

MCNAIR SCHOLARS RESEARCH REPORT

2015 • VOLUME 19



*Preparing UTA Students for Careers in
Research and Teaching since 1990*



Ransom Hall, location of the UTA McNair Scholars Program

The Ronald E. McNair Postbaccalaureate Achievement Program is a federally-funded **TRiO** program.

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MESSAGE

FROM THE VICE PRESIDENT FOR RESEARCH

As education is essential to providing a foundation for the future of society, research is vital to the discovery, invention, and innovation driving our world. Through The University of Texas at Arlington strategic plan, 'Bold Solutions, Global Impact', UT Arlington is committed to being *The Model 21st Century Urban Research University*. This vision reflects the importance of university research in meeting the needs of our students as well as those of the state, nation, and world. The vision also highlights the importance of taking on research that is appropriate to the needs of the community, which for us is the rapidly growing metroplex.

The McNair Scholars Program plays an important role in preparing the researchers who will provide solutions to the world's challenges. For promising students from low-income/first-generation or under-represented backgrounds, it is also a means to realize the dream of a good job and the opportunity for a better life than what their parents lived. Yes, it takes hard work; work that requires long hours of rigorous training with mentors. Yes, it takes dedication and persistence. But these efforts prepare the faculty members who will make discoveries that will shape our future. They will be the innovators and entrepreneurs who will develop the technologies that transform the results of those discoveries into improvements in health, education, and economic growth.

The University of Texas at Arlington is proud to be a supporter of the McNair Scholars Program. Those of us who have been privileged to work with McNair Scholars and to witness the transformation from students to scholars are impressed with their sophistication and, as mentors, take great pride in their accomplishments. My special thanks to the faculty who have mentored them.

Congratulations Scholars on your acceptance into the program. You have completed impressive work. It is work that portends an exciting future for you and for the promise your future contributions will make.

Duane Dimos, Ph.D.

Vice President for Research, UT Arlington



Dr. Duane Dimos,
Vice President for Research

NOTES

FROM THE DIRECTOR

One of the pleasures of my position is meeting a new group of bright and ambitious undergraduates each year who quickly transform themselves into serious, dedicated researchers. This evolution is accomplished with the assistance of many parties: McNair program staff, the Office of Research Administration representatives, library staff and, especially, our faculty mentors. It also requires that our Scholars draw on both their creativity and their subject area knowledge to craft significant yet feasible research projects. It is true that McNair interns, still new to the world of research, are often tested in various ways by their projects. Indeed, a major aspect of their development as scholars is to learn how to deal with obstacles that arise during this experience. McNair interns not only develop a greater understanding of the research methods in their disciplines but they also learn essential life lessons: how to manage one's time to meet a deadline; how to communicate effectively with peers, mentors and the public; how to meet and overcome conceptual, organizational or technical difficulties. Such insights are invaluable for McNair Scholars, who will draw on them frequently as they commence graduate-level studies and progress toward the Ph.D. As more than one Scholar has stated over the years, participating in the McNair Scholars Program is a life-changing experience! I would like to congratulate Scholars and mentors for their dedication to the research process and their success over the summer!

I would also like to thank the UTA community—particularly President Vistasp Karbhari, former Provost Ronald Elsenbaumer, Interim Provost Dr. Linda Johnsrud, Vice President for Research Duane Dimos and Dean Rebecca Bichel of the UTA Library, in addition to other deans, chairs, and faculty members (including members of the McNair Selection Committee)—for their commitment to student excellence and for their continuing support of the UTA McNair Scholars Program.

Joan W. Reinhardt, Ph.D.
Director, McNair Scholars Program



Dr. Joan Reinhardt,
Director

ABOUT

THE MCNAIR SCHOLARS PROGRAM

The McNair Scholars Program (officially known as the Ronald E. McNair Post-Baccalaureate Achievement Program) came to the campus of The University of Texas at Arlington in 1990. Created by the U.S. Congress in 1988, it is named after Dr. Ronald E. McNair, who perished with his fellow astronauts on the space shuttle *Challenger* two years earlier. The McNair program endeavors to assist talented undergraduates—either first-generation and low-income or underrepresented students—to prepare for graduate study leading to the Ph.D. and the professoriate.

Since its beginning at UT Arlington, the McNair program has encouraged and assisted over 300 students in various majors. Currently, it works with 34 students each academic year, providing seminars and classes on topics related to graduate school and the GRE, a May institute to heighten scholars' understanding of the culture of research, and a summer research internship. The program also provides guidance with the graduate school application process and travel funds to participate in conferences and visit prospective graduate

programs. UT Arlington McNair graduates have subsequently earned masters and doctorates not only from their alma mater, but also from an impressive array of universities including Harvard, Indiana, Rice, and Southern Methodist, among others.



Dr. Ronald E. McNair
Scientist & Astronaut, 1950–1986

The McNair Scholars Program enjoys strong support from the UT Arlington administration and greatly benefits from the expertise and enthusiasm of both faculty and staff. Faculty members who serve on the McNair Selection Committee and those who act as mentors to McNair interns deserve special recognition. Members of the 2014-2015 Selection Committee include the following UTA faculty and staff: Karishma Chatterjee, Ph.D., Department of Communication; Laureano R. Hoyos, Ph.D., Department of Civil Engineering; Raymond Jackson, Ph.D., Office of Graduate Studies; Christopher Kribs, Ph.D., College of Education/Department of Mathematics; Joan Reinhardt, Ph.D., McNair Scholars Program; Natalie Stephens, M.Ed., McNair Scholars Program; and Debra Woody, Ph.D., Department of Social Work.

MCNAIR STAFF MEMBERS



Director,
Joan Reinhardt, Ph.D.



Administrative Assistant,
Cheri Counts



Learning Specialist II &
Research Report Editor,
Natalie Stephens, M.Ed.

ALUMNI

EARNING DOCTORATES

During the past year, the following UTA McNair Alumni acquired their doctorates:

Gulnaz Bachlani ('03 B.S. Microbiology and Biology) earned a medical doctorate at the American University of the Caribbean. She is an OB/GYN resident (MD) at Richmond University Medical Center in Staten Island.



Gulnaz Bachlani



Kimberly Fuller

Kimberly Fuller ('92 B.S. Mathematics) earned an Ed.D. in August at Northcentral University. She is the Executive Director of Federal Programs of Richardson ISD.

Tara McKelvy ('09 B.S. Psychology) earned a Ph.D. in Counseling at the University of North Texas in August. She is a post-doctoral fellow at The Jones Center for Children's Therapy and Assessment in Mansfield, Texas.



Tara McKelvy



Bryan Motwani

Bryan Motwani ('09 B.S. Biology) earned a D.O. from Kansas City University of Medicine and Bioscience as well as an M.S. in Premedical Science at UNT Health Science Center. He is completing his emergency medicine residency at the University of Nebraska Medical Center.

Camille Rodgers ('07 B.S. Biology) earned a Ph.D. in Mass Communication/Media Studies from the University of Wisconsin-Madison. She is currently affiliated with Naval Postgraduate School's Graduate Writing Center and Thesis Processing Office.



Camille Rodgers



Ellen Terry

Ellen Terry ('08 B.S. Psychology) earned a Ph.D. in Psychology at the University of Tulsa. As a postdoctoral fellow at the University of Florida Pain Research and Intervention Center of Excellence (PRICE), her training involves working on the Understanding Pain and Limitations in Osteoarthritic Disease (UPLOAD-2) study.

Wilber Ventura ('12 B.S. Mathematics) earned a Ph.D. in Mathematics from UT Arlington. He is currently employed at Nationstar Mortgage in the DFW metroplex.



Wilber Ventura

SCHOLARSHIPS

AWARDED TO MCNAIR SCHOLARS

Kathryn A. Head Scholarship Winner

In Summer of 2015 the Kathryn A. Head Scholarship for McNair Scholars was awarded to Courtney Broderick, a History and Philosophy major engaged in her second summer of program-sponsored research mentored by Dr. Gerald Saxon. Broderick was selected for this award based on her essay, GPA, letters of recommendation, and commitment to pursuing research and the professoriate. After graduation, she began the Texas Legislative Internship Program in Austin. She has applied to various graduate programs in history focusing on borderlands or immigration studies. The scholarship honors the long and



Courtney Broderick and Kathryn Head

exemplary career of Kathryn A. Head, former director of the McNair Scholars Program and SOAR Learning Services. The scholarship committee includes Natalie Stephens, McNair Learning Specialist; Jennifer Luken-Sutton, Student Support Services Director; Dr. Kytai Nguyen, Associate Professor of Bioengineering and a former McNair mentor; and Laura Wolf, Assistant Director of University Studies. We thank our committee members for their commitment to selecting the best candidate for this honor, and we congratulate Courtney on receiving it.

Friends of the UTA Library Scholarship Awards

On November 13, the annual Friends of the UT Arlington Library McNair Scholarship was awarded to Ryan Stevens (Biology) and Sara Watson (Anthropology) for their McNair research presentations and papers. The scholarship recipients are determined by the excellence of the Scholars' oral research presentations and papers, as assessed by members of the Friends McNair Scholarship Committee: Shirley Applewhite, Roger Broom, and Kit Goodwin. The McNair Scholars Pro-



Friends of the UT Arlington Library President Melissa Deur, Ryan Stevens, Sara Watson and Dr. Joan Reinhardt

gram congratulates its 2015 scholarship winners and thanks the Friends of the UTA Library for their continued support. Special thanks to Rebecca Bichel, Dean of the UTA Library, and the current officers of the Friends of the UTA Library: Melissa Deur (president), Julie Alexander (first vice president), Jeanie Browning (second vice president), Mary Castle (treasurer), Carol Lehman (secretary), and Kit Goodwin (parliamentarian).

SCHOLARS

2015 INTERNS AND THEIR ABSTRACTS



ELIEZER ALVARADO
Biomedical Engineering Major

Analysis of Cortical Neuron Stimulation via Patch Clamp and How This Can Affect Glioblastoma Multiforme Research

Glioblastoma multiforme (GBM) is a Grade IV astrocyte that has a 100% mortality rate with the standardized treatment of temozolomide (TMZ). An analysis of cortical neurons with laser stimulation via patch clamp was conducted to allow for testing in an environment similar to *ex vivo* conditions, where constant stimulation of the neurons is present in organic tissue. GBM cells and other drugs were added into the solution and analyzed by cell vitality and change in electrical current. Cell vitality was quantified by cell count, using PI (Propidium iodide) and FDA (Fluorescein diacetate) staining, and the change in current was measured by patch clamp techniques. This experiment was unable to yield sufficient evidence to show that non-focused, near-IR pulsed laser stimulation produced enough consistent electrical stimulation for the cell membrane without any optogenetic sensitization. This means that the laser did not provide enough stimulation to open the ion channels in a consistent manner. Consequently, chemical stimulation will be used for further testing.

Mentor: Dr. Young-tae Kim
Department of Bioengineering



COURTNEY BRODERICK
History & Philosophy Major

Excluded, but Not Forgotten: The Aftermath and Effects of the National Origins Act on Mexican Immigrants in the Southwestern United States, 1924-1934

In 1924, the United States passed an immigration restriction law called the National Origins Act, which estab-

lished a quota formula to restrict the number of immigrants allowed to enter the U.S. from foreign countries. Yet, the entire Western Hemisphere was exempt from these quotas, including Mexico. Mexican immigrants who came to the United States had more job opportunities in the U.S. Southwest, particularly in the railroad and agricultural industries, after the exclusion placed on other immigrant groups. Additionally, even though quotas were not applied to Mexicans in the 1924 law, bills were proposed to apply similar quota restrictions on Mexicans in the late 1920s and early 1930s, such as the Box bill and the Harris bill. Neither bill passed, but after 1924, the idea of quotas applying to Mexicans remained in American politics. Furthermore, this paper examines prominent people who were proponents of quota restrictions, called restrictionists, and those against quota restrictions, called anti-restrictionists, both with emphasis on the U.S. Southwest. Finally, this research discusses the racial and economic arguments used by the Restrictionist and anti-Restrictionist platforms alike from 1924-1934.

Mentor: Dr. Gerald Saxon
Department of History



AIESHA CALHOUN
Psychology Major

An Exploratory Qualitative Assessment to Identify Skills-Gap Perceptions Among Graduate Students, Early Career Professionals, and Industry Leaders in the STEM Fields

This study investigated the perceptions of a potential skills gap among students in the STEM fields. A set of interview questions was developed and qualitative data were collected from three groups of participants (graduate students, early career professionals, and industry leaders) to gauge perceptions of student preparedness in order to better understand the characteristics that are needed for success in the workplace, which may

be lacking. Participants reported on strengths and areas needing development, as well as other characteristics that are thought to be important for job success as a new hire. Industry leaders in particular noted the characteristics of bringing a diverse perspective and being technically savvy as areas of strengths in new hires. The results also highlighted the need for more hands-on experience during graduate school in order to provide new hires with the confidence to succeed. A suggested solution is to create a partnership between academia and industry early in STEM students' academic careers where they are provided the opportunity to apply their technical knowledge to the field and gain valuable, practical experience. This partnership would help to fully equip new hires for success by providing both technical and practical foundations thus reducing the skills gap.



Mentor: Dr. Nicolette Hass
Department of Psychology



PETER HEDLESTON
English Major

**Sophist(icated) Pragmatism:
Towards a Unified Theory of
Language and Politics in Rhetorical
Studies**

This project examines the sophists of ancient Greece and how many contemporary scholars define and understand these ancient rhetoricians. Central to this work is an argument presented by Robert Danisch—that Stanley Fish is not a sophist. Initially, the validity of Danisch's claim is examined through works of modern scholars. After establishing contemporary understandings, the sophists are linked to current antifoundationalist views of language. Through this linkage, this project demonstrates the relevance of the sophists to current rhetorical literary studies. By doing this, Danisch's criticism of Fish is supported. Yet, despite this support of Danisch's points, whether or not Fish is a sophist ultimately depends on which attributes of sophists any particular scholar deems valid. Any rigid definition of the term sophist is problematic as all information about the sophists derives from secondary sources.

Despite the problem with rigidly defining a sophist, many of Danish's criticisms prove to have pedagogical uses. Fish, however, views such applications as unwise—regardless of the fact that many universities ignore Fish's suggestions. Ultimately recommending eliminating the use of the term sophist, this project concludes with alternative terminology taken from the work of Richard Rorty and his concept of the liberal ironist.



Mentor: Dr. James Warren
Department of English



KANDRA JONES
Psychology Major

Exploring the Undergraduate Experience of Black Students at an Urban, Predominantly White Institution: Using Concept Mapping to Examine Student Success

This research examined indicators of success for Black students at a Predominantly White Institution (PWI) and service areas of care that will help participants at the urban university. This study sought to find if Black students believed that factors such as racial identity, social capital, psychological adjustment, and academic achievement shaped their experiences at a university. Concept mapping methodology with thirteen students that attended an urban PWI was used. Eleven clusters were developed from the 103 statements that students generated to the prompt: "What is one specific thing that will facilitate student success for you and your peers at the university?" These clusters consisted of statements that were frequently sorted into like categories by the students. The students rated statements on their importance and feasibility. Examples of statements provided to ensure success were free tutoring, Black faculty, mentoring, and unity among the Black student organizations. The students generally ranked statements that involved self-actions as important and statements that involved the university providing resources as less feasible. The findings provided insight on what the Black

students believed they needed to facilitate success in college and allow for their voices to be heard so that they can experience success at a PWI.

Mentor: Dr. Schnavia Hatcher,
Director/Center for
African American Studies
Professor/School of Social Work



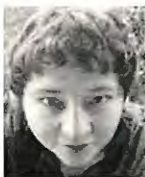
ESTHER KENTISH

English Major

Logos for President: A Look at the Logos for the 2016 Presidential Primary Candidates

Modern organizations and political candidates attempt to use logos to identify themselves, connect with their audiences, and give their supporters a symbol to rally behind. In this paper, I examine the logos for Democratic and Republican party candidates for each party's nomination for President of the United States in the 2016 election. To analyze these logos, I researched a number of well-known theorists in technical communication such as John McWade, Richard Sheehan, and Laura J. Gurak, among others. According to Mike Markel, all communication falls under the auspices of technical communication. Technical communication thus comes in many forms, but one consistent factor is design. Design includes all visual elements of various kinds of communication from large projects to seemingly small items such as logo design. This research is beneficial because it advances the understanding of how technical communication, especially its design aspect, is a powerful tool for political campaigns. In this paper, I analyze the logos of sixteen early presidential candidates including: Hillary Clinton, Bernie Sanders, Jeb Bush, Ben Carson, Ted Cruz, and Donald Trump. I specifically examine the following logo elements: shape, typography, and color theory.

Mentor: Dr. Crystal Elerson,
Department of English



LAWANDA MCKELVY

Communication Major

The Impact of Internet-Based Communication on the Acculturation of Muslim Women in the United States

This study, an expansion of Mckelvy (2014), examines the impact of internet-based acculturation of Muslim women in the U.S. Grounded theory methodology (Glaser, 1992) and Sam and Berry's (2006) model of acculturation were used as theoretical and analytical frameworks. Semi-structured interviews were conducted with twenty Muslim women to learn about their media use and experiences. Educational opportunities were an emerging theme in the determining factors of immigrating to the U. S. The data indicates that Muslim women use a variety of internet-based media such as Facebook, Skype, WhatsApp, Instagram, and Viber for communicating with family and friends locally and abroad. Participants reported using them because of convenience, international accessibility, and group communication. The data suggests that the participants attained the level of acculturation defined as integration. The participants use these media to create relationships in their new communities. The relationships the participants maintain both locally and abroad seem to play a role in the creation of balance in their lives, which allows them to thrive in their new communities, at school, and at work. The participants utilize media choices separately in different areas of their lives and often prefer to keep these areas distinct.

Mentor: Dr. Karishma Chatterjee,
Department of Communication



KAYLEIGH MIRANDA

Music Education Major

Abhorrence or Adoration: The Evolving Transverse Flute and its Involvement in Mozart's Life and Compositions

In 1852 a rumor began which has tarnished the legacy of Wolfgang Amadeus Mozart; he allegedly hated the flute

and distrusted flutists. Although many Mozart scholars have expressed their skepticism, few have studied the myth extensively. For those who accept the myth, there is just enough evidence to support it. This “evidence” for the myth is based largely on an improperly translated letter and an anecdote about Mozart and an acquaintance. Some also credit a single flutist with helping Mozart to overcome this hatred and accept an entire commission of flute works. However, through the analysis of Mozart’s flute works, his letters, and the circumstances surrounding his only major flute commission, this myth can be effectively disproved. Indeed, Mozart and other progressive eighteenth-century composers, such as Haydn, allowed the flute to advance beyond that of a hobby instrument for wealthy amateurs. Because of their extensive and innovative compositional methods, the flute became a legitimate instrument and a standard in later orchestras. Mozart’s extraordinary flute writing was not in spite of his hatred but rather was a testament to his natural interest in the instrument. Knowing this, we can re-approach the analysis of his music and examine the true ingenuity of his flute works and the flute’s usage in larger instrumental groups.



Mentor: Dr. Graham Hunt,
Department of Music

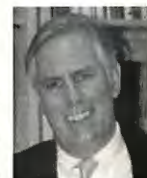


KINSLEY MUNOZ
Education Major

Comparison of the Newberry and Bluebonnet Awards in Children’s Literature

Teachers today are presented with an increasing amount of quality children’s literature for their classrooms. Fortunately, the Newberry and Bluebonnet awards are two reputable awards that serve as resources for teachers in selecting books to use in their classrooms. This study sought to determine what features teachers could expect to find in either award, thus helping them to narrow down their search for quality children’s literature. The research found that not

all significant themes present themselves within every winner of either award, but there are a few themes that both awards share. The Bluebonnet award is chosen by children from a Master List of twenty nominees selected by adults, while the Newbery award is selected solely by adults. This research examines features including genre, text features, text length, readability, and interest level. It found that the Bluebonnet award winners are usually lighthearted, shorter, and of lower readability and interest level. However, their Newbery award-winning counterparts are usually longer works with higher readability and interest levels, which deal with bigger issues. The differences discovered among these books, coupled with the criteria for each award, gives teachers an additional resource to use in the search for quality children’s literature for their classrooms.



Mentor: Dr. John Smith,
Department of Curriculum
and Instruction



KIÊN NHAM
Biomedical Engineering Major

Cancer Cell Manipulation and Imaging Using Laser Microbeam and Digital Holographic Microscopy

The biological and chemical properties that enable cancer metastasis and proliferation have been very well researched and classified with few studies on the physical properties of cancer cells in response to physical modulations, especially drug delivery using optoporation. This research uses an integrated system of laser microbeam and digital holographic microscopy to study the physical response of cancer cells to optoporation with a sub-micrometer resolution. Human breast cancer cells (MB231 cell line) were cultured in PDMS devices, and cells were first subjected to optoporation under isotonic conditions, which produced data that needed further investigation. Consequently, two more experiments were performed in which the cells were exposed to a hypotonic condition and optoporation was performed after the cells came to equilibrium with the solution. Second, instead of letting the cells

come to equilibrium, optoporation was performed immediately after the solution was made hypotonic. The results were inconclusive because of the many different phenomena that happen in such an experimental setup. It was found that to better study the response of cancer cells to optoporation, investigations of isolated parameters are needed to avoid such ambiguities. Overall, the drug delivery using optoporation has been demonstrated to have the ability both to modulate and to measure physical changes within the cancer cells.



Mentor: Dr. Samarendra Mohanty,
Department of Physics



AMANDA PATRICK
Mathematics Major

A Mathematical Model of Recycling

As epidemic-type mathematical models have been previously used to study diseases, rumors and behaviors, their application will be applied to study recycling influence. The types of influences taken into account were recyclers influencing non-recyclers to recycle, recyclers influencing other recyclers to quit recycling (recycling discouragement), and advertisements influencing non-recyclers to recycle. Generally, autonomous differential equations can be analyzed by calculating the equilibrium solutions and finding the eigenvalues to determine stability. The recycling population at UTA was modeled for constant and changing population. The average population increase and decrease were calculated for the system with constant population to calculate stability, and for a more accurate representation, a linear equation was calculated for changing population. Surveys were used to calculate parameters for advertisement influence and social influence between recyclers and non-recyclers. The parameters were manipulated, and each system was solved for number of recyclers and non-recyclers throughout time. The results showed a decline in recyclers with lower recycling discouragement as opposed to when it was zero even with advertisement influence

parameter doubled. Additionally, a lower value for the parameter regarding recyclers' influence on non-recyclers and a higher value for recycling discouragement caused non-recyclers to become the larger subpopulation as time increased.



Mentor: Dr. Benito Chen-Charpentier,
Department of Mathematics



MICHAEL PEREZ
Psychology Major

Aggression, Gender, Feasibility, and Brainstorming Factors in Relation to Perceived Novelty and Enjoyment

The purpose of this study was to analyze the aspects of brainstorming and qualities of final ideas that affect the perceived novelty and enjoyment of generated ideas. In this study, participants were instructed to generate ideas for a new sport onto an online message board. They then met (on Skype) with other members of a 4-person group to select and elaborate on a single, final sport idea. Three coders rated the final sports ideas for feasibility, perceived enjoyment, and aggressiveness. A linguistic analysis of the final sports ideas was also conducted. The message board activity was analyzed by counting the number of posted ideas and the number of replies to those ideas. Gender of the individual who proposed the accepted, final sports idea was also identified. The results indicated that feasibility and novelty were negatively related. Perceived novelty was related to the number of replies in the groups but was unrelated to the gender of the individual who proposed the idea. Male ideas were not selected more than female ideas. Perceived enjoyment was positively related to aggressiveness and to the number of ideas posted within the group, but was negatively correlated with idea feasibility.



Mentor: Dr. Jared Kenworthy,
Department of Psychology

**JOHN ETTA RASBERRY**

Kinesiology Major

The Relationship between Performance on the TGMD-3 and the Fitnessgram in Children

The development and acquisition of motor skills depends on the degree to which a person has the motor abilities to perform a given proficiency. The purpose of this study was to investigate the relationship between motor skills and physical fitness and to explore age differences between the variables of each assessment. Twenty-four children (12 boys and 12 girls, ages 8-to-10) participated in the current investigation completing the Fitnessgram 10 and the Test of Gross Motor Development 3rd Edition. Physical fitness components (aerobic capacity, muscular endurance, muscular (locomotor skills and ball control skills) were analyzed using Spearman's rho correlation. A one-way ANOVA and Tukey post-hoc analysis identified and examined the differences between age groups. The correlation between physical fitness and motor skills did not reach significance as established by the two-tail significance test $p < 0.05$. However, the Tukey post-hoc analysis revealed that differences occurred between age groups in upper body strength, BMI, and body fat. Therefore, the results indicated that as children developed, their upper body strength decreased while BMI and body fat increased. Although literature strongly suggests the relationship between motor skills and physical fitness exists, there may be a potential lack of association in the variables of each motor domain.

Mentor: Dr. Priscila Caçola,
Department of Kinesiology**ABRAHAM SALINAS**

English Major

(Mis)Representations of Latino-American Masculinities in *La Mission* and Junot Díaz's *The Brief Life of Oscar Wao*

In multicultural America, the dominant society alone has defined the Ideal Man in its image: the white, middle-class, straight, Protestant father. This Ideal Man has silenced the voices of the masculine Others in the United States—the working-class, the queer, the colored, the immigrants—by marginalizing their existence. This research challenges the Western constructions of the various Latino-American masculinities that permeate North American ideology and media. This paper analyzes how the 2009 film *La Mission*, starring Peruvian-American actor Benjamin Bratt, and the 2008 Pulitzer Prize-winning novel *The Brief Wondrous Life of Oscar Wao* by Dominican-American writer Junot Díaz, portray as well as challenge Western representations of an abusive, misogynous *machismo* culture. Also, using Edward Said's theory of Orientalism, this study contends that the dominant Western society has constructed the inaccurate cultural representations that form mainstream perceptions of Latino *machismo* culture to protect its own image, subsequently perpetuating prejudiced, racist perceptions of Latino males. This work uses feminist Chicana Gloria Anzaldúa's groundbreaking work *Borderlands* to challenge these contemporary representations of Latino-American masculinities. Finally, sociohistorical analyses of *La Mission* and *The Brief Wondrous Life of Oscar Wao* develop the psychoanalytic theory of the *machismo* consciousness, a triple consciousness that contrasts the Latino-American man's patriarchal traditions and Western constructions of *mochismo* attitudes and the popular notions of the Ideal American man.

Mentor: Dr. Barbara Chiarello
Department of English



RYAN STEVENS

Biology Major

Bumetanide Demonstrates Amelioration of Learning and Memory Deficits Induced by Ketamine Administration in a Neonatal Rat Model

Ketamine, which is widely used as a pediatric anesthetic, has been reported by our and other groups to demonstrate persistent deficits in learning and memory, and alterations in NMDA receptor (NMDAR) functioning. In neonates, γ -aminobutyric acid (GABA) is excitatory upon activation of GABA_A receptors rather than its mature action of neuronal inhibition. This is due to greater Na⁺-K⁺-2Cl⁻ co-transporter (NKCC1) and weak K⁺-Cl⁻ co-transporter (KCC2) expression in the neonatal cell membrane. Thus, bumetanide - an NKCC1 inhibitor - may prevent intracellular chloride accumulation by reducing or inhibiting GABA excitation in immature neurons. Therefore, we hypothesized that bumetanide may serve as a neuroprotectant via interfering with this GABA excitatory pathway through inhibiting NKCC1 to minimize ketamine-induced neuroexcitotoxicity. Seven-day-old rats were administered ketamine subcutaneously, with intracerebroventricular delivery of bumetanide concurrently with ketamine or vehicle. Three weeks following treatment, four groups were tested for spatial learning and memory deficits using the Morris water maze. Prolonged latency in learning was noted in the ketamine-treated animals with deficits in recall of the target platform location. However, the bumetanide co-treatment group showed a learning rate and recall similar to the control. Thus, these results suggest a new mechanism by which neonatal ketamine-induced learning and memory deficits can be alleviated through reducing hyperactive GABAergic-excitatory neonatal synaptic signaling.



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Anthropology Major

Comparative Analysis of MSA to LSA Transitional Technologies in the Cape Floral Region, South Africa

The Early Late Stone Age (ELSA) Industry of southern Africa shows a marked increase in regional variability compared to the Middle Stone Age (MSA) industries that preceded it. The ELSA dates between 50-20 kya (thousand years ago), a period of climatic instability and social fragmentation between increasingly isolated populations. The archaeological record suffers a severe reduction in the number of occupied sites during this time, resulting in a poor understanding of the ELSA industry and its associated developments in behavioral complexity. Previously only two sites provided information on this period of the late Pleistocene in the Cape Floral Region of southern Africa, but the recent addition of a new site, Knysna Eastern Heads Cave 1 (KEH-1), bridges this gap in the record and provides a new perspective on the lives of humans living along the now submerged continental shelf. By comparing the lithics found here with those from the published literature on Boomplaas and Nelson Bay Cave, we can expand our understanding of the technological industries present during the early LSA and their evolution from the MSA, along with the potential of raw material analysis to reveal insights into the mobility patterns of late Pleistocene forager populations of the southern African coast and the development of new production techniques based on raw material quality and availability.



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