

# TRiO

**McNair Scholars Program**  
ST. OLAF COLLEGE

Summer Research 2010  
**ABSTRACT BOOKLET**



[HTTP://WWW.STOLAF.EDU/SERVICES/MCNAIR](http://www.stolaf.edu/services/mcnair)



The TRiO McNair Scholars Program is a graduate school preparatory program funded by the U.S. Department of Education and sponsored by St. Olaf College. The TRiO McNair Scholars Program was founded in 1989 and initiated at St. Olaf College in 2007. This program identifies students who have high academic potential and meet eligibility criteria. The goal of the program is to support Scholars' aspirations and preparation for graduate study. The program is further described on our website: <http://www.stolaf.edu/services/mcnair>. For a student perspective on the TRiO McNair program check out this article: <http://www.stolaf.edu/magazine/2010fall/OTH.pdf>

### **Program Goals**

The federal goal of the TRiO McNair Scholars Program is to increase the rate of doctoral program applications, degree attainment and participation in the professoriate by low-income, first-generation college students who are underrepresented in graduate programs. The TRiO McNair Scholars Program provides opportunities for participants to develop graduate school level academic skills necessary to gain admission to and successfully complete graduate study.

### **Participants**

Annually, 27 undergraduates who are interested in pursuing graduate studies and careers as college faculty participate in the St. Olaf McNair Scholars Program.

- Two-thirds of the participants meet federal income guidelines and are from a family in which neither parent graduated from a four-year postsecondary educational institution.
- One third of the participants may be from groups that are traditionally underrepresented in graduate studies and the professoriate.
- Participants have completed at least 2 courses in their area of research interest and have a GPA of 2.75 or higher.

### **Services**

McNair Scholars receive assistance with:

- Internships - summer sophomore year to explore viable fields of academic study
- Research Writing Course - summer junior year to learn how to write an effective proposal, conduct research and present results
- Research experience - summer junior year. Participants are paired with a faculty mentor whose research interests match those of the McNair Scholar.
- Preparation for graduate school admissions tests
- Graduate school applications/completion assistance
- Financial aid, fellowship and scholarship applications/completion assistance

### **Highlights**

During the summer of 2010, nine students were paired with a Faculty Mentor who guided their participation in an intensive summer research experience. Faculty Mentors provide information and guidance about graduate school and support the McNair Scholars as they make the transition to their post-baccalaureate education. Working with their Faculty Mentors, students produced professional quality posters and presented their research at the University of Minnesota TRiO McNair Scholars Summer Research Symposium. This Abstract Booklet highlights the St. Olaf TRiO McNair Scholars' summer research.



## *Biography of Ronald E. McNair*

*"Before you can make a dream come true, you must first have one."*

Dr. Ronald E. McNair

In 1986, in memory of Ronald Ervin McNair, the U.S. Congress established the Ronald E. McNair Post-Baccalaureate Achievement Program, commonly known as the McNair Scholars Program.

Dr. Ronald E. McNair's career as a scholar and astronaut stands as an inspiration to all McNair Program participants. Ronald McNair, the second African American to fly in space, was born on October 21, 1950 in Lake City, South Carolina.

He was named the valedictorian of his high school class and went on to graduate magna cum laude from North Carolina A&T State University.

In 1976 McNair completed all requirements for the Ph.D. degree in physics at the Massachusetts Institute of Technology (MIT) and joined the Hughes Research Laboratories in Malibu, California as a scientist.

Dr. McNair received multiple honorary doctorates of Science and of Law. In 1979 McNair was named Distinguished National Scientist by the National Society of Black Professional Engineers.

Ronald McNair completed the training and evaluation course for shuttle mission specialists and began working at the Shuttle Avionics Integration Laboratory and later worked for NASA. Even though Dr. McNair's awards and special recognitions are numerous, he will be best remembered as being among those who died on January 28, 1986 when the Space Shuttle Challenger exploded after the launch. Dr. Ronald E. McNair was a mission specialist on that flight.

His lifelong commitment to scholarship lives on in the McNair Scholars who are selected each year to participate in the many McNair Programs across the United States.

### **St. Olaf McNair Scholars Staff**

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Pictured from left to right: Heather Campbell, Janis Johnson, and Melissa Hinderscheit

**Faculty Mentor:** Dr. Sharon Lane-Getaz

Professor Sharon Lane-Getaz was born and raised in New Jersey. She went to Trenton State College for her B.A. in Mathematics and graduated Summa Cum Laude. In the fall of her senior year, she was a guest of the Harvard University graduate school of Applied Mathematics. After working for 18 years in industry, she received a Master of Arts degree in Teaching Mathematics from Hamline University and a Ph.D. in Statistics Education from the University of Minnesota. Her research interests include examining students' understanding, misunderstanding, and reasoning about *P*-values and statistical significance. She developed an instrument to measure students' understanding in order to explore the impact of various teaching methods on students' understanding. Her recent publications include: *Linking the randomization test to reasoning about P-values and statistical significance* to be presented at the 2010 International Conference on Teaching Statistics and *Introductory and intermediate students' understanding and misunderstanding of P-values and statistical significance* presented at the 2008 International Congress of Mathematical Education. She is most proud of a chapter published in the 2006 National Council of Teachers of Mathematics Yearbook: *What is statistical thinking and how is it developed?* Aside from her academic accomplishments, she is intensively involved in the community. She is a founding member of the *Winds of Change* created in 2007, which is a multi-racial group assisting churches, community groups and schools explore issues of race using meditation, skits, movement, music, and the circle process.



Professor Lane-Getaz and McNair Scholar, Quyen Duong

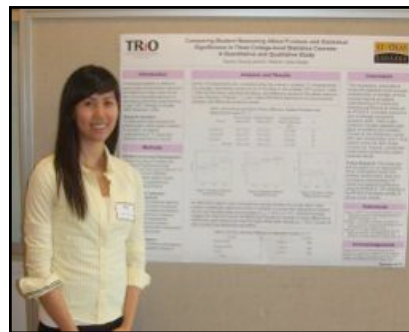
## Quyen Duong

**Title of Summer Research:**

Comparing Student Reasoning About P-values and Statistical Significance in Three College-level Statistics Courses: A Quantitative and Qualitative Study

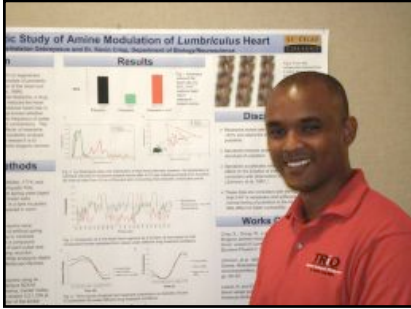
**Abstract:**

This quasi-experiment compares student learning outcomes from three college statistics courses to investigate whether greater randomization test content explains gains in conceptual understanding of inference, adjusting for prior knowledge and mathematical ability. Furthermore, the study extends and documents psychometric properties of the RPASS scale. The



RPASS is used to measure gains in student inferential understanding from pre-test to post-test. RPASS modifications for this study include rewording,

reordering, adding a new item and adding explanation fields to selected items. One of the two introductory courses examined has limited randomization content. The second introductory course emphasizes randomization, simulation, and P-values throughout. The third is a second statistics course that reviews randomization tests at the beginning. Quantitative and qualitative results are reported and directions for future research are discussed.



## Fisihatsion Gebreyesus

### Title of Research:

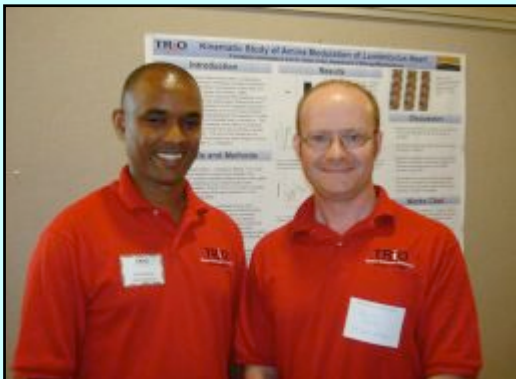
Kinematic Study of Amine Modulation of *Lumbriculus variegatus* Heart

### Abstract:

Little is known about the potential neural and hormonal control of pulsation in oligochaetes such as the blackworm, *Lumbriculus variegatus* (Muller, 1774). Pulsation is characterized by waves of peristaltic contraction traveling from the posterior to the anterior through each segment of the dorsal blood vessel, which is easily observed non-invasively through the transparent cuticle due to the red-pigmented blood within it. Previous research demonstrated a role for the biogenic amines maintaining a normal pulse rate, although the precise mechanisms by which the amines act on the circulatory system remain unknown (Crisp et al., 2010). This summer, we sought to elucidate the physiological role of the amines in the regulation of pulse rate by pharmacologically depleting the amines using the nonselective vesicular monoamine transport inhibitor, reserpine. We used videography on reserpine-treated and naïve worms to determine whether reserpine decreases pulse rate by lengthening cycle period, or decreasing the number of peristaltic waves initiated. We used the diameter of the dorsal blood vessel perpendicular to the long-axis of the worm as a proxy for muscle tension within a segment. Then, tables and graphs were constructed for statistical analysis in order to calculate the cycle period and contraction duty cycle. By comparing the cyclic statistics of reserpine-treated, reserpine + serotonin, and naïve worms, we concluded that serotonin is necessary and sufficient for the normal timing of pulsation in the heart but has little effect on heart contractility.

### Faculty Mentor: Dr. Kevin Crisp

Dr. Kevin Crisp received a B.A. in Psychology with a concentration in Brain and Behavioral Science from Haverford College, and a Ph.D. in Neuroscience from the University of Minnesota. His area of expertise and special interests include invertebrate neurobiology, plasticity, motor control, computational modeling of neuronal biophysics and circuits, repair and regeneration of injured nervous tissue, and invertebrate circulatory system. He has published 13 articles, and has held a variety of positions in his field including as visiting assistant professor and a Post-Doctoral Fellow at the University of Minnesota, a Post-Doctoral researcher at the University of Miami, an instructor (summer undergraduate research program in neurobiology) at the UMN Itasca Field Station, and currently as an assistant professor at St. Olaf College. Professor Crisp provides advising and mentoring for the Pre-Med Club, Mayo Innovation Scholars Program, TRiO McNair Scholars, and additional research assistance to students in Bio 398 and summer research at St. Olaf College. Dr. Crisp also provides great service to the St. Olaf community as part of the institutional review board, TRiO Young Investigator's Program, health professional member, and many other student and faculty committees.



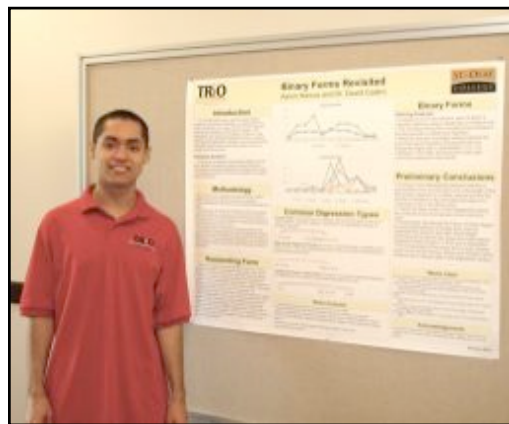
## Aaron Marcus

### Title of Research:

Binary Forms Revisited

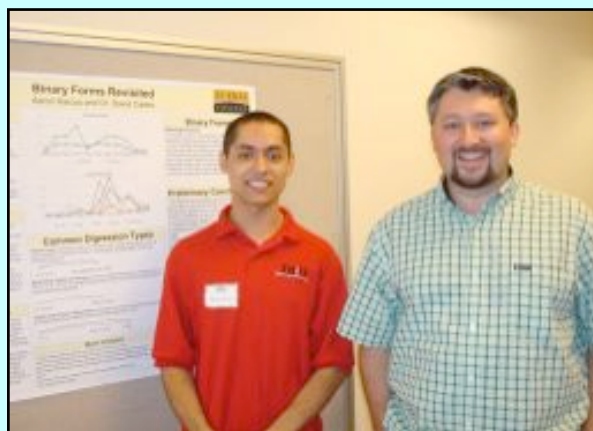
### Abstract:

The binary form is an ubiquitous term in the *formenlêre* (“study of musical form”) tradition, yet there has been no extensive research into the basis of its existence as a cross-genre convention. This study reexamines theories of binary form in order to understand how composers of the Eighteenth Century approached the fulfillment and frustration of binary form conventions. In order to test old theories and develop new ones, this study examines the melodic/motivic content, key areas, harmonic and cadential structure, and context of various two-reprise forms as they appear and function within minuet-trio, theme-and-variations, middle sections of rondo forms and other larger forms. In so doing, we have found three common digressional types, the pseudo presentation phrase, quasi-tight-knit theme group and quasi-tight-knit theme group with retransition. In addition, we have outlined three contextual backgrounds that are significant determinants in form-theoretical construction, historiographic ideologies, delimitation of material (composers included, timespans, etc.) and the pragmatic function of the theory. The paper will be divided into three sections. The first section gives a general introduction to the issues that have affected the neglect of binary form studies and gives a general outline of the paper. The second section deals with theories of form in general. The final section begins to develop a theory of binary form from the 912 musical samples analyzed.



### Faculty Mentor: Dr. David Castro

Assistant Professor, David Castro, received a B.Mus. in Music Education from Pacific Union College in 1998, a M.M. in Music Theory from the University of Arizona in 2000, and earned his Ph.D. in Music Theory at the University of Oregon in 2005. His doctoral dissertation, advised by Jack Boss, was titled, “Sonata Form in the Music of Dmitri Shostakovich.” In it, Castro examines Shostakovich’s adroit handling of a tonal form while maintaining his own unique post-tonal voice. Castro’s analyses also support hermeneutic interpretations when such readings are appropriate. Castro continues to examine Shostakovich’s music, having presented numerous papers at Music Theory conferences nationwide. He is also conducting research into the employment of Schenkerian notions of prolongation to examine Twentieth-century compositions, particularly for the works of those composers who employ neo-tonal compositional techniques, including non-functional triadic harmony and free counterpoint.



## Zach Hylton

**Title of Research:** Corruption and Consolidation of the Rule of Law in Bulgaria and Romania

**Abstract:**

In 2007, two of the poorest countries in Europe, Romania and Bulgaria, joined the European Union. With high levels of unemployment, corruption, and economic and political instability, these two post-socialist states hold a host of unsolved issues, which many consider evidence of the incompetence of their democracies and their ineligibility for EU accession. Communist rule left a legacy of neglect for rule of law. Without the boundaries of law, a strong underground economy, and control over public and private institutions, government officials practice corruption, and instigate the act within public institutions and the everyday lives of the public. Negative evaluations from international corruption and democracy surveys deem anti-corruption efforts by the EU and domestic governments unsuccessful. Critiquing the methodologies of the Bertelsmann Transformation Index (BTI), the Nations in Transit Survey (NIT), and the Corruption Perception Index (CPI), this essay emphasizes the inadequacy of corruption measurement and stresses the aberrancy of post-communist corruption. Using historical process and connecting recent literature regarding corruption in Romania and Bulgaria, corruption and democratic consolidation statuses are reevaluated to show Romania and Bulgaria's minimalist approaches to EU accession, and the ineffective institutions and policies of the EU. It suggests the EU must make specific institutional reforms to approach the high-level corruption, which exists within the entire supranational organization, and slows the delicate democratic process of these states.



**Faculty Mentor:** Dr. John Patrick Dale

Growing up in Anfield, Liverpool, Professor Dale experienced the aftermath of the Second World War first hand. Ingrained in his adolescent experience, the devastation and political turmoil of those years inspired Dale's political interest. After receiving his B.A. in International Relations at the University of Keele, in England, Dale went on to receive his M.A. in Soviet Politics and Government and Ph.D. in Government from the University Essex in England. Motivated by the political activism of the late 1960's, Dale saw himself as a political idealist. With great interest in Soviet politics, he recognized a strong dissonance between Classical Marxism and the current Soviet political situation and wanted to understand why this was so. This attraction, accompanied with an appreciation of learning and teaching and a desire to create and contribute to ideas, led Dale to pursue a career in academia. A distrust with both Western and Soviet governments further encouraged Dale's erudite interest with European Politics, and awarded him two British Council Scholarships to Moscow State University. He is the author of 14 publications including 10 reviews of literature and four other articles on Soviet Politics and Liberal Arts Education. Dale's research interests involve the politics of energy exploration in the arctic and the change of political identities in former Yugoslavian states. He teaches classes and leads an abroad program in Slovenia. His interests stretch even further to socio-economic status and class in state socialist societies, and he intends to publish literature on this topic in the future. While Dale understands the importance of race and ethnicity in social analysis, he would like to see socio-economic class incorporated into future analyses.



## Molly Ladwig

### Title of Research:

Learning Through a Lens: Enhancing Teen Parent Education through Videotaped Interactions



### Abstract:

Due to teen mothers' young age, lack of education, likelihood of living in poverty and single parent status, they are less likely to understand their child's developmental needs. Research has found that school-based interventions help teen mothers develop parenting skills (Williams & Sadler, 2001). At-home videotaping approaches allow parents of all ages to view and reflect on their behavior and their child's needs. This pilot project used the *Seeing Is Believing* videotaping approach for intervention learning and guided discussion (Erickson, Endersbe & Simon, (1999) with 8 Latina adolescent mothers and their 10 children enrolled in the Minneapolis Teen Pregnancy and Parenting Program (TAPPP). Play and reading interactions of mother-child dyads (video feedback) and teacher-child dyads (video modeling) were videotaped and replayed back to the mothers. By comparing mothers' responses to both intervention methods, we explored the potential effectiveness of using video at Minneapolis Teen Pregnancy and Parenting Program (TAPPP) to enhance parent-child interactions, communication, and learning. All parents enjoyed and learned from the videos, suggesting that video is a potentially valuable tool for teen parent education.

### Faculty Mentor: Dr. Dana Gross

Professor Dana Gross received her B.A. in Psychology from Smith College and her Ph.D. in Child Psychology from the University of Minnesota. Dana holds the rank of a full professor at St. Olaf College in the Psychology department and has been on the faculty at St. Olaf since 1988. Her research interests are in the field of Child Psychology with a particular focus on applied and community-based research. During the past seven years she has developed her interest in community-based research by working with community programs such as the Teen Pregnancy and Parenting Program (TAPPP) where she has studied child cognitive and language development, parent-child interaction, and early intervention. Another interest she has involves the study of play and variations of child practices cross-culturally. Dana is an advocate of community-based research because it focuses on applications of psychology and service learning. Throughout her career, Dana has published various articles, chapters, textbooks, and manuals. One of the publications she is most proud of is the Infancy textbook that she wrote titled *Infancy: Development from Birth to Age 3*.



Molly Ladwig and her parents at the St. Olaf and U of MN TRiO McNair Summer Research Symposium at the University of Minnesota.

# Anne LaRoche

## Title of Research:

Spirits and the Soul: College Parties and the Relationship of Fun and Happiness

## Abstract:

Literature on college parties focuses on the negative aspects of college parties associated with drinking and not on the fun that might increase happiness. The goals of this research are to investigate what students experience while pursuing fun at a college party and to explore connections between fun and the pursuit of happiness at a college party. The concept of fun, which has evolved into something related to but very different from happiness, has been left relatively untouched academically. Using established scholarship surrounding happiness, emerging histories of fun, and existing research of behavior in collegiate party atmospheres, it is possible to look more closely into what other opportunities parties may offer students after having “a little fun.” Student commentary and description of typical party activities suggest that students may attend parties for distraction/stress relief, self-exploration, to exchange peer support, and to strengthen ties with friends, classmates, and new people. Parties provide students with a place to relax and have fun after a week of classes, but parties also provide a space for self-development, to exchange peer support, and create and maintain lifelong relationships. These long-term benefits add to a person’s happiness. While students are having fun at parties, they may also be contributing to their happiness.



## Faculty Mentor: Dr. James Farrell

James Farrell graduated from Loyola University in Chicago, Illinois with a degree in Political Science, but he hasn't left his interests in college parties and fun behind him. Farrell went on to earn a Ph.D. in



American Culture from the University of Illinois in 1980 after crafting the degree himself. He is now a Professor at St. Olaf College teaching in the History, American Studies, and Environmental Studies departments.

Professor Farrell's interests in college consumer culture, the environment, and his creative insight into American culture led to a few years as the amazing "Doctor America," a radio personality on WCAL, a column in the Twin Cities' *Clergy Journal* since 1994, and most recently the publication of *One Nation Under Goods: Malls and the Seductions of American Shopping*. Farrell has met success in professorship as well, and has been awarded the Boldt Distinguished Teaching: Professor in the Humanities as well as the Gertrude Hilleboe Award for Faculty Involvement in Student Life 2009-2010.



**Faculty Mentor:** Dr. Devyani Chandran

Dr. Devyani Chandran grew up in a small town in India. She received her Bachelor's Degree in Political Science in 2001 and her Master's Degree in Social Work in 2003. At age 29, she graduated from the University of Kansas with a Ph.D. in Social Welfare. She is currently teaching at St. Olaf College as an Assistant Professor for the Social Work Department. Dr. Chandran's research interests are primarily with older adults in the fields of substance abuse and reactions to stigmas associated with HIV/AIDS. Her publications include HIV/AIDS Prevention in Adults over Fifty: A Strengths Approach to Social Cognitive Theory, Legal and Ethical Issues in Working with Older Adults: the Strengths Perspective, and Cultural Awareness in Aging: The Strengths Perspective. In addition, she has two articles that are currently in the process of being published. Besides teaching, researching, and writing, Dr. Chandran enjoys attending chapel because to her, it is a "welcoming spiritual space that allows for the school to come together as one." Within the next few years, she hopes to receive tenure so that she can become a permanent member of the St. Olaf faculty and staff.



Devyani Chandran and Pa Ku Lee visiting with Congressman Kline's aid, Chaz Johnson, at the 2010 UMN and St. Olaf TRiO McNair Summer Research Symposium.



**Pa Ku Lee**

**Title of Research:**

Aging Adults Living with HIV/AIDS: Strengths Displayed

**Abstract:**

Studies in the past on HIV/AIDS have primarily focused on younger adults and the fragility that is present in the face of social stereotypes and prejudices. As a result, older adults have been the least studied in the field to help prevent risky behaviors such as unprotected sex or the sharing of infected drug supplies. Using the strengths perspective that focuses on the positive qualities that an individual has, including skills, goals, resources, and social networks, the following research question was examined: What are the strength responses that older adults living with HIV/AIDS display in reaction to experiences of stigma and discrimination? The software *Atlas ti* was used to analyze the stigmas and the personal strengths that ten adults ages 50 and over from Kansas have revealed. These codes were then compared with stigmas and strengths from the literature review that was conducted. Major themes for stigmas include issues of confidentiality, ageism, stigma from family/friends, and workplace stigma. Major themes for strengths are support from family and friends, helping professionals, spirituality, and inner strengths. Based on the results of this study, the strengths perspective can allow for the individual to recognize what they do have so they can build on them. By concentrating on these characteristics, social workers can help the individual reduce negative feelings that can be both internal and external forces.



**Fatima Omar**

**Title of Research:**

Beyond Black: The Relationship between African-Americans and Somali College Students in the Twin Cities

**Abstract:**

This study investigates the relationship between African American and Somali college students in the Twin Cities of Minnesota, focusing on deep-rooted assumptions, cultural differences, and the building of networks of friendships that foster cultural integration. To do this, the research employed a multidisciplinary approach utilizing a privileged life history method. The researcher interviewed eighteen Somali and African American college students at the Minneapolis Community and Technical College, Augsburg College, and the University of Minnesota to determine their experiences, opinions, and assumptions. The results revealed a great deal of separation between the two groups. Interviewees noted that when groups interact, the interactions are limited due to negative generalizations especially in middle and high school years. Almost all interviewees said the relationship between the groups has improved, both over time and in the college setting. However, communication and building relationships that are meaningful and tolerant still require further attention. The African-Americans who participated in this study view Somalis through the lens of race, whereas the Somali participants perceive themselves through ethnicity, nationality, and religion (Islam). All interviewees recommended education as one of the most effective ways to encourage interactions and help change stereotypes.

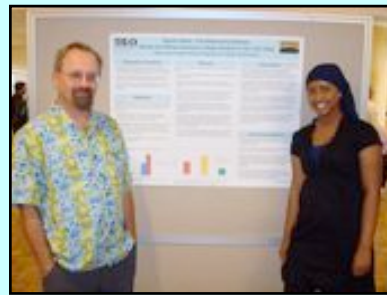
**Faculty Mentor: Dr. Abdulai Iddrisu**

Abdulai Iddrisu is a new faculty member in the history department at St. Olaf College, originally from Ghana. Iddrisu received his B.A. degree in History and a Diploma in Education taken concurrently from the University of Cape Coast (1991). He also holds a Ph.D. in African History at the University of Illinois at Urbana-Champaign. Iddrisu has many interests including Islamic education, Islam and Development, Drum Histories and its methodological imperatives for oral transmission. At St. Olaf College, Professor Iddrisu enjoys teaching African History along with courses about Muslim societies.



**Faculty Mentor: Dr. Michael Fitzgerald**

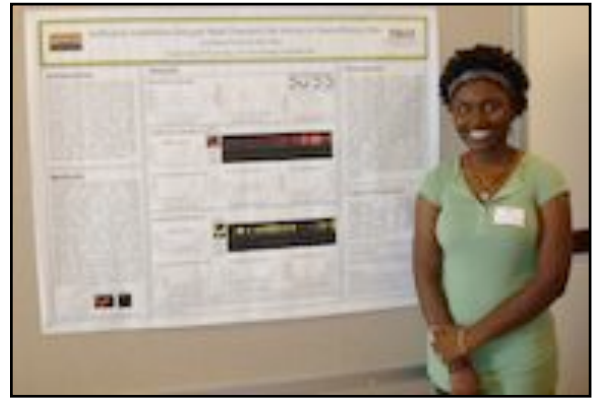
Michael Fitzgerald was born in Chicago but raised in Los Angeles. He received his B.A. from UCLA, Summa Cum Laude. Also, he holds a Ph.D. from UCLA. His research interests include Southern, African American, Civil War, and Reconstruction History. Throughout the years, he has published various books and numerous articles. At St. Olaf, Fitzgerald directs the American Racial and Multicultural Studies program. To mention a few significant accomplishments, Fitzgerald was the winner of Gulf South Historical Association's 2003 Best Book on Gulf South History Award. Along with that, he also received Honorable Mention (Second Runner Up) for the 2002 Lincoln Prize, for the Best book on the Civil War Era written in the preceding year. Fitzgerald has been a professor at St. Olaf for over 24 years and continues to contribute to the field of history.





**Faculty Mentor:** Dr. Gary Muir

Dr. Gary Muir received his Bachelor's, Master's and Ph.D. in Psychology from the University of Otago in Dunedin, New Zealand. After completing his Bachelor's, Professor Muir decided to continue studying Psychology. In New Zealand, Master's students complete a first year of general coursework and then spend their second year conducting research on a more specific topic. It was this research opportunity in a lab that allowed Professor Muir to learn more about neuroscience by being able to record from single neurons firing in the brains of rats. This interest grew in his doctoral research recording from place cells in the hippocampus. Muir's post-doctorate work at Dartmouth College exposed him to head direction cells, which he has studied ever since. In addition to his extensive work in neuroscience and head direction cells, Professor Muir has shown his talent for researching, teaching and working with students through his contributions to the fields of teaching and lab methodology.



**Courtney Payne**

**Title of Research:**

The Neural Basis of Spatial Navigation and Orientation

**Abstract:**

Within different areas of the brain, certain cells have been discovered which only fire when an animal's head is oriented in a certain direction. These "head direction cells" may provide a basis for how an animal orients a spatial map of its environment and one way that the brain deals with navigation. Using electrodes implanted into the anterior dorsal nucleus of the thalamus (ADN) in rats, we identified the electrical activity of these cells using amplification systems while simultaneously tracking the animal's movement and head direction. After isolating these cells we looked into the active role these cells play in the animal's navigational processes through the monitoring of head direction cells while the animal is consciously navigating through a spatial task.

