

2014 Zyzzogeton Poster Session Presenters Full Abstracts

Abdullahi, Sumaya

Benjamin L. Stottrup, PhD

Physics

Graphene oxide self-assembled films at the air-water interface

Langmuir monolayers at the air-water have been used for the self-assembly of monomolecular films for over a century. These films can then serve as a substrate for experiments or be deposited onto solid substrates for further characterization. We investigate the use of these interfaces to assemble micron size sheets of graphene oxide. Pressure-area isotherms, Brewster Angle, and Fluorescence Microscopy are used to characterize the films.

Alfuth, Eric

Benjamin L. Stottrup, PhD

Physics

Design and construction of Instrumentation for Langmuir Trough Automation

Langmuir film balance systems provide powerful insights into the workings of monomolecular films. Lateral organization, molecular affinities, and surface morphologies have all been studied by these devices at Augsburg College.

Al-Hajiby, Ibrahim M.

Matthew Maruggi, PhD

International Business and International Relations

Drone Strikes in the light of just war principles in Christianity and Islam

In my research, I am assessing the evolution of opinions of individual Muslim and Christian students about overseas drone strikes by the United States in light of their understanding of Muslim and Christian just war theories. Drone strikes involve unmanned aircrafts that target specific location with lethal force. Just war principles are guidelines and conditions of waging war. I am seeking answers to the following research questions: 1. What attitudes do individual Muslim and Christian students have about overseas drone strikes prior to the focus groups? 2. How are the opinions of individuals Muslim and Christian students affected by the knowledge of just war theory in both Islam and Christianity as discussed in the focus groups?

Ball, Emerson

Alex Iantaffi, PhD and Terry Lewis, PhD

Sociology

Cultural Competence in the Care of Transgender Patients

There are a number of barriers that weigh on transgender individuals within the health care system including health care providers who have received little or no training around transgender health care. Transgender individuals will undoubtedly encounter health care providers, particularly in seeking medical intervention, and at this point little is known about providers' training and level of understanding or competence around transgender health care. A number of studies have centered around current health care providers, but even less is known about medical students' and their training currently. There are a number of larger problematic societal forces influencing this, the largest being erasure or the making invisible of the transgender identity within medicine, research, and our broader society. Our study begins to examine the role of medical school and where there are gaps within medical students' training, as well as medical students' understandings and application of the concept of cultural competence to transgender health care.

Baltich, Zack
Carol Barnett, PhD
Music Performance
Idiomatic Percussion Music

I spent the ten weeks provided by URGO composing music for various forms of the percussion chamber ensemble. In the end I was able to write and notate 2 pieces. The first, entitled 40 Errors, is a duet for Marimba and a multi-percussion set-up (bass drum, 2 toms, 2 bongos, shaker, woodblock, and vibraphone). 40 Errors is an exploration of free form, as well as a reflection of my introduction to this style of creativity. The second piece, called Every Moving Part, is a trio for 2 percussionists and violin that is split into 3 contrasting movements. The percussionists each play vibraphone and a tom drum, while at the same time one plays glockenspiel, suspended cymbal and gong, and the other plays a set of seven tuned aluminum pipes. In writing this piece I was exploring the Ternary form, while experimenting with the unique combination of sound possibilities between metallic percussive instruments and violin. The final product of my work comes in the form of 2 fully notated musical scores, as well as parts and instructions for performers.

Bakkin, Marit; Johnson, Demond; Karl, McKay; McCarthy, Tanner
Nancy Steblay, PhD
Psychology
Lineup Evaluation: The Effects of Eyewitness Description

These two lab experiments examined the lineup quality of real police lineups. Experiment 1 established a significant bias against the suspect in the lineups. Experiment 2 is testing the extent to which this bias was produced by the police who were unable to match lineup members to the full description that was provided by the real witness to the crime. Both experiments used a mock witness procedure. The suspects were never revealed to the participants in the study.

Barrozo, Enrico
Matthew Beckman, PhD
Biology

Daphnia magna: an aquatic animal model to study dopaminergic signaling

Daphnia are freshwater crustaceans that have been used for decades in ecotoxicology research. Despite the important role that Daphnia has played in toxicological studies very little is known about the neurobiology of daphnids. Although comparatively few studies have been done on the Daphnia nervous system, many studies have investigated the swimming movements of the “water flea”. To characterize the effects on locomotor function of drugs in Daphnia a two-dimensional video imaging tool was developed. Due to the central role that dopamine plays in the movement of most animals, we sought to determine the role of dopamine in Daphnia movement by characterizing the effect of ten drugs that are agonists or antagonists of dopamine receptors. At one, two, and six hours of treatment with 10 μ M drug, the D1-like receptor agonist (A68930), the D2-like agonist (bromocriptine), and the D4-like receptor antagonist (L-745, 870) all decreased movement. Further, we determined behavioral IC₅₀ values at one hour of treatment for A68930 and bromocriptine to be 1.4 μ M and 5.0 μ M, respectively. These studies provide evidence that specific dopamine receptor signaling pathways are involved in the control of Daphnia swimming behavior. In summary, this work provides a method to study the neurochemical underpinnings of Daphnia swimming behavior.

Bednark, Julie

Kristen Chamberlain, PhD

Communication Studies

The Rhetoric of Religion: A Pentadic Analysis of Summit Ministries

This study was designed to examine the rhetorical choices of Summit Ministries, particularly as they relate to the group's understanding of identity and their functional role in society.

Berger, Katie

Adriane Brown, PhD and Douglas Green, PhD

Creative Writing

Transgender Lives Through Fiction

21st Century literature brings new visibility to transgender lives. The genre used most frequently to show trans people's stories is memoir, which has the disadvantage of exposing living individuals to the microscope of public scrutiny. Fictional narratives show the concerns of trans people in everyday lives, offering an alternative. The short stories “To the New World” by Ryka Aoki and “Ramona's Demons” by Susan Jane Bigelow, and the climactic chapters of the novel *The Bone Doll's Twin* by Flewelling employ themes of resistance, family, and transformation to give new patterns for transgender stories. These works point to an emerging canon of transgender literature and characters and make the case for interdisciplinary examination.

Bergstrand, David

David Crowe, PhD

Bio-psychology

Dynamic representation of visual information in the human brain

The evolution of neural signals over time is an often neglected aspect of neural processing. In the present study, we demonstrate that visual information is encoded in a temporally and spatially dynamic, rather than stationary, manner. We recorded magnetoencephalographic (MEG) data while subjects passively viewed visual cues. We then applied a pattern classification algorithm to the data in order to determine the degree to which cue type information varied with MEG data over time. The analysis showed evidence that patterns of activity across the brain representing the visual cue identity changed dramatically over time. Further, the speed with which these patterns changed was similar to the speed of dynamics seen in recent animal experiments. These findings confirm the presence of dynamics in the human brain during the processing of a constant visual stimulus.

Beyene, Eleni

Joan Kunz, PhD and Benjamin Stottrup, PhD

Chemistry

Systematic study of domain size distribution in phase separated cholesterol/ phospholipid Langmuir monolayers: line tension and kinetics

Oxysterols are oxidized derivatives of cholesterol that are produced by enzymatic and non-enzymatic processes. Increased oxysterol concentration has been correlated with cell age, membrane thinning in model systems, and several pathologies. It has been previously reported that mixed phospholipid monolayers containing 25-hydroxycholesterol exhibit anomalous phase behavior compared to similar cholesterol containing monolayers (Stottrup & Keller, BJ 2006). We present a systematic series of Langmuir monolayer and fluorescence microscopy studies which focus on the role of the positions of the hydroxyl moieties in difunctional oxysterols. The oxysterols 20, 22, 25, and 27 hydroxycholesterol were selected and mixed with DMPC for compositions from 10 – 90 mole percent oxysterol (increments of 10 percent were chosen). In all of these systems phase behavior was consistent with the 25-hydroxycholesterol/DPPC systems. Specifically, an upper and lower miscibility phase transition were observed in all systems for oxysterol concentrations less than 40 mole percent and a discontinuity in the pressure-area isotherm directly tracked the lower miscibility transition temperature. Likewise the area-expansion due to the presence of the oxysterols was confirmed. We present a model for oxysterol behavior within the lipid monolayers based on the presence and location of the two hydroxyl groups on the oxysterol. Consistent with our model we find the lower transition pressure increases with increasing distance between the two hydroxyl moieties. Pressure-area isotherms, fluorescence microscopy, analysis of domain size distribution, phase fraction measurements, isobaric cuts, and phase diagrams will be used to support our model of phospholipid/oxysterol interactions.

Blaquiere, Christa

Matthew Wentzel, PhD

Chemistry

A Guided-Inquiry Laboratory Experiment of a Green, Sustainable Triblock Copolymer

Recently, the ring-opening transesterification polymerization of δ -decalactone, a naturally occurring cyclic ester used by the food and flavor industry, has been incorporated into an introductory organic chemistry laboratory experiment. Formation of a block copolymer by chain extension with *L*-lactide illustrated the synthesis of a thermoplastic elastomer material made from all renewable resources with potentially biodegradable properties. To further engage the students in learning about polymers and how molecular structure affects mechanical properties, we investigated a student project approach to the experimental design. Variation of parameters such as the initiator used (monol, diol, triol, and tetraol), organocatalyst (diphenyl phosphate), and composition of each of the polymer blocks incorporated were examined. Trends related to physical properties characteristics that students could predict, compare and discuss were evaluated.

Chester, Tommy

Benjamin Stottrup, PhD

Physics

An investigation of microfilament formation from mono- and di-saccharides

The formation of micro-filaments is a topic of intense interest in nanotechnology and offers tremendous commercial opportunities applications. We describe our investigations of the formation of these micro-filaments from common mono- and di-saccharides. Scanning electron microscopy images and force profiles were taken to characterize the filaments. Cotton Candy samples will be provided for tasting.

Clark, Anika

William Capman, PhD

Biology

Patterns of Host Plant Resistance to the Parasitic Plant Cuscuta pentagona

Cuscuta pentagona (fiveangled dodder), is an obligate parasitic plant that infects mostly dicot plants. If the parasite is successful, it will make contact with its host and insert root-like haustoria in order to reach the host's vascular system. In the fall of 2008, five out of 24 *Abutilon theophrasti* (velvetleaf) individuals demonstrated inexplicable resistance to dodder's parasitism. When offspring of these resistant individuals and from several highly susceptible parents were grown in the summer of 2009, only one group of plants from one parent plant showed any signs of inherited resistance. Thus, the evidence of heritability seemed weak, but a complication was that the plants in the 2008 and 2009 studies were parasitized at different ages, and this might have caused different patterns of resistance to be seen in the offspring than in the parents. Our study focused on the possible effects of the age of plant parts on the susceptibility vs. resistance of offspring from the most susceptible and most resistant of the parent plants from the 2008 study. We found that dodder success was greater on the younger parts of offspring from both parent groups, but surprisingly, dodder was more successful on the offspring of the resistant parent.

Damjanovic, Sara

James Vela-McConnell, PhD

Sociology

Crisis in the Catholic Church: How Media Framing Influences Stigmatization

In a world where individuals can be connected with the click of a button, social media and online news sources become a way for others to instantly connect and discuss hot-button and controversial issues in today's world. Since 2002, the Catholic Church has received an enormous amount of media attention in regards to child sexual abuse committed by priests. Since then, it has become difficult to discuss the Catholic Church without making some kind of a reference to said abuse, thus creating a stigma on the Catholic Church. Erving Goffman identifies three types of stigma: abomination of the body, blemishes of individual character and tribal stigma (Goffman 1963). Blemishes of the individual character include being perceived as weak willed, having domineering or unnatural passions, expressing treacherous and rigid beliefs and being dishonest (1963). The purpose of this research is to analyze the second type of stigma—blemishes of the individual character— by looking at both secular and non-secular media sources and how each source stigmatizes the Catholic Church through the use of framing. Framing is used to explain what is going on and determines what is significant in a given event or experience. Events and experiences are framed in different ways, depending on the source. Frames are also socially shared and culture specific as well. By conducting a quantitative study of key words that appear in articles, followed by a qualitative study of comments made by users, I argue that the stigmatization of the Catholic Church in recent years varies among secular and non-secular news sources based on how the news sources frame the abuse.

Dasrath, Dereck

Mark Engebretson, PhD

Physics

Observations of dayside subauroral proton arcs and EMIC waves associated with increases in solar wind pressure

We present three examples of simultaneous subauroral proton arcs in the southern hemisphere near local noon recorded by the Far Ultraviolet (FUV) instrument on the Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) spacecraft and associated Pc1 waves recorded by ground based magnetometers at high latitude stations in Antarctica. Each event appeared to be triggered by a large increase in solar wind dynamic pressure during otherwise quiet geomagnetic conditions. The resulting compression of the dayside magnetosphere triggered ~0.5 Hz EMIC waves which were observed by search coil magnetometers at Halley and South Pole Station, Antarctica. These waves in turn caused energetic protons to precipitate into the southern high latitude ionosphere where they caused the appearance of an aurora several degrees of latitude equatorward of the steady southern auroral oval, and generated plasma irregularities which were detected by the Halley SuperDARN radar. Two additional proton arcs at similar latitude but in the dusk sector occurred shortly after the main phase of minor geomagnetic storms, and were not associated with solar wind pressure increases.

Davis, Nakisha; Lindemann, Ashley

Everen Guler, PhD

Psychology

Recollections of Early vs Late Memories in College Students

The purpose of the present study was to compare phenomenological qualities of early and later autobiographical memories. Participants were asked to report on their earliest memory and a recent memory. Using the autobiographical memory questionnaire, we asked 27 college students to rate their memories on various characteristics (e.g. visual content and emotion). Consistent with the hypothesis, the results showed recent memories were rated higher than earliest memories on degree of reliving the memory and sense of traveling back in time, recalling the spatial layout and setting, language content and coherence of the memory.

Devet, Chris; Moghadam, Katya; Waters, Ashley

Vivian Feng, PhD and Michael Wentzel, PhD

Chemistry

Amide Synthesis Using a Catalyzed Continuous Flow Process

A novel catalytic method for the conversion of nitriles and amines into amide products has been developed as a result of research efforts focused on the discovery of a more efficient, economical, and environmentally friendly method of amide synthesis. A pressurized lab scale continuous flow reactor system fitted with a catalyzed packed column and temperature control was successfully used to couple various amines and nitriles to form amide products. Both secondary and primary amide formation has been observed, the former as a result of nitrile coupling with primary amine and the latter as a product of the self-hydrolysis of the nitrile in the absence of amine. The reaction system has proven to be an effective and efficient method for amide synthesis.

Eldo, Emil

Joan Kunz, PhD and Benjamin L. Stottrup, PhD

Chemistry

Systematic study of domain size distribution in phase separated cholesterol/ phospholipid Langmuir monolayers: line tension and kinetics

Multicomponent phase separated phospholipid monolayer systems of a canonical cholesterol and DMPC (~30/70 mole percent) have been used to study several aspects of cholesterol/phospholipid interaction and phase behavior. Despite the successful characterization and theoretical approaches applied to these systems there are still important details of monolayer morphology that are not fully understood. Here, we address the role of transition kinetics on domain size distributions. For our experiments, three different barrier speeds were chosen (4, 40, 400 cm squared per minute) as the monolayer passed through the miscibility phase transition (8.4 mN/m transition pressure). Average domain size was observed to decrease as the barrier speed increased (transition rate). The detailed size distribution measurements also provide the opportunity to measure changes in phase fraction and size distribution with monolayer surface pressures (2, 4, and 6, mN/m). Careful study of factors influencing the size distribution of phase separated domains is particularly relevant to the recently proposed line tension measurement technique (Lee et al., vol. 108 pp. 9425, PNAS 2011). We have implemented this method for the monolayer system studied here. A comparison to previously implemented line tension measurements based on a Fourier analysis of boundary fluctuations approaches will be presented. Finally, a brief comparison on the role of dyes and dye quality will be presented. Comparison among one year old Texas Red and new Texas Red, showed an impact in the sizes of domains.

Ensz, Margo
Colin Irvine, PhD
English

Analyzing the Persistence of a Sense of Place

This project investigates the persistence, or lack thereof, in the twenty-first century of a sense of place and the extent to which this idea remains tied to identity. It examines how, in the age of pervasive, a-contextual technology and hyper-mobility, young adults think about who they are in relation to where they are from. Utilizing interdisciplinary methodologies common to American Studies and drawing on discourse analysis, life-story theory, and narrative dynamics, the research analyzed interviews from three states in the Midwest: Minnesota, Wisconsin, and South Dakota. In doing so, it asked these questions: Does where a person is "from" still have as powerful an impact on their identity as where they are now? Is place viewed as irrelevant to the current culture? What can a conversation reveal about an individual's identity in regards their current place? This research revealed the persistence of place as a part of identity construction among recent college graduates, many of whom face the prospect of moving to find employment, therefore these issues become tangled in identity, culture, and sense of place.

Feder, Chelsey
Kathy Swanson, PhD
Secondary Education and English

Implementing the Common Core Nonfiction Reading Distribution in Minnesota High Schools

This research investigates the controversy surrounding the nonfiction reading distribution in the Common Core State English Language Arts (ELA) Standards, implemented by Minnesota in 2010. The Common Core suggests that by twelfth grade, 70 percent of students' reading should be nonfiction and 30 percent should be fiction. This suggestion has been disputed by experts such as Sandra Stotsky and Mark Bauerlein, by education journalists and bloggers, and by teachers from across the nation. However, Minnesota teachers have remained silent on the issue, and very few articles offer an inside look at how the emphasis on nonfiction is changing instruction. Because the Common Core tests will not come out until the 2014-2015 school year, the results cannot be analyzed to see how nonfiction is affecting students' reading abilities. Therefore, instead of looking at how nonfiction reading is affecting students' reading skills according to test scores, this research focuses on teachers' perspectives and their experiences from working with nonfiction in order to expose the disconnect between top down education policy making and what is really happening in local Minneapolis and St. Paul area high schools. This paper compares the Common Core architects' vision for nonfiction in the ELA classroom and in the schools with the media coverage, expert opinions, and teachers' experiences to reveal how to enhance instruction and reform at the local level, as well as to make a call for more research in the area of nonfiction and high school literacy instruction.

Fowler, David

Matthew Beckman, PhD

Biology

Methods and Tools for Studying Heart Development and Function in Daphnia magna

Cardiovascular disease is the current leading cause of death in the United States. Studying gene expression in cardiac muscle will likely provide insight into normal heart function. We wished to study the developmental expression and function of the protein CapZ-beta, a key component of muscle, in the simple model organism *Daphnia magna*. We have cloned portions of the CapZ-beta gene from *D. magna* and made double stranded RNA (dsRNA) for injecting into embryos to achieve knockdown of this gene by RNA interference (RNAi). To monitor the effect of CapZ-beta on heart function I have developed a method of measuring heart rate of a daphnid using video microscopy. The tool we have developed allows for measurement of the mean heart rate of *D. magna* adults under test conditions. Future studies will utilize the tools we have developed to knock down CapZ-beta expression by RNAi to study the role of CapZ-beta in *Daphnia* heart function.

Gezegehn, Kirubel

Benjamin L. Stottrup, PhD

Physics

Biophysics Lab Design Driven by Responsive Inquiry

We have piloted a biophysics lab course focused on the semester-long development of specific skills and experimental techniques which can then be used to address a relevant biophysical question. This approach has been implemented successfully in Augsburg's modern physics course where students cycled through different stations to establish dexterity in sample preparation and the use of materials characterization tools (including Scanning Electron and Atomic Force Microscopes). Students are then asked to propose their own experiment and hypothesis using the tools they have developed. The modern physics lab was focused on the quality and physical characteristics of super-hydrophobic surfaces fabricated with nano-imprint lithography. Similarly in the biophysics course, students cycled through four stations in biophysics lab that were designed to build proficiency in optical tweezers, liposome synthesis and characterization, and fluorescence microscopy and fluorescence spectroscopy. A potential application of these tools is the development of a high-throughput liposome loading platform. We believe that this approach allows for more substantial skill development, exposure to research and experimental techniques, and an increased familiarity to inquiry based research when compared to conventional lab design approaches. Finally, we address the potential for implementation of this model at other institutions.

Giddings, Cedith

Matthew Beckman, PhD

Biology

Light Microscopic Study of Eye Development in D.magna

Daphnia magna is a freshwater micro-crustacean that is a well-established model organism in biological research. Daphnia eye development is distinct in that two pigmented spots within the eye field fuse to form a cyclopean eye. An understanding of the mechanism of normal cyclopean eye development may aid in understanding altered development that is seen in human mid-line defects such as cleft-palate (Solomon, et. al. J Med Genet 2012;49:473-479). This research focused on defining the time-course of eye development in Daphnia. Daphnia embryos were cultured and microscopic images of embryos were analyzed with Image J which permitted for measurement of the distance between the two eye spots as they migrated medially to form the cyclopean eye. Developing embryos were also stained with fluorescent lectins in an attempt to find a marker for migrating cells. Although a lectin was not identified which reliably stained eye structures in Daphnia, embryos were successfully stained with methylene blue to aid in visualizing eye spot migration. The data demonstrate a linear relationship between developing eye spot diameter and both age and body length. In summary, these studies provide a method for staining and quantifying eye development in Daphnia.

Glimer, Emily; Reese, Laura; Windhorst, Lauren

Ben Denking, PhD

Psychology

Eyewitness Memory Procedures in Older Adulthood

Compared to young adults, older adults tend to show poorer recall of details surrounding a criminal event and perpetrator. Older adults tend to perform with reduced lineup identification accuracy than younger adults. Older adults also tend to have a higher "choosing" rate than younger adults, regardless of if the culprit is present or absent in the actual lineup. Thus, the problem is how to reduce false alarms from older eyewitnesses. This study aims to examine a number of variables within eight separate conditions. The research compares the responses of younger and older adults and their correct identification rate of a suspect in a staged "car-jacking" video. The first variable was age. Participants were either young (between 18-30 years of age), or older (60-80 years of age). Secondly, the participants viewed either a sequential lineup (images were viewed one at a time) or simultaneous lineup (images were viewed six at once). The third factor was whether the guilty culprit was actually absent or present in that lineup.

Ginter, Casey
Nancy Steblay, PhD
Psychology and Law
Eye Tracking and Police Lineups: The Effect of the Appearance Change Instruction

The appearance change instruction (ACI) is used by police departments nationally during eyewitness identifications. The ACI informs the eyewitness that the appearance of the culprit may have changed since the time of the crime. This study examines the effect the ACI has on participants who view a short video of a robbery. After viewing the video, participants-witnesses were either given an ACI or not and then shown one of three photos (culprit, culprit with appearance change, and innocent suspect). The witness made a decision as to whether or not the photo shown was the culprit in the video. The ACI produced an increase in correct identification decisions, primarily through a decrease in false identifications of the innocent suspect. The ACI may lead to an increased attention on the photo and greater decision accuracy.

Grafelman, Michelle
Matthew Beckman, PhD
Biology
The Role of the Hedgehog Gene in Daphnia magna Eye Development

During *Daphnia magna* eye development, a rare phenomenon occurs: two distinct eye spots, which are present in early-stage embryos, gradually fuse into one cyclopic eye by the time the daphnids reach adulthood. Though these small, freshwater crustaceans are a great model organism to study, this eye fusion event has not been awarded much attention in the past. Therefore, the genes involved in this process have not been identified. This study is focused on the role of the Hedgehog gene, a gene known to be involved in eye and spinal cord development in other organisms. The corresponding human gene, Sonic hedgehog, when mutated, can cause a disorder called holoprosencephaly (HPE), which can be manifested in a variety of midline defects, including cleft palate, the presence of a single central incisor, or, in extreme cases, cyclopia. It is currently not known whether *Daphnia* and its Hedgehog gene is a good model for studying this human condition. However, when the amino acid sequences of these genes' corresponding proteins were aligned and compared, a high percent identity was recognized between them, especially in the functional, N-terminal domain of the proteins. In situ hybridization and RNA interference experiments are underway to aide in the continued learning of this gene's role in *D. magna* eye development.

Grant, Benjamin
Benjamin L. Stottrup, PhD
Physics
Functional Mesoporous Silica Nanoparticles for the Selective Sequestration of Fatty Acids

The use of seed and/or algae oil is an attractive alternative feedstock for the biofuels industry. Currently methods to sequester free fatty acids (FFAs) are expensive, but using mesoporous silica nanoparticles may provide a fast, efficient, and cost effective way to selectively sequester the FFAs from feedstock oils. The goal of this project is to illuminate why functionalized mesoporous silica nanoparticles are able to sequester certain FFAs. Presented here is the parameterization and molecular dynamics (MD) simulations of various common saturated, monounsaturated, and polyunsaturated FFAs. Density functional theory (B3LYP/CBSB7) has been used to optimize and calculate the charge distribution, which was transformed into a classical point charge representation using the restrained electrostatic potential method (RESP). Modifying the general amber force field (GAFF) with the new charge distribution has enabled the simulations of pure FFAs, FFAs in hexane, and a silicon dioxide porous material with a FFA-hexane mixture. The resulting densities for the pure FFAs are found to be in excellent agreement (within 5%) with the experiment values. Simulations have also elucidated the structural and energetic properties of pure FFAs, and FFAs in hexane in addition to insights on the sequestering capability of unmodified silicon dioxide pores.

Hassan, Sawiya
Ankita Deka, PhD
Psychology

Exploring Health Barriers for Somali Immigrant Women Seeking HealthCare

There are significant healthcare disparities for racial and ethnic minority groups as compared to European Americans in the United States. These healthcare discrepancies impact individuals from minority groups disproportionately leading to adverse consequences in diseases outcomes, death and disability. (Andrulis, et al.2013). One definition of health care disparity is defined by the (NIH) National Institute of Health services research information centrals as “differences in access to or availability of facilities and services”. In the wake of this phenomenon several researchers have conducted studies in an effort to determine root causes for these discrepancies; ultimately they have determined that there are many barriers to accessing quality healthcare services. In particular, cultural and communication barriers, lack of access, unavailability of highly trained interpreters and lack of information about available services.

Hernandez-Balderrama, Luis H.
Benjamin L. Stottrup, PhD
Physics

Comparison of Cholesterol and 25-Hydroxy-cholesterol Behavior in Phase Separated Langmuir Monolayers at the Air-Water Interface.

Langmuir monolayer studies combined with fluorescence microscopy provide powerful insights into the phase behavior of cholesterol and cholesterol analog / phospholipid monolayer systems at the air-water interface. These studies have established the ability of cholesterol and similar molecules to condense the average molecular area of the monolayer as well as to laterally organize the monolayer into sterol rich and sterol poor regions. Oxysterols are one class of molecules that deserve particular attention due to the functioning of mammalian cells for both their metabolic and physical effects on the membrane. We systematically explore the miscibility of 25-hydroxycholesterol (25OH) with 1,2-Dimyristoyl-*sn*-glycero-3-phosphocholine (DMPC) in lipid monolayers. Like cholesterol, the 25OH/DMPC system exhibits phase separation, however due to the difunctional nature of 25OH there are significant differences. Using fluorescence microscopy and traditional Langmuir techniques we investigate the average molecular packing and micron scale phase separation within a 25OH/phospholipid monolayer. We present evidence of a different path to domain formation, the expansion of the monolayer induced by 25OH, and a model to describe our results. We conclude that 25OH and other similar hydroxysterols provide a useful and independent test of cholesterol's behavior within monolayer leaflets.

Hildebrandt, Daniel
Sandra Olmsted, PhD
Biology and Chemistry

Combating Antibiotic Resistance with Dextran-Linked Drugs

The research being conducted involves organic chemistry synthesis as well as techniques and concepts of microbiology. Dextran was attempted to be conjugated to Vancomycin through carbonate ester spacers linked using ‘click’ chemistry to create a biocompatible antibiotic delivery mechanism. The compound synthesized will then be used to experiment on the effectiveness of inhibition on the resistant bacterial strains. Since the microbes are not susceptible to Vancomycin under normal circumstances, we hypothesized that the presence of the dextran would improve uptake of the drug. With success this change in the delivery mechanism may be applied to several antibiotics against resistant bacteria, thus making the drug useful again.

Hommerding, Jilian; Zhao, David

Mark Engebretson, PhD

Physics

A multi-year study of the correlation between traveling convection vortices and Pc1 wave bursts

Space physics research has shown that an extended region of magnetic fields, which holds a thin ionized gas called plasma, encloses the Earth. Variations in the solar wind create disturbances called traveling convection vortices (TCVs) and Pc1 wave bursts on the dayside of the magnetosphere around noon, recorded by ground-based magnetometers. TCVs are solitary pulses with 1-2 oscillations and frequency of about 5 milli Hz. Pc1 wave bursts have a higher frequency, 200-2000 times greater than the TCV frequency. Previous studies found that these phenomena sometimes occur simultaneously, prompting this study. TCVs and Pc1 wave bursts were identified at stations in northern Canada and Svalbard between the years of 2008 and 2012. It was found that TCVs and Pc1 bursts have only a modest correlation with each other. When TCVs were identified first, about 22% of them had a matching Pc1 wave burst. When Pc1 wave bursts were identified first, about 27% of them had a matching TCV.

Kalina, Amber

Mary Lowe, PhD

Youth and Family Ministry

Broken Bodies: Ours and Jesus' in Contemporary Disability Theology

What constitutes as a 'normal' body has long been defined on the basis of two criteria: able-bodiedness and whether a body looks normal. In the Christian tradition, disabled bodies have been defined as impure, sinful, and/or demon-possessed. This has often led to the exclusion of persons with disabilities in Christian Churches, which should welcome all persons regardless of their embodiment. Thankfully, theologians of disability have been working hard in the past fifty years to formulate alternative ways to understand disability, sin, wholeness, and even God in order to honor the bodies and experiences of persons with disabilities. With this research, we can begin to create the inclusive, accessible Church that Jesus Christ intended his Body to be in the world.

Kang, Heechan

Pavel Belik, PhD

Mathematics and Computer Science

Modeling Tornado Vortices

Wurman studied the velocity and vorticity distribution. Our goal was to use our 2D model of vortices and study the velocity and vorticity distribution.

Keratithamkul, Khomson

Vivian Feng, PhD

Chemistry and Mathematics

Surface modification and degradation characterization of dissolvable 3-D electrospun mesoporous silica nanofibers for tissue engineering.

We examined the surface properties and the dissolution behavior of electrospun mesoporous silica nanofibers (MSNF) as potential degradable scaffolding material for primary hippocampal neuron cell growth and differentiation. Two different surface functionalization chemicals, poly-D-lysine (PDL) and 3-aminopropyltriethoxysilane (APTS), produced bioactive surfaces that promote cell adhesion. Surface amino group densities were assessed using fluorescence microscopy with fluorescein isothiocyanate (FITC) as fluorescent probes. PDL-modified surfaces resulted in higher amino group densities than those modified with APTS. Silica dissolution of the various modified versus nonmodified MSNF were assessed by both silicomolybdate blue method tests and ICP-OES. SEM image analysis during the dissolution process confirms there to be continuous dissolution during which fibers collapse, flatten, and eventually fully dissolve into solution. Interactions between MSNF and neurons were also examined using SEM and ICP-OES to better understand the effect of cell attachment and growth on MSNF dissolution.

Maru, Mahelet

Ronald Fedie, PhD

Chemistry

Thermodynamics of A super Absorbent Polymer: Sodium Polyacrylate

Sodium Polyacrylate is a remarkably water-absorbent polymer commonly found in diapers, eye contacts, and even potting soil. When water is mixed with this polyelectrolyte, it has an increase of 250x its dry volume. Cross-links between polymer chains prevent the polymer from dissolving in water and other liquids. When the chains become hydrated, the cross links prevent them from moving around randomly. This decrease in random movement or entropy produces a stiff gel. This summer, research was conducted in the hopes of using the properties of this polymer for pill encapsulations. However, in conducting this research it was discovered that the stiff gel of this polymer in fact releases heat, resulting in exothermic enthalpy. The ability to produce heat without the use of electricity or burning fuels could be useful in creating various consumer products and conducting medical procedures. In the cosmetic and medical industries, the ability to heat substances, and keep them warm is desired when other means of heating are not available. In future works, Sodium Polyacrylate could be used to study diffusion for pharmaceutical applications.

Mattson, Ben

Ben Denking, PhD

Psychology

Victim Blame, Gender and Sexual Orientation

The purpose of this study is to examine factors that lead others to blame rape and sexual assault victims for their own victimization. Prior research has found a positive correlation between prejudiced beliefs and acceptance of rape myths which are beliefs that shift blame from the perpetrator onto the rape victim. This study compares attributions of blame towards male victims and female victims to see whether the victim's gender, sexual orientation, or the perpetrator's sex are significant predictors of blame. In this study participants are being asked to read a fictitious scenario that depicts a rape and then are asked to attribute blame. The survey also includes scales measuring sexism (hostile and benevolent), homophobia, and rape myth acceptance. While prior studies have investigated individual factors such as victim gender and victim sexual orientation, or victim gender and the sex of the perpetrator, none have focused on all three of these factors in a single study on adult survivors of rape and sexual assault.

Mebler, Niki

Evren Guler, PhD
Psychology
WAM Study

This study examined whether an individual's working memory capacity (WMC) is related to their ability to retrieve autobiographical memories. We hypothesized that those with a higher WMC would also have a higher ability to recall specific autobiographical events. Participants were given two tests on the computer. One tested their autobiographical memory by giving them a cue word and asking them to come up with a specific memory relating to that word and describe it with as much detail as possible. The other tested their WMC using an Operation Span task in which they solved a series of math problems while also trying to remember a presented series of letters. Participants were divided into high WMC and low WMC groups based on median split. An independent samples t-test showed that there was no significant difference between the two groups in how well they recalled autobiographical memories. These findings are not consistent with previous research and potential reasons for this will be discussed.

Myers, Christopher
David Crowe, PhD
Bio-psychology
Dynamic representation of visual information in the human brain

The evolution of neural signals over time is an often neglected aspect of neural processing. In the present study, we demonstrate that visual information is encoded in a temporally and spatially dynamic, rather than stationary, manner. We recorded magnetoencephalographic (MEG) data while subjects passively viewed visual cues. We then applied a pattern classification algorithm to the data in order to determine the degree to which cue type information varied with MEG data over time. The analysis showed evidence that patterns of activity across the brain representing the visual cue identity changed dramatically over time. Further, the speed with which these patterns changed was similar to the speed of dynamics seen in recent animal experiments. These findings confirm the presence of dynamics in the human brain during the processing of a constant visual stimulus.

Moloney, Lily
Michael Wentzel, PhD
Chemistry
A Bulky Silane Protecting Group for the Synthesis and Functionalization of Amines

Benzylamine was protected by using a bulky but reactive silane protecting group, tri-tert-butoxychlorosilane. The protected benzylamine was then able to be functionalized once through a bimolecular nucleophilic substitution reaction. After functionalization, deprotection could occur in an acidic environment and another bimolecular nucleophilic substitution reaction could functionalize the secondary amine to produce a tri-functional tertiary amine. The product of each step is identified and characterized by ¹H NMR and GC/MS spectra.

Nehiba, Cody

Stella Hofrenning, PhD
Economics
Factors Influencing Student Loan Default

As of 2008 over 7 million students in the United States looked to the Federal Student Loan Program to aid them in financing their higher educations, and that number rises every year. The three year cohort default rate on these Federal Student Loans is also rising. In the first quarter of 2012 about 10.6% of student loans were at least 30 days past due (Brooks, Edmiston, Sheelwich, 2012.) Students who default on their loans cause the government to incur large losses. In an attempt to recoup some of these losses Congress passed a bill in July, 2013 that ties the interest rates of student loans to a market based rate slightly higher than what the government must pay to finance the loans (JEC, 2013.) Using logistic regression analysis I will determine the major factors that point to whether or not a student will default on their loan. Specifically I'm interested in the relationship between interest rates and the probability of default. A correlation of higher interest rates and student default could result in the federal government spending even more on student loans.

Nguyen, Thu
Keith Gilsdorf, PhD
Marketing
The Relationship between Intercollegiate Sports Participation and Academic Performance

Our research studies the relationship between athletic participation and academic performance using academic year 2012-2013 data from Augsburg College. Focusing on academic achievement is a way to examine whether or not intercollegiate sports participation could be considered a form of human capital investment. Using annual grade point average as a proxy, we do not find evidence that sports participation lowers academic performance. Even more interesting, there is some statistical evidence suggesting that athletes may perform better than non-athletes at college level, depending on model specification.

Okeke, Promise
Benjamin L. Stottrup, PhD
Biology
Irreversible Heme Crystal Inhibition By Amodiaquine And Pyronaridine: A Means To Circumvent Malaria Drug Resistance

We propose B cells as alternative antigen presenting cells for cellular vaccines. Advantages of B cells over DCs include their ability to exponentially expand, their relative high abundance in blood and their persistence in vivo. Disadvantages of B cells are their low uptake of non-BCR-recognized antigens and low co-stimulatory molecule expression when resting. We address these limitations by direct cytosolic delivery of protein by microfluidics-based mechanical deformation and receptor-mediated cellular activation, respectively.

Ortiz, Magaly

Markus Fuehrer, PhD and Joseph Towle, PhD
Philosophy and Spanish
Sor Juana Inés de la Cruz and the Ideal Authentic Individual

This investigation focuses on the idea of the “authentic individual” as developed by Sor Juana Inés de la Cruz (1648-1695). I looked at selected poems of Sor Juana. Additionally, in order to carry out the investigation, I employ Ludwig Wittgenstein’s theory of family resemblances to develop a grammar of authenticity. I maintain that Sor Juana, through her works, while encouraging authentic living, expresses a concern for its restriction, and develops a theory of what it means to live as an authentic individual amidst social norms and authorities that foster and incite inauthenticity. I conclude that Sor Juana herself attempted to practice such a lifestyle. The terms engaño (deception) and desengaño (unveil), along with their cognates, are studied as they were used in her time by Sor Juana, her contemporaries and in the Spanish literary tradition in order to see how they form a family of terms that reveal her theory of authenticity.

Osip, Daniel
Anthony Clapp, PhD
Exercise Science
Examination of Resting heart rate and VO2 in Division III Collegiate Soccer Players

Resting heart rate (RHR) is widely considered to be an excellent indicator of health and longevity. The crude risk of sudden death increases linearly with the level of resting heart rate and relative risk in sedentary men, upwards of four-fold for those with a resting heart rate greater than 75 beats/min. However, the inverse relationship has not been well established in the literature, and a theoretically stronger case may be made for RHR and the relationship with maximal oxygen consumption (VO2 max). Purpose: The purpose of this investigation is to examine the relationship between RHR and VO2max in division III collegiate athletes. Methods: Twelve collegiate soccer players from a NCAA division III program participated in this investigation (age=20.2 ± 1.3 yr., ht. = 174.0± 7.6 cm, wt. = 71.7 ± 9.1 kg). All athletes had been collecting their resting heart rates every morning for 80 consecutive days in the Fall of 2013. All subjects performed VO2max prediction assessments in both a laboratory and field setting (step and jog). Linear regression analysis was performed to examine the relationship between the mean RHR and mean VO2max. Results: The correlation between VO2max and RHR was -0.75. Conclusion: The results of this study suggest that a low RHR provides a strong indication of elevated VO2max in male division III collegiate soccer players. The significance of this relationship makes it possible to estimate with considerable accuracy the maximal oxygen consumption from only the resting heart rates. Because of the inverse relationship with maximal oxygen consumption, it can be assumed that the resting heart rate provides information reflecting the cardiovascular fitness of the athlete.

Petaisto, Susanna
Henry Yoon, PhD
Biopsychology
Can a Reduced P300 Brain Amplitude be a Biological Marker of ADHD and Other Childhood Disruptive Disorders?

Evolutionary theory suggests that males should desire mates who are youthful, healthy and attractive. We first investigated the possibility that hair color and length might serve as signals to these underlying characteristics. We further explored the possibility that these differences in perceptions might be driven by increased or decreased attention to certain facial features. To test these hypotheses, we tracked men’s eye-movements while viewing images of women whose hair varied in length and color. Results generally indicate that both hair length and color can influence perceptions of desired characteristics and that darker hair tends to draw attention toward facial features.

Peterson, Anna

Merilee Klemp, PhD

Music

Gouging Machines: A History and Analysis

The oboe reed gouging machine is an important tool in making reeds. This paper focuses on the history of the machine and how the multiple popular American gougers have evolved from the 19th century design. Henri Brod invented the gouging machine in 1834 and it was taken to the Paris exhibition in 1839. There is a need for knowledge about gouging machines amongst oboists today. The gouging machines used and explored in this project were the Gilbert, Ross, Graf, Innoledy, Reeds n' Stuff, Ridilla, Jeanné and Harvard Double Reeds Machines. Reeds were made from each of the different gouges, rated and surveyed in 4 parameters to assess the qualities of the different gouges according to a study by Vernon Vernier and Llyod Shorter. These parameters were: response, tone, pitch stability and pitch. There was a noticeable difference between the single radius and the double radius machines with the double radius gouges scoring higher than then the single radius machines in most areas. Passing down the history and the significance of a good gouge is vital for understanding what makes a good oboe reed.

Peterson, Nathan

Matthew Haines, PhD

Education and Mathematics

Baseball Math: Developing a 7th Grade Math Investigation

Is baseball really a game of inches? The Detroit Tigers lost Game 2 of the 2013 American League Championship series when outfielder Torii Hunter missed catching a home run ball off the bat of David Ortiz. He missed catching the ball by only a few inches. Should he have been standing in a different location when Ortiz came to bat? / / This project was designed to investigate the placement of fielders given a hitter's consistencies. The mathematical exploration leads to the creation of an education module focusing on teaching and learning middle mathematics through the context of baseball.

Powell, Casey

Brian Steffenson, PhD

Biology

*Resistance to the Virulent *Cochliobolus sativus* Isolate ND4008 in Barley*

Six-rowed malting barley cultivars in the Upper Midwest have been bred for resistance to the devastating disease of spot blotch, caused by the ascomycetous fungus *Cochliobolus sativus*. This resistance has remained effective for over 40 years. However, a newly discovered isolate (ND4008) of *C. sativus* with virulence for these barley cultivars was discovered in North Dakota and has the potential to cause widespread damage to barley across the Upper Midwest region. Resistance to virulent isolate ND4008 was discovered in a wild barley accession (Mehola) from Israel. A backcross population involving Mehola and the six-rowed malting cultivar Rasmusson was developed and screened for reaction to isolate ND4008 to elucidate the genetics of resistance. Progeny segregated widely for reaction to isolate ND4008 ranging from 1 to 9 with an average of 4.25. Quantitative trait locus analysis based on 9,000 single nucleotide polymorphic markers revealed a significant association on chromosome 1H. Agronomically advanced progeny with the highest level of spot blotch resistance will be used as parents in the Minnesota Barley Improvement Program.

Procopio, Amanda

John W. Kiringe, PhD
Chemistry and Math
Water Quality Along the Kimana-Kikarangot River System

This study assessed the water quality and the state of the riparian environment along the Kimana-Kikarangot river system. The riparian environment was evaluated by assessing: human encroachment; vegetation cover; presence of soil erosion; and turbidity of the water source. The results of the study show that the riparian environment was degraded severely, because of the low vegetation cover and turbidity of the water, and through human activities, such as an increase in agriculture and waste disposal. This has in turn increased the amount of water-borne diseases in the community. Information about local perceptions of the water resource was gathered through household and key informant interviews and was analyzed. The health impacts on water sources have stemmed from improper management, education on conservation issues, and enforcement of policies listed in the Water Act of 2002 within the local communities. These impacts have led to a decrease in the overall quality of both the water resource and riparian zone, which has had great impacts on the local water users. Recommendation for improvement of water quality and public awareness are here in discussed.

Rutten, Emily
Danielle E. McCarthy, PhD
Psychology and Biopsychology
Relations Between Impulsiveness and Smoking Dependence in Adult Smokers Trying to Quit

Objective: The purpose of this study was to investigate how smoking and impulsiveness are linked. Design: Personality and behavioral measures were used to examine longitudinal data and multiple measures of tobacco dependence. Participants: The sample included 109 adults (18 years old or older) daily smokers from central New Jersey. Measurement: Three subscales of the Barratt Impulsiveness Scale (attention impulsiveness, motor impulsiveness, and non-planning impulsiveness), as well as a Delay discounting task and Go/no go task were used to measure participants' impulsiveness. Measures of smoking dependence included the Fagerström Test of Nicotine Dependence and the Wisconsin Inventory of Smoking Dependence Motives cue reactivity, loss of control, and automaticity subscales. Results: Those with impulsive decisions had lower odds of being abstinent at the end of the study. However, a disregard for planning was unexpectedly associated with lesser tendency to smoke in the presence of smoking cues. Conclusions: Additional research is needed to identify whether impulsiveness is more important earlier in the quit process.

Roisen, Nate
Matthew Engebretson, PhD
Physics
Electromagnetic Ion Cyclotron Waves Observed at Geosynchronous Orbit and on the Ground at Subauroral Latitudes

The magnetosphere is a large region surrounding the Earth that is generated by its magnetic field and is filled with a thin, electrically charged gas (plasma). The magnetosphere shields the Earth from energetic particles and harmful radiation carried by the solar wind. The resulting energy exchange creates shock waves that travel down the magnetic field toward Earth. Electromagnetic ion cyclotron (EMIC) waves can be measured as wave bursts, categorized by frequency. I analyzed these wave bursts, which were collected and recorded by magnetic field sensors on satellites and at high latitude ground stations from August 2012-July 2013. This is a continued study with purpose to record activity of these events to investigate their relation to solar activity, time of day, and whether there is correlation at different locations. It was found that activity was greatest at the satellite orbit in the afternoon, while the ground station activity was evenly distributed over all times of the day. I also worked on the MACCS (Magnetometer Array for Cusp and Cleft Studies) project, an Augsburg operated project which controls an array of magnetometers, specialized GPS receivers, and computer-based recording systems at eight locations across Arctic.

I ensured that the data retrieval process was running smoothly by communicating with the stations and correcting timing errors in the data.

Romskog, Anna
Philip Adamo, PhD
History

Augsburg @ 150: Augsburg and the World, a Two Way Street

The relationship between Augsburg, Minneapolis, and the wider world, is one that has grown over time as Augsburg moved from a seminary that trained pastors and missionaries, where the main focus was on religious conversion in foreign countries, to a service-oriented college, where helping out our neighbors in immediate surroundings and the world is more important than conversion of beliefs. This transition was slow and took place over the school's 150 years. The creation of a service-based learning environment was a joint effort between the faculty, staff, and students of Augsburg and its neighbors; the Cedar-Riverside neighborhood, greater Minneapolis, and study abroad sites across the globe.

Rose, Amir
David Murr, PhD
Physics

Optimizing An Open Source Radar Design For Measuring Lake Depth

Within the past five years in Minnesota alone, there were a total of 18 ice-related fatalities from individuals driving cars, snowmobiles, or walking over unstable lake ice. Current methods of determining ice thickness rely on individuals who volunteer to make the measurements using basic tools. To assist in this situation, my colleagues and I are working to create a light-weight, economical, potentially air-borne thickness measuring device. Our motivation for conducting this research is to improve efficiency in measuring ice depth, while simultaneously making the process safer. An existing open source radar project from MIT was adapted and optimized to measure lake depth, with the ultimate goal of measuring the thickness of ice covering a lake. We intend to fly the radar over a lake via high-altitude balloon. This requires optimizing both the electronics and physical structure of the design to reduce the mass and size. We will first present results of the optimization: the electronics portion of the original radar was miniaturized from a solder-less breadboard to a printed circuit board (PCB), and the unit housing was re-designed using a computer-aided design (CAD) program, and fabricated using a computer numerical control (CNC) machine to reduce the size of the structural housing. The overall mass of the unit was reduced by approximately 75 percent. We will then present measurements made with the radar under multiple lab controlled situations. The unit is currently scheduled to be flown over a Minnesota lake in mid-August 2013. Future work with this research will explore the design requirements for measuring the thickness of ice covering a lake.

Safi, Amineh
Diane Pike, PhD
Psychology and Political Science
Racializing Islam: Newspaper Portrayal of Crime Involving Muslims and Islam

This descriptive content analysis examines how crimes involving Muslims are portrayed in the Minneapolis Star Tribune and the St. Paul Pioneer Press. Data were collected from the Lexis Nexis online data base for the dates January 1, 2009 through June 20, 2013. The quantitative results indicate that terrorism crimes totaled 51% of the crimes with which the terms Muslims and Islam were associated. A significant relationship was found between the newspaper and the selection criteria used to include an article in the sample (Muslim, Islam, both, and Somali). Selection criteria were significantly related to the type of crime (violent, property, terrorism or other). Fifty-four percent of the time that both search terms "Islam" and "Muslim" were included, the crime committed was terrorism. When the term "Islam" was used alone, 68% of the crimes committed were also terrorism. For non-terrorist crimes, 74% of the time the term "Muslim" was used alone. Similar to the findings reported by Frost (2008) regarding the British press, the way in which Muslims are portrayed in these two newspapers suggests the racialization of Islam because it more directly links religiosity with terrorist behavior

Shaut, Devin
Anthony Clapp, PhD
Exercise Science
Relationship of Body Composition Scores to Home-to-First Sprint Times

Softball is a sport that demands strength, speed, and power to be successful. The most common explosive movement in softball is the home-to-first sprint (HTFS). Subjects participated in a standard off-season strength training program to enhance HTFS. The purpose of this study was to assess changes in adipose tissue and changes in sprint performance in DIII softball players. Twelve softball players participated in an 8-week strength program. Pre and post test body composition and pre and post test 40-yd sprint times were measured. Average HTFS did not change significantly, despite the modest improvements in lean muscle tissue as reflected in the body composition scores.

Sheller, Ryan
Anthony Clapp, PhD
HPE

Smith, Alexandra
Philip Adamo, PhD
Art History, Religion, History
Augsburg @ 150

This research was part of a larger project: an institutional history of Augsburg College for its upcoming sesquicentennial celebration in 2019, conceived and edited by history professor Phil Adamo. The book is meant to follow in the footsteps of Carl Chrislock's *From Fjord to Free-way: 100 Years, Augsburg College*, which was published in 1969 for the celebration of Augsburg's centennial. As with Chrislock's book, we proposed this to be serious history, which interprets the sources critically, and locates events at the College in the larger, higher educational and social context. It was not our intent to create a "puff piece" that promotes the College uncritically. We also set out to write a history with the broadest possible audience in mind, in particular alumni and future generations of Augsburg students, faculty, and staff, who deserve a work on the College at 150 with as much gravitas as Chrislock's work on the College at 100. My contribution to this project was to research the history of Augsburg College's relations to the Lutheran Church and the Lutheran faith; especially in the Norwegian Lutheran tradition. My findings showed how these relations evolved throughout the course of the history of the institution.

Sneed, Raesean
Matthew Beckman, PhD
Biology

Environmental Temperatures Affect Daphnia Swimming Forces

Daphnia magna are keystone species in freshwater lakes and ponds that are consumed by fish and are important to the health of freshwater bodies. Their ability to evade predation is central to their survival. Daphnids are also an emerging model organism in toxicology research. The major aim of this study is to understand the role that environmental temperature plays in affecting the maximum power stroke exerted by the second antennae—the mechanism for swimming in daphnids. In order to measure the power stroke, daphnids were tethered to custom-made, calibrated force transducers composed of fine plastic filaments embedded in glass micropipettes held by a positioner. Two perspective video imaging was carried out to measure the micro-newton forces associated with swimming. Two populations of *Daphnia magna* were studied: one group was raised at 20°C and a second group was reared at 28°C. The data reveal an increase in the maximum power-stroke among the daphnids raised at 28°C compared to 20°C. Further studies aim to delineate any neurochemical changes involved in this adaptation. These studies are providing insight into the role that environmental temperature plays in shaping the motor control and physiology of swimming behavior in *Daphnia*, a new model organism.

Storlie, Katie
Audrey Lensmire, PhD
Elementary Education

The Descriptive Review of the Child: Understanding and Implementing the Prospect School Method

In 1965, a small group of teachers, compelled by the work of philosopher John Dewey founded The Prospect School. This school provided a unique way for students to learn and grow. Their growth was documented in a narrative of interests. This study investigated how the descriptive process, taken from The Prospect School could educate teacher candidates to best support student learning. This research was used to develop a template that outlined the descriptive process that provides a holistic view of a student. As a result of this research teacher candidates learned how to see a student holistically, implementing that into curriculum writing and the understanding of student work.

Summers, Vernantius
Stella Hofrenning, PhD
Economics

The Effects of Minimum Wage Hikes on Poverty Rates... Do Increases in Minimum Wages Actually Reduce Poverty?

With President Obama calling upon Congress to raise the federal minimum wage from its current level of \$7.25/hr. to \$10.10/hr. by 2015 (Office of the Press Secretary, 2013); the overall ability of minimum wage hikes to reduce poverty comes into question. Data from the US Census was used to run ordinary least squares regressions. Initial regression analyses on wage, population and poverty found that an increase in the minimum wage slightly reduced poverty for certain demographic groups. However, the impact of minimum wage increases upon poverty as a whole was insignificant and continues to be an insufficient solution to assisting the poorest Americans. Our results suggested that the Earned Income Tax Credit (EITC) program was a much more superior policy solution in the reduction of poverty.

Swanson, Benjamin
Michael Wentzel, PhD
Chemistry

A Guided-Inquiry Laboratory Experiment of a Green, Sustainable Triblock Copolymer

Carbon-hydrogen activation and functionalization is a topic that has generated much interest in organic synthesis, especially in recent years¹. The ability to break and utilize such a classically inert, stable bond opens up many new possibilities for effective and efficient synthesis projects. By starting with electron-rich directing groups such as aryl imines, the possibility of using low-cost, highly available, environmentally friendly iron catalysts to activate and functionalize the ortho-position of aryl compounds was explored.

Terry, Courtney
James Vela-McConnell, PhD
Sociology

Image Restoration: The Catholic Church's Responses to Stigmatization

How has the Catholic Church responded to stigmatization in the wake of the clergy sex abuse scandal? The numerous negative media stories about the scandal attack the Church's reputation and discredit its identity as a moral institution. Goffman has noted that stigmatized individuals try to protect their identities through impression management. The purpose of this study is to examine the methods by which the Catholic Church has attempted to cope with its stigmatized identity. We analyzed the press coverage of two sources, one secular, one religious, in the wake of the scandals: the Washington Post and America magazine, ranging from 2000 to present day. The comments on these press articles were also examined and provided valuable feedback to the Catholic Church's attempts at image restoration. Benoit's theory of image restoration was utilized as a framework to identify the Church's strategies for coping with the stigmatization following the abuse scandal. The Catholic Church has chosen strategies within Benoit's categories of denial, evading of responsibility, reducing offensiveness, corrective action, and mortification to respond to the public outrage over the abuse scandal. The apparent effectiveness of these attempts by the Catholic Church to reclaim its spoiled identity will be examined.

Vahle, Sadie
Philip Adamo, PhD
Economics

Augsburg Academics: Keeping Tradition Alive in Modern Times

This research was part of a larger project: an institutional history of Augsburg College for its upcoming sesquicentennial celebration in 2019, conceived and edited by history professor Phil Adamo. The book is meant to follow in the footsteps of Carl Chrislock's *From Fjord to Free-way: 100 Years, Augsburg College*, which was published in 1969 for the celebration of Augsburg's centennial. As with Chrislock's book, we proposed this to be serious history, which interprets the sources critically, and locates events at the College in the larger, higher educational and social context. It was not our intent to create a "puff piece" that promotes the College uncritically. We also set out to write a history with the broadest possible audience in mind, in particular alumni and future generations of Augsburg students, faculty, and staff, who deserve a work on the College at 150 with as much gravitas as Chrislock's work on the College at 100. My contribution involved researching the academic history of Augsburg College by studying the institution's growth from a divinity school to a fully functioning college offering professional programs, liberal arts studies and graduate programs.

Walsh, Andrew; Winegar, Emma
Pavel Belik, PhD
Mathematics
Analysis of Laguerre's Method

Previous analyses of Laguerre's root-finding method have provided results on the convergence and properties of this popular method when applied to the polynomials $p(z) = z^n - 1$, where n is a natural number. While these analyses appear to provide a fairly complete picture, careful study of the results reveals that more can be said. We provide additional analytical, computational, and graphical results, details, and insights. We raise and summarize questions that still need to be answered.

Waytashek, Wesley
Anthony Clapp, PhD
Exercise Science
Effects of a 5-week sports specific dynamic resistance training program NCAA Division III Collegiate football players

Football is a game that is dominated by speed and it has been reported that acceleration and sprinting are major discriminators between elite and sub elite athletes. PURPOSE: The purpose of this study is to examine sprint performance and the benefits of adding a five week sport specific dynamic resistance training program in addition to the players sprint training program, in collegiate football division III defensive backs. METHODS: Twenty collegiate football players from a NCAA division III program implemented a 5-week sprint training program, ten (age= 21.6 ± 1.1 yr., ht. = 187.0 ± 8.1 cm, wt. = 87.8 ± 9.0 kg) incorporated a dynamic resistance program (DR) with their high speed sprint training, and ten (age= 21.9 ± 1.2 yr., ht. = 189.0 ± 8.6 cm, wt. = 86.2 ± 9.9 kg) participated in just the high speed treadmill (HST) only. All subjects were randomly assigned to training groups and all had over 4 years of previous experience of playing football. Pre and post training 40-yd sprint testing was measured by the Brower TC-laser timing system. All subjects performed treadmill running in short bursts at high speeds with intermittent rest for a total time of 8 minutes, three times a week, for 5 weeks. Additionally, the DR group used K-bands, secured at the top of the knees for a series of 12 minutes of exercises. Repeated measures ANOVA were used to determine differences across time and between groups. RESULTS: Following the 5-week training period, there were no significant differences in forty-yard dash times from pre to post nor between the two groups ($p > 0.05$). Average 40-yd dash score for the HST improved from $5.15 \pm .22$ to $5.14 \pm .31$ ($p = 0.59$). Average 40-yd dash score for the DR improved from $5.17 \pm .72$ to $5.13 \pm .55$ ($p = 0.41$). CONCLUSION: The results of this 5-week sport specific training did not produce significant improvements in sprint times however, select individuals showed improvement. Additional research is necessary to examine periodization and if adding additional training techniques could significantly improve sprint performance

Windhorst, Lauren
Ben Denking, PhD
Psychology and Religion
Age-Related Positivity Effect and the Perception of Time

Viewing emotional images has the potential to affect an individuals' perception of time. Using a temporal bisection task, older adults between 60-80 years of age were asked to categorize the amount of time an emotional picture was displayed as either 'long' or 'short.' They were first familiarized with images that were displayed for long (1600 milliseconds) or short (400 milliseconds) durations. Previous research related to this area of interest generally suggest older adults may indicate positive images as being presented for a 'long' time span (i.e., closer to 1600 ms than 400 ms), regardless of the actual presentation duration. This would suggest what is called an age-related positivity effect. This theory states that as we age time tends to be perceived as taking longer during positive events. The current study compares data from younger adults between the ages of 18-30 years, and older adults between 60 – 80 years. Older adults displayed an overall tendency to perceive images as being presented for a longer time span than younger adults.

Zank, Allison
Benjamin L. Stottrup, PhD
Chemistry
Nanowire Fabrication and Industrial Research Observations

One of the major limiting factors in exploring the uses of nanotechnology is the heavy expense of nonmaterial. Recognizing this as a major problem, local physician and entrepreneur, Ken Rosenblum, began to explore novel and inexpensive methods for nanomaterials production and in 2012 funded NanoMotif. As a devoted friend of Augsburg College, Dr. Rosenblum saw an opportunity to support Augsburg's STEM programming by offering an internship while also furthering his dream to significantly contribute to science. In my position as the summer intern, I studied the rate of nickel nanowire formation while changing certain variables.