, higher levels of anxiety are understood to be associated with the disruption of autonomic equilibrium. Thus, the proposed research seeks to examine whether implicit bias may augment the degree of intergroup anxiety and reflect individual differences in CV reactivity using two models, the Biopsychosocial approach to arousal regulation (Blascovich & Tomaka, 1996) and Polyvagal Theory (Porges, 1995). In the proposed study, anxiety will be elicited through anticipatory intergroup interaction. Subsequent performance on cognitive tasks and CV responses through non-invasive electrophysiological recordings (e.g. impedance cardiography, electrocardiography, blood pressure) will be measured. Considering the connections between anxiety and cardiovascular pathology, this research may shed light onto the effects of intergroup anxiety on mental and physical health.

Mentor(s): Bruce Friedman

John A. Lockwood

Solving the Motivational crisis, BIT by BIT

Topic: An analysis of the benefits of incorporating IT to display students' work publicly. Can IT solutions positively affect a student's motivation, effort, and pride in their work? Significance: Many believe that blame is disproportionately put on college students for their lack of motivation to complete class projects and exercise their full potential. Some students struggle to retain interest in their classes and forget material as quickly as they learn it. IT solutions could be a feasible, cost-efficient way to boost student morale and success. Resources: Research will be conducted primarily through the resources available at Newman library, including books, Addison, and online databases. Additional data may be collected through interviews in order to fully understand the research problem and the student perspective. Scope: The project will begin in February and continue through April. It will briefly address typical students' concerns on our current system and discuss the possibility/feasibility of using IT to mediate them.

Mentor(s): Christopher Zobel

Cindy Min

Flushable Carbon in Spring and Winter Floods

Abstract All living things contain carbon. Without carbon, the world would not exist. Carbon cycles throughout the ecosystem and one significant aspect of the carbon cycle is the transportation of carbon in soil back to the atmosphere. Seasonality can affect this carbon exchange due to different activity of vegetation and microbes. This project looks into the difference between amount of flushable carbon during spring and winter floods in a flood plain. The hypothesis was that there will be more carbon from the soil that can be flushed out into the flood because of the increase in activity of vegetation and microbes during spring time. Samples from different cross sections were obtained during both spring and winter floods. The floods were generated by pumping water out of Stroubles Creek in Blacksburg. This water was pushed into the flood plain, and throughout the flood plain, different cross sections were marked. Samples were collected from each cross section during both spring and winter time. These samples were tested by using a carbon isotope analyzer called, Aurora. The data was analyzed to see the ratio between carbon 13 and carbon 12. This will help evaluate the amount of carbon in the system and also what produced these carbons. We expect the outcomes to show that there will be more carbon in the spring flood from vegetation and microbe activity.

Mentor(s): Durelle Scott

Anna “Kaitlyn” Revercomb

Determining the dietary requirement for digestible phosphorous in growing pigs

Only two reports in the scientific literature that can be used for estimating digestible phosphorous requirements for young pigs weighing 20 kg and these references are over 30 years old. All work was conducted at the Tidewater Agricultural Research and Extension Center (TAREC) in Suffolk, VA. The experiment was conducted as a randomized complete block design with six dietary treatments (standardized digestible phosphorous of 4.58, 3.60, 3.14, 2.86, 2.69, and 2.56 g/kg) and 4 replicate pens of pigs per dietary treatment. Each pen contained 3 barrows or 3 gilts, and there were 2 pens of barrows and 2 pens of gilts for each treatment. A total of 72 pigs were used. Pigs with an initial body weight of 18 to 20 kg were fed the different diets on an ad libitum basis for 28 days. Pigs and feeders were weighed on days 0, 14, and 28 in order to determine weight gain, feed consumption, and feed conversion efficiency (gain:feed). Data was analyzed using SAS (SAS Institute, Inc.; Cary, NC). Increasing phosphorous had a positive effect on both body weight and average daily gain. Pigs on higher total digestible phosphorus diets had better gain to feed ratios. The greatest body weight and average daily gain occurred in treatment six with the highest total digestible phosphorous.

Matthew M. Rosati

Characterizing the roles of two S1 subsite cap residues in determining the substrate specificity of a malarial M1-family aminopeptidase

PfA-M1 is an M1-family aminopeptidase in the malaria parasite *Plasmodium falciparum* that participates in the catabolism of host proteins and has been identified as an essential enzyme for parasite growth. PfA-M1 residues Glu572 and Met1034 serve to cap a cylindrical S1 “subsite”, which is a well-defined pocket that interacts with the sidechain of the first residue of peptide substrates and is the dominant determinant of enzyme specificity. As PfA-M1 is of interest as a potential drug target, further characterization of the roles played by these two residues in defining substrate and inhibitor specificities is desirable. We have used the peptidic aminopeptidase inhibitor bestatin to characterize the effects of the two cap residues on the potency of a model inhibitor. These results indicate that both cap residues contribute to the binding of bestatin to PfA-M1. Experiments with X-Ala dipeptide substrates are currently in progress to assess the effects of the PfA-M1 cap residues on substrate specificity.

Mentor(s): Michael Klemba

Sarah E. Rouzer

Mapping Congress

United States political history is a significant focus of research for modern scholars. Understanding the changing nature of politics in this country since the 18th century involves detailed temporal analysis of voting patterns, demographics, etc. at various scales. Readily available historical resources are necessary. As technology has progressed, how do researchers make the transition from analog to digital? How do we handle old data? How can researchers analyze large amounts of historical data from a spatial perspective? The purpose of this project is to create user-friendly U.S. Congressional historical data and resources to advance the understanding of the interaction between space and politics. Methods involved creating GIS resources, including shapefiles and formatted data sets of elections results, roll call votes, and district and state demographics. This project is part of an ongoing effort to assess the impact of region, local economies, demographics and local politics on national politics and policy making. The transformation of historical, analog sources and scattered digital data (some from the punch card era) into an integrated base involves surmounting numerous intellectual and information management challenges. This poster will help illustrate the power of GIS and the implications of digital data analysis to the study of American political history, while examining conventional wisdom about realigning elections and changes in the American electorate.

Mentor(s): LaDale Winling

Arianna C. Schuler Scott

Heuristic-Systematic risk judgments in the Android market

It has become second nature to many users to allow third party applications to access personal information on their mobile phones, opening them up to the dissemination of private data without conscious consent. The access and use of personal data by third party entities exposes the user to the risk of experiencing privacy violations. The Heuristic-Systematic model of information processing proposes two modes an individual may utilize to arrive at a risk perception. Heuristic processing draws on personal factors, such as prior experiences in similar scenarios, to help arrive at a determination of risk. Systematic processing involves a methodical information seeking approach to constructing the risk perception. Three antecedents have been identified in the literature that may influence to what extent either mode of processing is used: self-efficacy (an individual's ability to produce a desired result), motivation, and information insufficiency. In this paper we develop and test a model to illustrate how individuals arrive at risk judgments regarding third party application access to personal information. The perception of risk may influence decisions regarding the acceptance and installation of applications on the Android market, which is of interest to application developers.

Mentor(s): Dr. T. James

Elizabeth C. Sharp

Assessing the reliability and validity of the Intergenerational Best Practices Checklist

The goal of the current study is to address the reliability and validity of a scale piloted in 2013 and used for assessment of intergenerational programs, specifically Project TRIP. Intergenerational research is a relatively new field in human development, and greater understanding of the most effective implementation methods is needed. Through Neighbors Growing Together, an intergenerational program launched in order to “improve the lives of people across the lifespan through intergenerational collaboration involving teaching, research, and outreach” (Jarrott, 2008), we investigated the reliability and validity of a scale used by practitioners and researchers to evaluate intergenerational programming. For the observer on the research team, it serves as process data to clarify why goals are or are not being met. For the practitioner(s) of the session, the scale serves as a reminder of the best practices and how to implement them for optimal results. Two undergraduate researchers observed sessions at least once a week using the scale and discussing results. The research team discussed discrepancies and needed clarifications for scale items. Our goal is to provide improved training materials for practitioners and researchers to learn how to use the scale reliably with varied intergenerational programs.

Mentor(s): Dr. Shannon Jarrott

Alysha E. Simmons

Immune Cell Properties of Macrophages in a Urethane Injection-NLRX1 Deficient Mouse Model

The family of nucleotide-binding oligomerization domain (Nod)-like receptors (NLRs) encompasses many different receptors found throughout the body with various influence on the activity of the innate immune system, many of which are characterized as pro-inflammatory. Recently, a novel group of these NLRs has shown anti-inflammatory function, identifying a need to further characterize these NLRs. Inflammation is a hallmark of tumorigenesis. To explore the connection between these novel inflammatory mediators and inflammation tumorigenesis, we utilized a model of cancer based on urethane injection. In mice, this model, including a long and short term model, allows us to look at inflammatory response and innate immune cell behavior. The data shows that there is a greater proliferative rate in NLRX1 macrophages compared to wild type controls. Immunohistochemistry and cell harvests also show an effect on histology and cytokine prevalence in harvest samples after IP injections of urethane. A greater understanding of the contribution to the innate immune response and disease pathogenesis by NLRX1 is essential to future clinical innovations, both veterinary and human.

Mentor(s): Dr. Irving Coy Allen

Ariel N. Smith

[Genotyping Arabidopsis thaliana knockout mutant jmj24-1](#)]

The interaction of individual proteins to form functional multi-protein complexes is an essential feature of many cellular processes. In the model plant *Arabidopsis thaliana*, the biosynthetic enzymes involved in the production of flavonoids assemble into a complex with the entry-point enzyme, chalcone synthase (CHS), acting as the hub. In addition to the well-characterized biosynthetic activity of CHS in the cytoplasm, a substantial fraction of the protein is also found in the nucleus where its role is not well defined. A recent screen for proteins that interact with CHS identified a novel binding partner, a putative jumonji histone demethylase involved in epigenetic control of gene expression. In order to further investigate this relationship, we have obtained an *Arabidopsis* mutant line in which the gene encoding this jumonji protein has been disrupted. The mutant plants are currently being genotyped to identify individuals that are homozygous for the mutation in order to establish a lineage that will be used for further study. The genotyping is being performed using a PCR-based strategy in which the primers are specifically designed to distinguish between the mutant and wild-type gene. The establishment of a homozygous mutant line will facilitate future research endeavors, including assessing the phenotypic effects of the mutation on CHS expression or localization and the amounts and types of flavonoids produced under different conditions.

Mentor(s): Brenda Winkel

Lauren N. Snelson

Menu and Recipe Development for Burger '37

The purpose of this research project was to develop the menu and recipes, for that menu, for the next Dining Services venue. This new venue will be located in Squires Student Center and will be called Burger '37. The researcher, working with dining services chefs, created samples and held numerous tasting sessions to finalize the choices for burgers, French fries, and milkshakes. Decisions were made by the researcher and other dining management and based upon guest, student, and management feedback. The preliminary menu included: 3 burger options; vegan, turkey, and beef, 1 size of hand cut French fries and 6 flavors of hand dipped milk shakes. Ingredients and all necessary items (including paper goods) for each recipe were selected to fit the inventory management system. Tasting sessions for secondary recipes resulted in the selection of 6 options for specialty burgers, infused ketchups and mayonnaises, and cold and hot burger topping options. Recipes were developed for the toppings, requiring recipes. Suppliers for all necessary items were found and quantities and usage was addressed with each supplier. Finally, managers, supervisors and employees were trained.

Mentor(s): Irene Leech

Nattasha Srikongyos¹, Timothy Song², Mehdi Kargar³

Quantifying the Effects of Colloidal Crystals on Microbial Adhesion

Biofilms are complex microbial societies, which grow on the surfaces. Biofilm formation is a chain of events, which starts with adhesion of bacteria to the surfaces. Biofilm formation presents itself as a major problem in medicine due to its high resistance to antibiotics. This makes infections difficult to treat using traditional methods such as antibacterial treatment throughout the body. The aim of this research is to control bacterial adhesion using surface topography. We aim to combat the problems of biofilms by manipulating surfaces to control the bacterial adhesion to the surfaces. With the use of qPCR and SEM imaging, it has been found that topographically modifying surfaces will decrease bacterial count on surfaces and prevent microbial colonization of surfaces.

Mentor(s): William Ducker

Shelbie Turner

Evaluation of score variances between the Mini Mental State Exam (MMSE) and the Mini Mental State Exam-2: Standard Version (MMSE-2:SV)

With a growing aging population, increasing numbers of adults experience dementia, involving a progressive decline of cognitive abilities. To diagnose cognitive impairment, practitioners must assess an individual's cognitive status. One widely used assessment method is the Mini Mental State Examination (MMSE), which evaluates an array of cognitive dimensions. Criticisms of the MMSE are widespread. Creators have responded to criticisms with the MMSE 2 in brief, standard, and expanded versions. We administered the MMSE and the MMSE-2: Standard Version to answer our research questions: Are MMSE-2: Standard Version sub-scale and total scale scores comparable to those achieved with the original MMSE? Are there practical advantages of using the MMSE-2: Standard Version over the original scale? Adult Day Services (ADS) participants completed the original MMSE followed one week later by the MMSE-2: Standard Version, both of which were administered by a trained staff member or research student. Sub-scale and total scores were similar across the two scales. For a typical ADS, the original MMSE appears to be as valuable as the new, costlier MMSE-2: Standard Version. However, organizations serving more diverse populations may appreciate the increased options of the MMSE-2 brief and expanded versions.

Mentor(s): Dr. Shannon Jarrott

Jennifer L. Wertheim

Links of Empathy with Gratitude and Forgiveness in College Students

Empathy is important because it is associated with lower aggression and less antisocial, externalizing behavior (Miller & Eisenberg, 1988). Relatedness, a similar construct, has been found to enhance positive relationship functioning (Hadden, Smith, & Knee, 2013). The purpose of this study was to examine whether empathy is associated with gratitude and forgiveness, which may necessary for maintaining interpersonal relations. As part of a larger study, 263 undergraduates self-reported empathy and responded to hypothetical vignettes about pleasant and unpleasant actions. Participants evaluated intentionality of the acts and tendencies to display gratitude and reciprocity to helpful acts, and forgiveness or revenge to hurtful acts. Regression analyses, controlling for participant sex and academic level, tested whether aspects of empathy predicted ratings of intentionality, gratitude, and forgiveness. With regard to helpful behaviors, empathic concern was positively associated with a willingness to thank and to reciprocate, as well as evaluations of others' intentionality. For hurtful behaviors, empathic concern was positively correlated with a willingness to forgive and negatively correlated with both a desire to get revenge and with evaluations of others' intentionality. Results support the notion that empathy may play a role in the use of adaptive relationship strategies by reducing antisocial actions and promoting prosocial actions towards others (Miller & Eisenberg, 1988).

Mentor(s):

Suh H. Yang

Determining the efficacy of wine-related flavonoids in the inhibition of Alzheimer's Amyloid- β peptide (16-22) using molecular dynamic simulations

Aggregation of cytotoxic amyloid- β ($A\beta$) oligomers in the brain are trademark characteristics of Alzheimer's disease (AD) pathogenesis. One of the strategies in finding therapeutic treatment for AD is to prevent the assembly of $A\beta$ monomers into toxic oligomers. The region of residues 16-22 is known as the region of $A\beta$ most likely form oligomers, hence making it a useful model in the study of amyloid formation. Flavonoids, such as morin, quercetin, catechin and epicatechin have been known to destabilize $A\beta$ oligomers. This study aims to analyze the stability of $A\beta$ (16-22) in the presence of different flavonoids at the atomistic level using molecular dynamics simulations. Determining the overall efficacy of how these aromatic compounds disrupt hydrogen bonding between pre-formed $A\beta$ (16-22) trimer is essential to constructing an effective and noninvasive treatment. Initial studies show that when morin is placed near the pre-formed $A\beta$ (16-22) trimer, it does not disrupt or destabilize the trimer. Other flavonoids are currently being tested to determine efficacy, but current hypotheses focuses on flavonoids inhibiting the formation of an $A\beta$ (16-22) trimer, rather than destabilizing a preformed trimer. Determining the efficacy of these flavonoids and the influence of the state of $A\beta$ (16-22) trimer is essential in determining novel therapeutics for the treatment of AD.

Mentor(s): David R. Bevan

Yue Yu

Pamplin Text Analytics Toolbox (PamTAT)

Objective: To develop text analytic components, and incorporate them into the Pamplin Text Analytics Toolbox (PamTAT). Method: Technology: Use Excel VBA. Justification: PamTAT is an Excel based text analytics toolbox. Multiple features are missing and the independent study will work on incorporating some of these features, and developing and documenting new features. Evaluation: - Quality of coding (does it work?, is it generalizable to new data sets?) - Quality of results, analysis (are they correctly produced, accurate, clearly described?) - Quality of user interface design - Quality of documentation: - for new features: user requirements specification - for implemented features: tutorial documentation (step by step example with screen captures).

Mentor(s): Alan Abrahams

Nicholas Zinck

Tsunami Flow Depth in Patchy Coastal Forest

Understanding the movement of tsunami waves can allow for improved planning in tsunami prone areas. Coastal forests can greatly influence the flow of tsunami waves, which can be better understood by modelling tsunami waves through various coastal forest conditions. Tsunami studies in the laboratory as well as with numerical wave models explicate the effects of coastal forests. A laboratory study was conducted in the O.H. Hinsdale Wave Research Laboratory at Oregon State University. A steep beach with orderly patches representing forests was created in the large wave basin. A simulation with equivalent conditions was conducted using COULWAVE, a freely-available Boussinesq model for studying wave dynamics in the coastal zone. Generally, an increase of flow depth occurred in areas that did not have any forest patch obstructions in the cross shore direction. Locations just beside a forest patch saw the greatest increase in flow depth. Decreases in flow depth were observed behind each coastal forest patch in comparison to a tsunami inundation in the absence of forests. Areas of greater flow depth will potentially endure the greatest damage in the event of a tsunami. Proper planning should be addressed and new infrastructure in these areas should be avoided if possible.

Mentor(s): Robert Weiss

**ORAL
PRESENTATIONS
SESSION 1
10:30-12:00**

Nada Berrada

Democracy in the Middle East and North Africa and the Role of Civil Society

“Democracy in the Middle East and North Africa and the Role of Civil Society” is an attempt to look differently to the democratization process in the region, taking into consideration the power of civil society and its contribution. The concept of Civil Society, Democracy and Democratization will be explored, along with its contemporary characteristics and conceptual paradoxes. The analysis will focus on the particularities of civil society and the environment in which it operates. In this context, the challenges of Civil Society will be discussed and illustrated by case studies from countries in the MENA region. We will address these current challenges by evaluating the future prospects and the political potential of civil society and democracy in the region. This paper aims to will to provide an interdisciplinary and critical overview of the most important questions, debates and challenges. When examining the MENA region, we will analyze the political dynamics as they are and how they nourish our understanding without linking them to a normatively-driven vision of how we wish to see them. Occasional regressions into history and references to culture and politics will be made in order to understand the context in which Civil Society and Democracy operate in the MENA region

Mentor(s): Marc Lucht

Nicole N. Capriola

Associations of Social Support and Sense of Belonging with Worry and Stress in College Students

College is a transition period, as many students leave home for the first time and must adjust to separation from family (Gerdes & Mallinckrodt, 1994). Developing and maintaining social support systems and feeling a sense of belonging to their new community may be important for adjustment. Lack of social connectedness and lower personal sense of belonging are associated with negative psychological effects such as depression, social anxiety, and guilt (Blai, 1989; Hagerty, Williams, Coyne, & Early, 1996; Leary, 1990). In the present study 143 undergraduate students participated online for class extra credit. Students self-reported social support by significant others, family, and friends (Barrera, 1986); sense of belonging at the university (Goode-now, 1993); general worries (Meyer, Miller, Metzger & Borkovec, 1990); and perceived stress (Cohen, 1988). Regressions showed that social support from parents and friends significantly predicted greater sense of belonging. Students higher in belonging reported lower anxiety and stress. Mediation models suggest that social support is indirectly associated with student anxiety and distress, through its direct association with sense of belonging. Findings suggest that fostering social support and sense of belonging will be beneficial for college students.

Mentor(s): Julie C. Dunsmore

Jack DiTrapani

Comparing Mother and Teacher Reports on the Behavioral Assessment System for Children (BASC -2)

The Behavioral Assessment System for Children, Second Edition (BASC-2; Reynolds & Kamphaus, 2004) is used to measure children's behavior problems and adjustment. This scale includes reports from the child's parent and teacher, as well as child self-reports. Past literature has shown that parent reports show only modest overlap with teacher reports on various questionnaires (Achenbach, McConaughy, & Howell, 1987; Youngstrom, Loeber, & Southamer-Loeber, 2000). These reporter discrepancies could cause significant methodological problems if researchers are not aware of them. As part of a NIMH-funded treatment project under Dr. Ollendick, we explored consistency between parent and teacher reports from the BASC-2. Responses for 72 children diagnosed with Oppositional Defiant Disorder (ODD) were analyzed. Specifically, responses for children's externalizing and internalizing behavior and adaptive skills were compared. Results found that relative to teachers, mothers indicated greater maladjustment across all scales examined. Similar to Achenbach and colleagues' 1987 meta-analysis, correlations between mother and teacher reports were small to moderate. Further, only mother reports were significant predictors of clinician ratings of children, although this finding may be partially due to the inclusion of parents in the clinical diagnostic process. Results suggest that it is important for researchers to take reporter differences into consideration when planning clinical treatments.

Mentor(s): Dr. Julie Dunsmore

Matthew W. Johnson

“Faithless Wars”: War and Realism in Don Juan

According to conventional markers, Lord Byron was a symbol of privilege—white, aristocratic, and male—but he grew up in adversity: abandoned by his father, raised by an impoverished mother, physically handicapped. Sympathetic to those outside privileged circles, Byron develops a relatable narrator through down-to-earth, insistently humanist interjections. Despite the poem’s apparent nonchalance, Byron presents a serious criticism of English society and tyrannical authority. He discusses the morality of war in fullest detail through his realistic depiction of the Siege of Ismail. Byron wrote that Don Juan “is the most moral of poems” (Letters and Journals IV 279). Byron also states in Don Juan, “this poem will become a moral model” (Don Juan 219). Byron recognizes that war is a necessary part of humanity, as seen in his support of the Greek War of Independence, but his moral is that war should not be waged for power, land, or heroism. He recognizes the high human costs of war and compares heroes to butchers and mercenary soldiers. In this sense, he boldly fights against the privileged society and nationalistic impulse that raise up “heroes.” In a letter to his editor, Byron wrote: “It is necessary, in the present clash of philosophy and tyranny, to throw away the scabbard [...] the battle must be fought” (L&J VI 101). As I shall show, in Don Juan Byron fought that battle for ordinary people, the suffering citizens who bear the cost of all wars, in all places, at all times.

Mentor(s): Dr. Peter Graham

Derek J. Litvak

Falling Sacrifice to Despotism: Virginians Respond to the Intolerable Acts of 1774

The purpose of my project was to determine how Virginians responded to the Intolerable Acts of 1774, which were mostly aimed towards Boston and Massachusetts. While 1774 wasn't a year that independence was declared or shots were fired, it marks an important time of colonial unity. The backbone of my project were coal county and town resolutions passed during the summer of 1774 in response to the Intolerable Act. These resolutions allow a view into what many Virginian's were thinking during this time, and the evolution of their sentiments. Through these resolutions, and other documents of the time, I was able to construct a portrait of the Virginia colonial mindset towards these acts, and how they eventually affected the overall colonial response. My results showed that these acts worked, inadvertently, towards unifying colonists against British policy. Their responses during this year are critical in understanding the American Revolution, and I believe that this year, and its consequences, are not allotted enough attention. My project was aimed towards paying more attention to this year, and showing its importance.

Mentor(s): Peter Wallenstein

Jennifer L. Murphy

Breaking Gender Stereotypes and School Victimization

Youth violence is a serious problem within the United States school system. Prior research demonstrates that victimization is stratified by gender; however, few studies consider factors that may moderate this relationship. This study extends research on this topic by considering whether stereotypes moderate school victimization among female and male youth. It is also evident that youth who violate gender stereotypes may experience derogatory treatment. Therefore, this study explores whether violating gender stereotypes are associated with the victimization of females and males at school. The study will draw from the Education Longitudinal Study of 2002 to investigate if stereotypes linked to interscholastic sports and math related school activities moderate the relationship between violent, property, and bullying victimization at school for female and male youth. The implications for future research and policy implementation will be discussed.

Mentor(s): Dr. Anthony Peguero

Elizabeth L. Fread

The predator potential of the soldier beetle, *Chauliognathus marginatus*, in Virginia agro-ecosystems.

Chelsea P. Giles

Peace Out Media Company Business Proposal

In the 21st century, relationships, connections, media platforms and organization's profiles are launched and thrive in a virtual world. Non-governmental organizations (NGOs) are on an edge in this technological age, because to successfully attract donors and sustain relations with them, it requires an accessible online interface. However, many of these development groups don't have access to such resources or aren't aware of how to best attract potential donors over the Internet. Meanwhile, due to the increasing demand of Corporate Social Responsibility (CSR), the business world is now, more than ever, pressured to build social relations with community groups at the development level. In effort to build a bridge between the two, I propose a media company that works both with NGOs and corporations to create and sustain partnerships between them. Through my research of peace journalism as well as field experience with Sarvodaya Shramadana in Sri Lanka, the idea for the Peace Out Media company was inspired and proven as a need for future social work.

Mentor(s): Dr. Robert Siegle

Bradley Mount

The Impact of Investing in Internal Social Media Platforms

Internal social media platforms (SMP) are frequently utilized in the corporate environment, yet firms question their effectiveness. Due to increased pressure for collaborative environments, firms are focusing on developing internal tools for employee resource and knowledge sharing. These tools are aimed at promoting innovative thinking while utilizing software to facilitate idea formation. Investment in said platforms has potential to influence companies' innovation, but there is difficulty in quantifying the benefits derived from such investments. Since internal SMPs carry high development, implementation, and maintenance costs, it is useful to be able to determine if absorbing these costs will produce return. Our analysis will examine the prevalence of internal SMPs, the motives for their development and implementation, and how we may quantify the benefit derived from the use of such platforms. Our results will provide firms with increased insight into the use and effectiveness of internal social media platforms, which will aid in adoption, usage, and training decisions. Keywords: internal social media platforms, innovation, technology adoption and use

Mentor(s): Tabitha James

Allen E. Ross

Vegetation density as an indicator of territory selection and nest placement for song sparrows (*Melospiza melodia*)

Eduardo D. Villacis

[A Servqual Model for HealthCare: A Text Mining Approach](#)

Servqual is a popular model used in the literature to examine the customers' perception of the service quality of various industries. In this research, we will text mine a website that allows users to leave comments regarding their experience with various physicians in the United States. By applying analytical methods to the text generated by users on the feedback site, we will locate the dimensions of service that appear most frequently for physicians and their practices. Using our analysis, we will develop a customized service quality model for the healthcare industry and propose metrics to apply to healthcare rating sites to complement the typical rating system utilized.

Mentor(s): Tabitha James

LeAnn M. Rhodes¹, Sarah Emsley², Kathryn A. Shepard³, Kaitlin N. Winfree⁴

[An Exploration of Student Opinion regarding the Implementation of Gender Neutral Housing on the Virginia Tech campus](#)

Gender Neutral Housing (GNH) is a college campus residential option in which members of the same sex are allowed to share the same dormitory room. GNH is a new policy occurring in college housing development, and recent studies have shown that GNH is mainly used as an option for married couples and transgendered students. The goal of this study is to determine whether Virginia Tech students would welcome GNH as a housing option for all students and whether students feel having the option would improve their college experience here at Virginia Tech. Data collection methods include a web-based survey for current undergraduate Virginia Tech students and two focus group sessions with the student LGBTQA organization. We hope that our findings will illuminate overall student perceptions of GNH at our university.

Mentor(s): Brandy S Faulkner Ph.D.

Jennifer N. Nester

Breaking Gender Stereotypes and School Victimization

Youth violence is a serious problem within the United States school system. Prior research demonstrates that victimization is stratified by gender; however, few studies consider factors that may moderate this relationship. This study extends research on this topic by considering whether stereotypes moderate school victimization among female and male youth. It is also evident that youth who violate gender stereotypes may experience derogatory treatment. Therefore, this study explores whether violating gender stereotypes are associated with the victimization of females and males at school. The study will draw from the Education Longitudinal Study of 2002 to investigate if stereotypes linked to interscholastic sports and math related school activities moderate the relationship between violent, property, and bullying victimization at school for female and male youth. The implications for future research and policy implementation will be discussed.

Mentor(s): Lindsay Kahle

Kevin Porter

Elaboration Likelihood and Peripheral Influences: Chris Christie's 2013 Reelection Campaign

After studying the Elaboration Likelihood Model, I applied the model to the television ads produced during the 2013 reelection campaign for New Jersey Governor Chris Christie. The content analysis focused on how the campaign ads utilized central processing and peripheral processing cues, and if one type of cue was favored. I studied this campaign to gain a better understanding of how politicians gain credibility in the 21st century. I analyzed all television commercials released by the Christie for NJ campaign on their YouTube channel. These television commercials varied between 30 seconds and 1 minute in length. Other videos released on the campaign's YouTube channel were not included in this analysis. The analysis found that Christie for NJ favored peripheral processing cues in the ads, but not to the point of over-reliance.

Mentor(s): Beth Waggenpack

Nneka D. Sobers

Lakeview: Study on Crime

The Lakeview: Study on Crime is a research and action study that provides an opportunity to investigate, analyze, and explore the Lakeview community through geographic data and design thinking. The study focuses on linking unconnected existing patterns among typology, traffic, and community behavior while uncovering the unseen correlation of crime in order to better understand neighborhood crime. By blurring the lines of the design and technical data, the blending of cross-discipline tools, such as census data, maps, graphs and photography, will illustrate the narrative behind the linked patterns that occur within the Lakeview community. Analyzing technical data provides a quantitative understanding of existing geographic trends, while design reinforces a qualitative perspective. By simultaneously representing quantitative and qualitative data through visuals, unseen connections become more apparent. Such a transdiscipline approach synthesizes an understanding of patterns and networks among seemingly disparate information. By breaking down local crime patterns through connecting disparate geographic data, the patterns revealed through the simultaneous overlay of data became the foundation to crime disruption through community scale design interventions. Through the study, Urban Mapping transcends the function of a tool and becomes a universal language that reshapes general understandings in order to reimagine greater possibilities within the Lakeview community.

Mentor(s): Andrew Balster

Delia S. Tomlinson

Backed Into a Corner: Women in the Black Panther Party

The paper seeks to answer the question, “what was the role of women in the Black Panther Party, and how did their involvement conflate with the women’s liberation movement?” Women’s involvement in the Party has long been overlooked, and my paper draws attention to both misconceptions about the Black Panthers as well as crucial female participation. I used primary sources such as interviews and news articles accompanied with scholarly articles to construct the narrative leading to my conclusion: while women in the Party largely performed traditionally feminine, assistance-based tasks, many eventually rose into leadership positions. As the women’s liberation movement of the time was largely white and middle class, the Black Panther Party focused on black women’s specific needs, providing an alternative form of liberation.

Mentor(s): Mark Barrow

Sydney J. Vaile

The Shackles Have Fallen: An Evaluation of Richmond as the Harlem of the South

My project, “The Shackles Have Fallen: An Evaluation of Richmond as the Harlem of the South,” assessed how the New Negro Movement in the early twentieth century influenced the rise of black cultural identity. Two factors, black entrepreneurship and artistic entertainment in Jackson Ward, greatly contributed to the relocation of black cultural expansion from Harlem, New York to Richmond, Virginia. The research completed on Richmond’s role in the New Negro Movement fits into the broader study of the 1920s Harlem Renaissance and the tactics the black community used to assert themselves in a world of white supremacy. To get a complete understanding of the information, I traveled back home to Richmond to walk around and see the historical sites discussed in my paper. Resources that provided useful insight to my topic included biographies, encyclopedias, and newspaper articles. I concluded that Virginia-born Bill Bojangles Robinson and Maggie Lena Walker allowed Richmond to flourish as the Harlem of the South through their hard work, dedication, and talents that brought other notable black artists to the South. African Americans made significant success in establishing an identity as “New Negroes.”

Mentor(s): Peter Wallenstein

Special Performance Linux Laptop Orchestra

Mason A. Gottschalk

Chris W. Kurlmel

Alexander D. Little

Erik R. Rodriguez

Mark C. Soler

Sadah Proctor

Paul Sathre

**ORAL
PRESENTATION
SESSION 2
2:30-4:00**

Daniel Alley¹, James B. Gregory²

Silvopasture Systems

The goal of our Silvopasture Systems project is to create a research based silvopasture system in an actual production environment that will allow measurable data to be collected over the years. Once implemented, this system is intended to be used as an educational tool for surrounding producers. Our system is designed to study several different factors: 1) relationships between the types of trees used in the system 2) effects of different spacing distances between planted trees (both on tree growth and forage production) 3) different methods of fence-out strategies (in relation to cost vs. potential forage value). The design of this system has been a combination of on-site physical measurements and observations mixed with GIS lab tools and computerized design programs. First, we established the best size and location for the plots based on the existing landscape. We then worked with this to create a layout for the trees that allows for testing of desired factors. Finally, we developed a fencing system to allow for livestock production to continue. The actual implication of this system will begin in late March 2014.

Mentor(s): Joe Guthrie

Dylan Cooper

The First Flush: Studying Soil Nutrient Dynamics in a Restored Floodplain

A common practice of stream restoration is to reconnect a stream with its natural floodplain. Floodplain reconnection is done to achieve such benefits as reduced flood stage, nutrient removal, sediment deposition, and protection of the stream channel topography. However, few studies have quantified the benefits of a floodplain. Prior to this study, an abandoned remnant channel on the floodplain (along the 2nd-order stream Stroubles Creek in Blacksburg, VA) was experimentally flooded. Spring and summer results have shown that a “first flush,” or release during initial wetting, of DOC, NH₄, and SRP occurred during the floods. A monthly soil sampling campaign from the study site was conducted to determine how much of the floodplain soil carbon, nitrogen, and phosphorous are “flushable.” For each month, ten samples are collected. A “gentle” soil extraction using deionized water is performed. Initial results have shown that the soil nutrient levels have a similar seasonal pattern to the soil temperature and groundwater levels within the floodplain. We expect to measure seasonal changes in extractable nutrients in response to vegetation growth/death cycles through August 2015. This is an ongoing investigation in the Stroubles Floodplain Study (NSF) within the StREAM Lab at Virginia Tech.

Mentor(s): Durelle Scott

Jonathan E. Hittel

Manufacturing Topographically Engineered Surfaces for Antifouling Applications

Adhesion of human pathogens to surfaces can lead to formation of microbial societies known as biofilms. Biofilm formation is a major factor that contributes to microbial infections from medical surfaces. It is particularly pernicious for users of catheters, contact lenses, and other such implantable devices. Once biofilms form, they are more resistant to antibiotics and to other common methods of mitigating infections. Therefore it is an urgent need to prevent the initial adhesion of bacteria to a surface. We present a manufacturing method for producing surfaces that can reduce the available binding sites for bacteria and thereby can potentially delay bacterial adhesion. The manufacturing method suggests a two step procedure. In the first step, microscopic spheres are hexagonally-packed atop a surface, thereby controlling the surface topography. We then produce a negative mold composed of PDMS (polydimethylsiloxane) that exhibits inverse hemispherical surface nanotopography. We will discuss both the effect of manufacturing parameters on the process and the optimum manufacturing procedure.

Mentor(s): William Ducker

Tyler L. Weiglein

Floodplain soil greenhouse gas emissions: variation due to altered rainfall magnitude and temporal distribution

Current global climate models predict climate change caused by anthropogenic greenhouse gas emissions will result in altered precipitation regimes by the end of the 21st century. In the mid-Atlantic region, mean annual rainfall is not predicted to change considerably, but it is predicted that there will be larger rainfall events followed by longer dry periods. Although many studies have investigated the effect of higher temperatures on greenhouse gas emissions from soils, which play a significant role in the global flux of three major greenhouse gases (CO₂, CH₄, and N₂O), there has been less focus on how soil-atmosphere gas exchange will be affected by precipitation regime changes. This project investigates the effects of the temporal distribution of simulated precipitation on greenhouse gas emissions from soil cores from a low-order floodplain. Soil cores were collected from the StREAM Lab along Stroubles Creek, placed in soil chambers, and divided into three groups. Each group received the same total amount of water over seven days, but the temporal distribution of the application of water was altered to simulate one large storm event, three medium storm events, or seven small storm events. Concentrations of CO₂, CH₄, and N₂O in the chamber headspace were measured using a cavity ring-down spectrometer and used to calculate hourly flux from the soil cores.

Moderator(s): Durelle Scott

Alexzander Williams

Computer Vision

The goal of my professors' research was in essence to help computers see what we see. To help computers see different emotions, different motions, and more importantly to deconstruct an image to remove the distracting parts of the image and focus on the key components of it. The goal of my part of the research was to find the real life images for each verb so my professors solution could be tested. My method was quite tedious for the requirements for the image were it had to contain only two people, chosen from off the web, clearly depict the verb, and many more. I am not aware of the outcome of my project.

Mentor(s): Devi Parikh

Kathleen E. Baugh

The Gang Crisis in El Salvador

This paper analyzes the gang crisis in El Salvador, and how the policies enacted against such gangs in the US affects the gang crisis in Latin America. This paper observes the relationship, or lack thereof between these transnational gangs, and how their relationships have evolved over the years. This paper also explores the recent truce between the Salvadoran regime and leaders of the main gangs in El Salvador. The outcome of the research is that firm-handed legislation against gangs in El Salvador does not seem to be as effective as legislation which attempts to create opportunities for young people outside of gangs.

Mentor(s): Dr. Jason Weidner

Earl K. Cherry Jr.

Tales from Fincastle Hall: How a Community College Grew Up.

This paper shows the people and events that gave rise to the Virginia Community College System, and uses Wytheville Community College as an example. It begins in the era of “Massive Resistance” and school desegregation and how a transfer-only satellite branch of a major university that had its own exclusivity issues, became a comprehensive community college of the modern era. It looks at the contributions to that end of two brothers, both educators, from Clay Co., Ga., and is the result of research drawn from a number of books and first-hand accounts of people from the early days of the VCCS and WCC, and original documents from the birth of the system. The findings are that the VCCS did rise to become the first educational opportunity in the history of the state open to anyone. Race, gender, and economy had long kept higher education out of reach for many, but the VCCS allowed anyone and everyone to enroll. The men from Georgia did carry their educational ideas to Virginia, and used them to bring individual enrichment and community development to areas that needed it. This project is significant for several reasons. First and foremost, the VCCS has become such a part of the community that the timing and historical significance of its inception are often overlooked. Perhaps the most important reason is that it shows the contributions of two brothers, raised poor in 1920’s southern Georgia, and the impact they had on Virginia education of the present day.

Mentor(s): Peter Wallenstein

Kaitlyn E. Fitzgerald

Society and Knowledge: Through the Eyes of French Science Fiction

Mentor(s): Alexander Dickow

Sawsene Nejjar

Islamists' Reaction(s) to the Spread of Globalization/Westernization in the Islamic World and the Threat it Constitutes

The topic of my research paper deals with the “Islamists’ reaction(s) to the spread of Globalization/Westernization in the Islamic world.” What is meant by such a title is that the world is experiencing a sort of forced globalization, and in order to meet current standards, there is a global need to modernize. Thus, if we are to consider the assumption that Globalization is forced on some groups of individual, would it necessarily be accepted or wanted by everyone? Is it perceived some as Americanization of the world? That is, another means by which the most developed countries, especially the USA, showcase their strengths and hegemony. How does globalization help in maintaining the status-quo in the race for power between those who are “strong” and those who are not? The case study I have chosen to answer these questions and to demonstrate that globalization is not only forced, but also repudiated by certain groups, is the strong rejection that comes as a reaction of some Islamist/Islamic countries who refute this ‘invading global wave’ and even fight it. Throughout this paper, I will try to demonstrate the impact of this “forced globalization” over certain minorities and the consequences it generates.

Mentor(s): Theresa Gillian

Michelle M. Oh

The Technological Age of Hate: How does the type of website with hate content influence the level of self-esteem?

In this research, the relationship between the type of website with hate content and the level of self-esteem was explored. The Internet is the most popular method of communication; however, it is also a platform for many hate groups (Greenfield and Subrahmanyam 2008; Leets 2001). Many studies indicate exposure to hate materials results in negative consequences (Giles and Leets 1997; Leets 2007). Moreover, a number of studies reveal that the type of hate speech used and the motives for publishing online hate speech relates to the level of offensiveness of the statements (Cowan and Hodge 1996; Wojcieszak 2010). Because children are constantly exposed to the Internet, it is important to understand the potential effects of exposure to hate material. My primary research question is whether the type of website in which the hate content was accessed affects the respondent's level of self-esteem. Websites were categorized into three groups based on the audience they interact with; these categories include, private websites, public websites, and websites incorporating both elements. Data collected for this research were used to test the hypotheses that the type of website influences the level of self-esteem, and the type of website influences the level of self-esteem with age controlled. The results of the research will reveal whether this relationship exists.

Mentor(s): James Hawdon

Cassidy A. Turner

Containing the Female Threat in Smollett's *Humphry Clinker*: The Case of Tabitha Bramble

The goal of this research paper is to explore a woman's place in 18th century English society, reflected through Tobias Smollett's novel "Humphry Clinker", focusing on the main character's luxury-loving sister, Tabitha Bramble. This research paper explores how many scholars believe that marriage is necessary to redirect a woman's attention from luxury to a desire for having children. These ideas are put into historic context and explore the role of marriage in containing the female threat. The purpose of this paper is to explore if marriage is actually a mode to subdue women and redirect their thoughts to more domestic purposes. Methods of intense scholarly research were used to create this essay. I delved further in 18th century conduct books to understand how the ideal wife was supposed to act. The result of the project proved that marriage is a method to subdue a woman's desire for luxury, however it is imperative that an authoritative husband, suited to change the ways of violent females, be paired to unconventional women.

Mentor(s): Nancy Metz

Notes:

Notes:

