

**College of Arts & Sciences
College of Business & Management
Daniel L. Goodwin College of Education
College of Graduate Studies and Research
Ronald Williams Library**

Present

**NORTHEASTERN ILLINOIS
UNIVERSITY EIGHTH ANNUAL
FACULTY RESEARCH & CREATIVE
ACTIVITIES SYMPOSIUM**

November 17, 2017



Participants

College of Arts & Sciences
College of Business & Management
Daniel L. Goodwin College of Education
College of Graduate Studies & Research
Ronald Williams Library

Symposium Steering Committee Members

John Albazi, College of Arts & Sciences
Saba Ayman-Nolley, College of Graduate Studies & Research
Pamela Geddes, College of Arts & Sciences
Robert Heitzinger, Creative Activities
Alberto Lopez, Daniel L. Goodwin College of Education
Mary Thill, Ronald Williams Library
Angela Vidal-Rodriguez, McNair Scholars Program
Chunwei Xian, College of Business & Management

SYMPOSIUM PROGRAM

8:00 – 8:30 AM Registration/Coffee
Student Union, First Floor

8:30 – 8:50 AM Program Commencement
Alumni Hall

Welcome and Introduction
Dr. John Albazi, Symposium Coordinator

Greetings
Dr. Richard J. Helldobler, Interim President
Northeastern Illinois University

This year's Symposium is sponsored by the Office of Academic Affairs

Track 1

CBM 149 (College of Business and Management Building)
Presiding: Chunwei Xian, Accounting, Business Law Finance

- 9:00 AM "LEAP OVER FEAR. UNANIMOUS DESIRE WINS," Stephen Grove, Management and Marketing (page 10)
- 9:40 AM "PREDICTIVE POWER OF COUNTRY'S ECONOMIC GROWTH: A GLOBAL ANALYSIS," Hardik Marfatia, Economics (page 11)
- 10:20 AM "INCREASING MARGINAL REVENUE PRODUCT AND EQUILIBRIUM IN THE MAJOR LEAGUE BASEBALL LABOR MARKET," Michael Wenz, Economics (page 11)
- 11:00 AM Coffee Break
- 11:20 AM "THE EFFECT OF SUPPORTIVE ENVIRONMENT AND PROACTIVE PERSONALITY ON EMPLOYEE SELF-DEVELOPMENT," Qiumei (Jane) Xu, Management and Marketing (page 12)
- 12:00 PM "R&D INTENSITY, ABILITY INDICATORS, AND EXECUTIVE COMPENSATION," Chunwei Xian, Accounting, Business Law and Finance; Rajiv Bank, Accounting, Business Law and Finance; DMITRI BYZALOV, Accounting, Business Law and Finance (page 12)
- 12:40 PM Lunch Break
Lunch with the Dean of Research in SU 214: A conversation about a vision for research and creative activities at Northeastern
- 1:20 PM "SEMANTIC FRAMING AND RECONCILIATION FOR DISTRIBUTIVE INTERNAL CONTROL AND PERFORMANCE TUNING," Hong Chen, Accounting, Business Law and Finance (page 12)
- 2:00 PM "MILLENNIALS AND PERSONAL USE OF TECHNOLOGY AT WORK," Sungdoo Kim, Management and Marketing (page 13)

Track 2

FA160 (Recital Hall, Fine Arts Building)
Presiding: Robert Heitzinger (Music)

- 9:40 AM "WRITING THROUGH DISORIENTATION AND EXHAUSTION TO RECLAIM MY (ACADEMIC) EXISTENCE: RECONCILING THE (IM)POSSIBILITY OF FINDING "HOME" AS A TRANSNATIONAL SUBJECT IN THE (U.S.) ACADEMY," Wilfredo Alvarez, Communication, Media, and Theatre (page 15)

- 10:20 AM "TRADITIONAL VS FUNCTIONAL VRPS: COMPARING STRATEGIES AND RESULTS OF AMPLITUDE, FREQUENCY, AND EGG WAVEFORM IN EMERGING ARTISTS (SOPRANOS)," Katherine Petersen, Music and Dance (page 16)
- 11:00 AM Coffee Break
- 11:20 AM "A MUSICAL JOURNEY TO EUNICE, LOUISIANA," James Lucas, Music and Dance (page 16)
- 12:00 PM "TEACHING DIVERSITY THROUGH CHILDREN'S THEATRE," Ann Hartdegen, Communication, Media, and Theatre (page 17)

Track 3

Student Union 103 (Golden Eagles Room)

Presiding: Christina Ciecierski and Billie Kersh (Economics)

- 9:00 AM "MATHEMATICAL MODELING OF NON-SMALL CELL LUNG CANCER RESPONSE TO THERAPY," Emma Turian, Mathematics-Chicago CHEC; Russell Injerd, Mathematics-Chicago CHEC (page 18)
- 9:40 AM "THE ROLE OF DNA END PROCESSING PROTEINS IN DNA REPAIR AND AGING IN DROSOPHILA MELANOGASTER," Elyse Bolterstein, Biology-Chicago CHEC (page 19)
- 10:20 AM "EXPLORING HOME ASSISTANT DEVICES IN BREAST CANCER EDUCATION," Francisco Iacobelli, Computer Science-Chicago CHEC; Xiwei Wang, Computer Science-Chicago CHEC (page 20)

Track 4

Student Union 124

Presiding: Mary Thill (Library)

- 9:00 AM "*Work Work*: "CONFLUENT TIDES OF SWARM," Olivia Cronk, English; Amanda Goldblatt, English; Larry Dean, English (page 21)
- 9:40 AM "Can One Get Out?: STAYING WOKE IN CONTEMPORARY BLACK HORROR MOVIES," Ryan Poll, English (page 22)
- 10:20 AM "DECODING ELEVATORS AND RACIAL AND CLASS SUPREMACIST THOUGHT IN COLSON WHITEHEAD'S THE INTUITIONIST," Tim Libretti, English (page 22)
- 11:00 AM Coffee Break

- 11:20 AM "IF ANYONE SAYS SINGULAR 'THEY' IS FOR NONSEXIST LANGUAGE, THEY'RE WRONG!" Lewis Gebhardt, Linguistics (page 23)
- 12:00 PM "CAN WE CREATE NON-VIOLENT MOVEMENT?: CRITICAL QUESTIONS ABOUT METAPHOR IN EDUCATION NEWS," Jill Hallett, Linguistics (page 24)

Track 5
Student Union 214
Presiding: Pamela Geddes (Biology)

- 9:00 AM "LOGINS FROM 14,894 UNIVERSITY STUDENTS REVEAL SOCIAL JETLAG AFFECTS A MAJORITY OF STUDENTS AND CORRELATES WITH DECREASED ACADEMIC PERFORMANCE," Aaron Schirmer, Biology; Benjamin Smarr, Psychology (page 25)
- 9:40 AM "DECONSTRUCTING THE MANTIS VISUAL SYSTEM: MERGING LITERATURE, PSYCHOLOGY, NEUROSCIENCE, AND COMPUTER PROGRAMMING," Frederick Prete, Biology (page 26)
- 10:20 AM "IN SEARCH OF AN ALTERNATIVE CONTROL MECHANISM FOR MULTIDRUG RESISTANT PSEUDOMONAS AERUGINOSA," Emily Booms, Biology (page 27)
- 11:00 AM Coffee Break
- 11:20 AM "DOES THE ALS ASSOCIATED PROTEIN TDP-43 SPREAD LIKE A PRION?" Cindy Voisine, Biology (page 28)
- 12:00 PM "USE OF MOLECULAR TOOLS TO DETERMINE INVASIONS AT AN EARLY STAGE: A CASE STUDY WITH TYPHA DOMINGENSIS INVASION TO THE MIDWEST REGION," Pamela Geddes, Biology (p29)
- 12:40 PM Lunch Break
 Lunch with the Dean of Research in SU 214: A conversation about a vision for research and creative activities at Northeastern
- 1:20 PM "LESSONS FROM WORMS: ELUCIDATING THE MOLECULAR MECHANISMS OF HOW CELLS TALK TO EACH OTHER IN MULTICELLULAR ORGANISMS," Michael Stern, Biology; Cindy Voisine, Biology; Te-Wen Lo, Biology; Victoria Puccini de Castro, Biology; Omar Payan Parra, Biology; Mariya Stefinko, Biology (page 29)

Track 6
Student Union 215
Presiding: Stefan Tsonchev (Chemistry)

- 9:00 AM "EXCITING PROPERTIES OF ORGANIC PHOTOVOLTAICS AND METALLOPOLYMERS FOR SOLAR FUEL GENERATION," Samantha Brown-Xu, Chemistry; Lin Chen, Chemistry (page 30)
- 9:40 AM "INGAP PEPTIDE PROTECTS PANCREATIC RINM5F CELLS FROM METHYLGLYOXAL-INDUCED DEATH," Jing Su, Chemistry; Shubhangee Mungre, Biology (page 32)
- 10:20 AM "PEER ENHANCED EXPERIENTIAL RESEARCH," Ken Nicholson, Chemistry; Paulo Acioli, Physics; Sudha Srinivas, Physics; Elisabet Heah, Earth Science; Joseph Hibdon, Mathematics; Lidia Filus, Mathematics, Marcelo Sztainberg, Computer Science, Rachel Trana, Computer Science (page 32)
- 11:00 AM Coffee Break
- 11:20 AM "MAGNETITE CRISIS IN MINIATURE: VANADIUM, SULFUR, AND IRON VALENCE STATE MEASUREMENTS IN NYAMURAGIRA VOLCANO (AFRICA) MELT INCLUSIONS," Elisabet Head, Earth Science (page 33)

Track 7
Student Union 216
Presiding: Alberto Lopez (College of Education)

- 9:00 AM "A RAPID ASSESSMENT OF NIGER DELTA EX-MILITANTS' EXPERIENCES IN MILITANCY PARTICIPATION IN THE FEDERAL AMNESTY PROGRAMME'S SKILLS DEVELOPMENT CURRICULUM," Isidore Udoh, Health Sciences and Physical Education (page 34)
- 9:40 AM "HOW CINEMA EXCERPTS ENHANCE A CULTURALLY RELEVANT RESPONSIVE-VALUE DRIVEN PEDAGOGY," Sunni Ali, Educational Inquiry and Curriculum Studies (page 34)
- 10:20 AM "EXPLORING HOW FIRST-GENERATION ADULT LEARNERS' MAKE MEANING OF THEIR TRANSITION EXPERIENCES TO FORMAL EDUCATION," Russel Wartalski, Literacy, Leadership, and Development (page 35)
- 11:00 AM Coffee Break

- 11:20 AM "TRANSLANGUAGING: A CASE STUDY OF LATINX BILINGUALS SOLVING A MATHEMATICS PROBLEM," Hector Morales, Teacher Education (page 36)
- 12:00 PM "A THREE CONCEPT MODEL TO TEACH NOS: EMPIRICAL OBSERVATION, SUBJECTIVE PROCESS OF SCIENCE, AND INFERENCE EXPLANATIONS," Huseyin Colak, Teacher Education (page 37)
- 12:40 PM Lunch Break
Lunch with the Dean of Research in SU 214: A conversation about a vision for research and creative activities at Northeastern
- 1:20 PM "THE POWER OF HIDDEN LANGUAGE," Sunni Ali, Educational Inquiry and Curriculum Studies (page 38)
- 2:00 PM "YOUNG CUBANS, TRANSNATIONALISM, AND CITIZENSHIP," J. Ruth Dawley-Carr, Educational Inquiry and Curriculum Studies (page 39)
- 2:20 PM "STATE POLICY AND EQUITY ON ATTAINMENT OUTCOMES: THE IMPACT OF ADOPTING A COMMUNITY COLLEGE BACCALAUREATE POLICY ON STATES' ATTAINMENT INDICATORS FOR LATINO STUDENTS," Angela Vidal-Rodriguez, Educational Inquiry and Curriculum Studies (page 40)

Track 8
Student Union 217
Presiding: Lidia Filus (Mathematics)

- 9:00 AM "INCORPORATING COMPUTATIONAL THINKING INTO BIOLOGY, PHYSICS, AND MATHEMATICS CLASSROOMS FOR EDUCATORS: A COLLABORATIVE RESEARCH AND CURRICULAR EXPERIENCE," Rachel Adler, Computer Science; Joseph Hibdon, Mathematics; Hanna Kim, Teacher Education; Brittany Pines, Math, Science, and Technology for Quality Education; Jennifer Slate, Biology; Sudha Srinivas, Physics; Durene Wheeler, Educational Inquiry and Curriculum Studies (page 41)
- 9:40 AM "POPULATION DYNAMICS AND VIABILITY ANALYSES OF THE RARE AND ENDANGERED PLANT LEEDY'S ROSEROOT (RHODIOLA INTEGRIFOLIA SSP. LEEDYI)," Rachel Trana, Computer Science; Joel Olfelt, Biology (page 42)
- 10:20 AM "DIFFUSION FLAME DYNAMICS IN A ONE-DIMENSIONAL DOMAIN," Joseph Hibdon, Mathematics (page 43)

- 11:00 AM Coffee Break
- 11:20 AM "HOW TO SOLVE SINGULAR AND ILL-CONDITIONED LINEAR SYSTEMS," Zhonggang Zeng, Mathematics (page 43)
- 12:00 PM "TOPOLOGICAL DATA ANALYSIS," Matthew Graham, Mathematics (page 44)
- 12:40 PM Lunch Break
Lunch with the Dean of Research in SU 214: A conversation about a vision for research and creative activities at Northeastern
- 1:20 PM "RIBBONLENGTH OF KNOT DIAGRAMS," Nancy Wrinkle, Mathematics (page 45)
- 2:00 PM "CLASSIFICATION OF ISOMETRIC IMMERSIONS OF PSEUDO-SPHERICAL SURFACES VIA DIFFERENTIAL EQUATIONS," Nabil Kahouadji, Mathematics; Niky Kamran, Mathematics; Keti Tenenblat, Mathematics (page 45)

Track 9
Student Union 218
Presiding: Saba Ayman-Nolley (Psychology)

- 9:00 AM "ARCHAEOOMETRY AND THE MAPPING OF MOBILITY: XRF AND NAA OF OBSIDIAN ARTIFACTS UNVEIL ROUTES LINKING SOUTHERN SOUTH AMERICAN PEOPLES (10,000 BC-AD 1500)," Martin Giesso, Anthropology; Michael D. Glascock, Physics (page 46)
- 9:40 AM "AFRICAN RESISTANCE TO THE ATLANTIC SLAVE TRADE: A VIEW FROM THE GAMBIA RIVER," Michael Tuck, History (page 47)
- 10:20 AM "THE COSTS OF BELIEVING," John Casey, Philosophy (page 48)

ABSTRACTS OF PRESENTATIONS

**NEIU EIGHTH ANNUAL
FACULTY RESEARCH & CREATIVE ACTIVITIES SYMPOSIUM**

NOVEMBER 17, 2017

Abstracts are reproduced by permission of the authors, and are not to be construed as publications. Permission to reproduce, quote, or cite any data contained herein may be granted only by application to the individual authors.

Northeastern Illinois University
Chicago, Illinois 60625

LEAP over FEAR. UNANIMOUS DESIRE WINS

Stephen Grove, Management and Marketing

Good news! Humanity is at a tipping point assuring that **all** of us—every man, woman and child on earth—will be able to choose health, happiness and a purposeful life for ourselves. Better news! If we tip the wrong way, no one of us will ever know in this lifetime. We'll be gone.

Today, in ignorance, the world lives in escalating FEAR, False Evidence Appearing Real. Today, in enlightenment, both mathematically-proven, emotionally-argued bio/physical science and spiritually-informed, faith-driven revelation agree that love, fear's direct opposite, offers sustainable economic value to the evolution of human life on earth.

What allows human progress has been entirely misunderstood by a distracted, foolish humanity. Only each unique individual has free choice. Ignorance or enlightenment in this lifetime is a personal decision. We each have both easy choices, and hard choices. We act either on our own desires, or following others. You can't escape the fact of your life consciousness, whether you choose it well, or squander it in lazy tolerations or foolish indulgence.

Individual environment is no matter. Whether you are blessed by challenges or cursed by riches, you alone decide how these prosper or degrade your life. You are free will incarnate playing the ultimate team sport. You are as vital to all life in this time as were the ancient village chiefs and modern national dictators who made the choices that destroyed their lands and culture in their time. Today however, the risk to humanity has scaled ultimately: the weight of bad choices promises to end the whole of life on earth as we know it.

Only the individually created life can win over FEAR. Only you can choose to LEAP over any FEAR that has you saying or doing whatever in reckless arrogance or disregard of another human life. When you choose moment-to-moment to LEAP inside and ignite the Love Everyone Always Paradox you pretest what you are about to say or do with this essential internal question: Do I show love and forgiveness in how I am about to speak or act? If not, think better; if not, you are the one who puts the world at risk.

You want world peace? You want love and understanding for all people? Focus your desire on what **you** say and what **you** do. All scientific and revealed understanding of human behavior confirms that only this personal choice can change the world. Together, with the technology-driven understanding this generation has of war and peace, we have given equal opportunity to the previously unknowable: a violent end to our human species, or heaven on earth.

Make it your desire to win humanity for good. LEAP over FEAR.

PREDICTIVE POWER OF COUNTRY'S ECONOMIC GROWTH: A GLOBAL ANALYSIS

Hardik Marfatia, Economics

This paper explores the out-of-sample forecasting connections of real per capita disposable income growth across the globe using an autoregressive distributed lag framework with exogenous predictors. The forecasting performance is analyzed across several horizons as well as using different forecast combination techniques. Evidence suggests that the foreign country's income provides superior forecasts of income growth beyond what is provided by country's own past income movements. Most superior information is contained in the income growth of Belgium, Korea, New Zealand, the UK and the US, while these countries are rather difficult to predict. The developed European economies can better predict the income growth across the globe at longer forecasting horizons as compared to shorter horizons. Also, in contrast to the conventional wisdom, results show that models' forecasting performance improves for longer horizons. We find that the forecasting performance is strongly linked to the degree of integration and bilateral trade.

INCREASING MARGINAL REVENUE PRODUCT AND EQUILIBRIUM IN THE MAJOR LEAGUE BASEBALL LABOR MARKET

Michael Wenz, Economics

This paper examines market for playing talent in Major League Baseball. I review the method of salary determination as it is typically described in the literature, and suggest that there may be a problem with the stability of equilibrium in the model as commonly described. In the standard model, the marginal revenue product of playing talent is decreasing across teams, which results in a downward-sloping demand curve for playing talent and a stable equilibrium. Increasing marginal revenue product, however, leads to an instability of equilibrium and can potentially explain cyclical behavior in playing talent. I examine the possibility of tipping points, where teams amass talent outside the competitive market for playing talent, and only participate in the competitive market for talent when they have reached a certain threshold. Teams who enter the competitive market for playing talent will then "go for it" and make large, extramarginal acquisitions of talent in an attempt to qualify for the playoffs.

THE EFFECT OF SUPPORTIVE ENVIRONMENT AND PROACTIVE PERSONALITY ON EMPLOYEE SELF-DEVELOPMENT

Qiumei (Jane) Xu, Management and Marketing

This article tests a model that support for development and proactive personality affect employee self-development through different cognitive-motivational states. The interaction effect of proactive personality and support for development is also examined. The findings supported that coworker support and non-work support made unique contributions to employee self-development. Self-efficacy for development and career motivation mediated these relations. In support of person-situation interactionist theory, individual with higher proactive personality responded to non-work support stronger than those with lower proactive personality.

R&D INTENSITY, ABILITY INDICATORS, AND EXECUTIVE COMPENSATION

Chunwei Xian, Accounting, Business Law and Finance; Rajiv Bank, Accounting, Business Law and Finance; DMITRI BYZALOV, Accounting, Business Law and Finance

We examine the relation between R&D intensity and the weights on ability indicators and financial performance measures in CEO compensation. The CEO's technology-related ability is likely more important in R&D intensive firms. Therefore, we predict that these firms place higher weights on indicators of technology-related ability, using the compensation contract as a screening device to mitigate the adverse selection problem. Both accounting and market performance measures are likely noisier in R&D intensive firms. Therefore, we predict that these firms rely less on short-term incentives tied to concurrent earnings and stock returns and rely more on long-term equity incentives. We test these predictions using hand-collected data on the education and professional background of the CEOs in Execucomp. The results support our predictions and are robust. While prior research examined performance compensation in the context of moral hazard, our findings suggest that compensation based on ability indicators plays a screening role in the context of adverse selection.

SEMANTIC FRAMING AND RECONCILIATION FOR DISTRIBUTIVE INTERNAL CONTROL AND PERFORMANCE TUNING

Hong Chen, Accounting, Business Law and Finance

Reconciliation for control and performance tuning is everywhere, not just for accounting systems by accountants. However, accountants learn these reconciliations through their

degree programs and their professional practice. For example, accountants will reconcile bank statements with book records to make sure that cash control is good. Another example is budgeting. Through budgeting, business can have a basis to feed forward and at the end of the period have a basis to create feedback. The reconciliation between feed forward and feedback through budgeting gives accountants a basis for doing performance tuning. Through education and practice, every accountant has a collection of reconciliation tools in his command ready to examine and correct the systems they are going to work on.

Since environment continues to change and technology continues to innovate, the conventional canned reconciliation tools need to be adapted to the new situations in order to do a fine job. So accountants need to have a deep understanding of how those existing reconciliation tools had been created. However, checking with accounting textbooks, one finds the discussions stop only at offering a specific reconciliation framework for a specific or type of concrete problems. Thus all accountants have to invent their reconciliation tools with their intuition on the spot. They get better at it by chance, not with method. What is needed is a general solution framework and algorithm for constructing reconciliation solutions for all the risk controls and performance tuning problems.

This presentation is to show a semantic framing and reconciliation for providing an efficient formulaic solution for risk control and performance tuning. Its essential elements are operation, data, value, and semantic structure. The value helps to frame a semantic structure. The data, when input into the semantic structure, helps to reduce the uncertainty and increase understanding of the entire operation. Through inputs of different scenarios, the semantic frame reveals different comparison solutions ready for a better risk control and performance. This semantics framing can be constructed for any nodes in a distributive semantic diagram like data flow diagrams or flowcharts. And this is exactly what many reconciliation solutions were developed in the local and location settings.

MILLENNIALS AND PERSONAL USE OF TECHNOLOGY AT WORK

Sungdoo Kim, Management and Marketing

As various technologies increasingly permeate every aspect of our lives, a question about the appropriate use of technology at work is an important concern for managers and organizations. One of the most controversial issues is personal use of technology at work, which is often referred to as cyberloafing, a voluntary act of employees using technology for non-work-related purposes during working hours. Employees arguably spend about two hours per eight hour work day using technology for personal reasons, at a cost to U.S. corporations of \$85 billion annually due to reduced productivity (Zakrzewski, 2016).

Who is the mostly likely group to engage in this technology use? Many sources point to millennial employees. Growing up with the internet and unparalleled access to technology, millennials (individuals born during 1981-1995, also known as Gen Y and Gen Me) extensively use various technologies for non-work-related reasons while at work. One study found that millennials wasted more than twice as much time as Baby Boomers (individuals born during 1946-1964) at work (Conner, 2013). Given the pervasiveness of millennials' personal use of technology at work, it is not surprising that employers hesitate to hire members of this generation. For example, managers selected from a representative sample of U.S. industries reported that they prefer to hire senior applicants rather than millennials with the same level of experience (Corgnet, Hernán Gonzalez, & Mateo, 2015) because they believe millennials to be less reliable and less diligent.

Whether this stigmatization of millennials is based in fact or not, it is undeniable that millennials now comprise the largest segment of the U.S. workforce. If organizations are to attract and retain millennial workers, it is crucial to understand their characteristics and provide a workplace in which they can thrive (Stewart, Oliver, Cravens, & Oishi, 2017). Toward this end, drawing on research on generational differences, organizational control, and cyberloafing, I explain how unique characteristics of millennials lead them to engage in personal use of technology at work. Specifically, this article discusses three characteristics: work values (weak work centrality and high priority on leisure and work-life balance), autonomous learning style, and multitasking proficiency.

Based on a deeper understanding of millennials, this study discusses how organizations should address their personal use of technology at work? Before presenting viable solutions, I contrast two one-sided approaches (deterrence and laissez-faire) that can lead to dysfunctional outcomes when used in excess. A deterrence approach helps minimize the negative aspects of personal technology use by preventing excessive and inappropriate use, while a laissez-faire approach helps tap positive aspects by providing opportunities for respite, work-life balance, and learning. Yet, if one approach is overemphasized, firms can lose competitive advantage due to reduced productivity, increased turnover, or financial and legal liabilities. Thus, embracing and leveraging both approaches may foster sustainability, or short-term peak performance that fuels long-term success. To tap the enlightening potential of millennials, this article makes several recommendations. These solutions include establishing a workplace technology use policy based on shared understanding, fostering both relaxation *and* urgency mentalities, and training both millennials and their managers.

WRITING THROUGH DISORIENTATION AND EXHAUSTION TO RECLAIM MY (ACADEMIC) EXISTENCE: RECONCILING THE (IM)POSSIBILITY OF FINDING “HOME” AS A TRANSNATIONAL SUBJECT IN THE (U.S.) ACADEMY

Wilfredo Alvarez, Communication, Media, and Theatre

Autoethnography is a research method that emphasizes reciprocal relationships between self, self in relation to other, and self and culture. Autoethnographic writing has the potential to challenge and change normative institutional power structures through storytelling. Scholars have advanced that autoethnography is a narrative or story about the self, “told through the lens of culture” (Holman Jones, Adams, & Ellis, 2014, p. 1). Furthermore, according to Adams, Holman Jones, and Ellis (2014), “Autoethnographic stories are artistic and analytic demonstrations of how we come to know, name, and interpret personal and cultural experiences” (p. 1). In this paper, I write my transnational (academic) self into existence through autoethnography. My aim is to translate, narrate, and articulate my experiences as a transnational scholar in the (U.S.) academy. This is a critical autoethnographic account that considers how my social positionality as a transnational academic organizes how I experience “home” in academia.

As a transnational subject from an Afro-Indigenous-European Caribbean nation, I am never at “home” in the (U.S.) academy. I experience the concept of “home” as fleeting and fragile. I am always searching for, and never finding, “home.” This perpetual state of impermanence constitutes my experiences as a transnational subject in the (U.S.) academy. Mundane interactions with host society members further affirm the experience of living always already in exile (Butler, 1995). I am an outsider within who speaks from the interstices of U.S. society in general and the academy in particular (Delgado, 2009; Hill Collins, 1986; Orbe, 1998). In this essay, I narrate illustrative vestiges of my life as a “homeless” transnational academic. Through personal narratives, I highlight the pain and despair that I have felt wandering the “streets” of “downtown” academia as a “homeless” academic. I also share stories about some of my triumphs in my continued search for hope and “home” in the predominantly white (U.S.) academy.

In this paper, I also discuss how issues of “voice” and “belonging” create the contours that shape transnational academics’ practices. A reality that often feels like “schizophrenia,” confusion, and disorientation. To this end, I explore my inner struggles and interpersonal challenges due to my “condition” as an immigrant. Oftentimes, I feel like I am unintelligible and incoherent to people who have not experienced and cannot relate to performances of “transnational-ness.” I explain how those inner struggles constitute how I experience the academy as a transnational academic who ceaselessly experiences feelings of “exileness” and ephemerality. Overall, I contend that transnational academics negotiate persistent tensions as we struggle with feelings of liminality living in the interstices of U.S. society.

TRADITIONAL VS FUNCTIONAL VRPS: COMPARING STRATEGIES AND RESULTS OF AMPLITUDE, FREQUENCY, AND EGG WAVEFORM IN EMERGING ARTISTS (SOPRANOS)

Katherine Petersen, Music and Dance

Voice range profiles have been used to establish norms for a variety of categories including range, tessitura, fach, and vocal health. Most VRPs test the extremes of frequency and amplitude by requiring a vocalist to sustain a series of tones at his or her minimum and maximum amplitudes throughout the entirety of his or her ranges. In his clinical assessment of voice, Sataloff describes the resulting phonetogram as a means to track register transitions, vocal fach, and pathology. Often this tool is helpful in revealing each instrument's absolute boundaries, but in its most frequent practice the VRP fails to address how a professional voice actually functions for live singing. In his 2010 article, *The Singer's Voice Range Profile: Female Professional Opera Soloists*, Lamarch stresses the importance of addressing the vocal instrument as it is used in performance. In a clinical setting, many singers use vocal strategies that are unacceptable in regard to performance practice, tone, amplitude, and overall function.

This study investigates the use of a Functional VRP for which measurements were only taken from instances in which sopranos were able to crescendo from their lowest amplitudes and decrescendo from their greatest amplitudes on the same series of tones throughout their ranges. The use of a FVRP ensures that singers are employing their most consistent and operative tonal production. This study compares the traditional VRP with the FVRP to show how amplitude, frequency, and egg waveform contour are affected by the requirement to change dynamic without stopping the tone. Five "emerging artist" sopranos were recorded on six different occasions, performing 3 traditional VRPs and then 3 FVRPs. The results of the traditional versus the functional VRPs were averaged together to create comparative phonetograms that reveal how a singer's extremes may vary when a task's requirements become more challenging.

This paper was recently presented at the International Conference of Voice Teachers in Stockholm, Sweden and was well received as it continues to bridge the gap between qualitative and quantitative measurement of the voice and to reconcile the differences in terminology between vocalists and vocologists.

A MUSICAL JOURNEY TO EUNICE, LOUISIANA

James Lucas, Music and Dance

The project will be a performance of Cajun songs as they might be heard at The Savoy Music Center and the Liberty Theater in Eunice, Louisiana. The songs will be performed by Dr. Lucas, singing and playing harmonica, and his colleagues from the Muscovy Ducks ensemble. This Old Town School of Folk Music ensemble traveled together to Eunice,

Louisiana, the home of Cajun music, and performs regularly at Amy's Winehouse in Forest Park, at open mics, and other venues. The songs will reflect the influence of the great Cajun harmonica player from Eunice, Jerry Devillier. They were arranged, learned, and transmitted in Cajun Harmonica, a class taught by Zoe Savage at the Old Town School of Folk Music in Chicago. The presentation will include a discussion of Cajun music, as well as an explanation of the musical textures (melody, bass, harmony, and rhythm) involved in the performance.

"A look at Cajun music and its development offers a glimpse into Louisiana's different cultures, its fascinating history, and the variety which exists within a traditional culture." Ann Savoy. 1990. Cajun Music: Alive and Well in Louisiana Louisiana Folklife Festival.

Exemplar songs:

Diggy Liggy Lo (traditional country song in the Cajun tradition)

The Criminal Waltz (La Valse Criminelle: traditional Cajun song, with new lyrics by James Lucas)

Les Flammes d'enfer (The Flames of Hell: traditional Cajun song)

Jole Blon (Pretty Blonde: traditional Cajun song: sung in Cajun French)

Jambalaya (music and lyrics by Hank Williams)

TEACHING DIVERSITY THROUGH CHILDREN'S THEATRE

Ann Hartdegen, Communication, Media, and Theatre

For more than 25 years The Children's Theatre Workshop of the Communication, Media and Theatre Department of NEIU has produced two plays every year for young audiences. This year feels different. All theatre necessarily reflects the values and current concerns of the culture producing it. Children's Theatre, in addition to entertaining, has always been a vehicle to transmit both popular stories and widely held cultural values. But what ARE our "widely" held values? This year feels different. Children's Theatre generally shies away from current politics. But as we look into our audiences we see children of colour, in headscarves, speaking Spanish. And we know what they are hearing on the nightly news about "rapists", "terrorists", "sons of bitches". So what are our cultural values? This year feels different. The themes of Children's Theatre Workshop for 2017-2018 are: Immigration, Diversity, Inclusiveness.

The Fall 2017 production of FACES OF FREEDOM traces the history of 20th century

immigration to America through the stories of child and adolescent immigrants and refugees. From Italy, Vietnam, El Salvador, Liberia, Bosnia, Guyana, Mexico, Brazil and Afghanistan we hear wonderful and terrible stories told with grace and humor. Like the European immigrants before them, and like all Americans, these young people are searching for Freedom. Written in 2003, the play does not directly address DACA, but is certainly generating class discussion about this and, more broadly, the position of immigrants in American society.

The Spring 2018 production of SILK ROAD STORIES introduces children to stories written by 13th century Persian Muslim poets and scholars. For more than 1500 years the "Silk Road" brought trade goods - especially silk and horses - from Asia to Europe. And on those long journeys people told stories - of exotic lands, of people and sights never seen in the western world. Jalal ad-Din Rumi, Saadi Shirazi and Farid ad-Din Attar were 13th century Persian Muslim poets and scholars. These writers were already well known in what is now Iran, Turkey, Afghanistan, India: the Silk Road introduced their writing and poetry to Medieval Europe. The play does not directly address the recent attempts to restrict Muslim immigration to America, but we anticipate it will generate class discussion about this, and in general the presence and contributions of Muslims in American society.

By the date of the Faculty Symposium we will be about a third of the way through our 12 performance run OF FACES OF FREEDOM. Ann Hartdegen (director), Alanna Boucher and Emily Hosman (assistant directors), and members of the cast and crew will discuss the themes and concerns of the plays with an emphasis on: civic engagement and responsibility; the importance of standing with and speaking for any group or individual marginalized by religion, race, country of origin; the many forms of bigotry flourishing in the current political climate, etc.. In the presentation we will analyze the structure of the play, discuss the technical challenges of realizing the staging of multiple locations and multi-national characters, review the material created to prepare audiences to see the play, and discuss the reactions and feedback from audiences. The presentation will be accompanied by a PowerPoint illustrating the performance.

MATHEMATICAL MODELING OF NON-SMALL CELL LUNG CANCER RESPONSE TO THERAPY

Emma Turian, Mathematics; Russell Injerd, Mathematics

Non-small cell lung cancer (NSCLC) represents the largest proportion of lung cancers in the United States. Image guided radiotherapy allows tumor volume dynamics to be measured at certain intervals during treatment. This has improved our ability to study the evolution of tumors such as NSCLC during treatment using time series approach models. The main goal of our research study is to identify the model that best describes the

existing radio-therapeutic treatment options: Stereotactic body radiation therapy (SBRT), also known as stereotactic ablative radiotherapy (SABR), and standard therapy (ST). Our mathematical structure builds on the linear quadratic model from the radiation oncological field and therefore, introduces parameters related to tumor's radio-sensitivity. Previous such one and two population ODE models of tumor volume dynamics, treating NSCLC, were designed using exponential and logistic growth functions. These studies indicate that a two population exponential model provided the best balance between fit and mathematical complexity and may serve a functional role in clinical practice. Our study reevaluates previous findings for treating NSCLC using both, the standard and SABR regimens, and tests the suitability of the hyper-Gompertz, hyper-logistic, Richards, Von-Bertalan, and a non-linear model derived using fluid mechanics laws by assessing their goodness of fit versus their mathematical complexity. These models are calibrated using data from eleven patients treated using SABR regimen, and four patients treated using standard therapy, extracted from a previous study. Models pertaining both treatment regimens are evaluated using statistical approaches, such as the Akaike Information Criterion. Model comparison indicates that the models fitting patient data perform differently based on the treatment regimen.

Our study suggests that for the SABR patients the non-linear model derived from fluid mechanics laws overall outperforms the rest of the studied models, and in the case of the standard treatment the logistic model seems to better represent patient data. Our hope is that our findings will benefit research regarding NSCLC, as well as other cancer field types.

THE ROLE OF DNA END PROCESSING PROTEINS IN DNA REPAIR AND AGING IN DROSOPHILA MELANOGASTER

Elyse Bolterstein, Biology

Every day chemicals, radiation, and free radicals can cause DNA damage in the form of mutations, lesions, and breaks in the DNA. Because, inaccurate repair of double-strand breaks (DSBs) can lead to genomic instability and cancer, it is unsurprising that many cancers include alterations in the expression of DSB repair genes. Therefore it is crucial that we have a clear understanding of DSB repair mechanisms to better understand cancer progression and to predict cellular responses to DSB-targeting chemotherapeutics.

One mechanism that cells commonly use in DSB repair is non-homologous end-joining (NHEJ). NHEJ is a template-independent mechanism in which DSBs are directly ligated back together through the coordinated efforts of end processing proteins, DNA polymerases, and ligases. One of these proteins is Werner (WRN). In humans, mutations in WRN cause Werner syndrome, an autosomal recessive disease characterized by

patients' increased risk of cancer and early onset of aging-related pathologies. We are especially interested in the 3' exonuclease function of WRN, which is shared by the *Drosophila* homolog, *WRNexo*. Our studies use flies containing a null allele of *WRNexo*, *WRNexo^Δ*, which we have previously shown to be deficient in repairing replication-induced DNA damage. We have found that compared to age-matched wild type controls, *WRNexo^Δ* flies exhibit shorter lifespans and higher tumor incidence. *WRNexo^Δ* flies also show increased physiological signs of aging such as degeneration of the flight muscles and reduced locomotor activity. Additionally, *WRNexo* appears to have a role in preventing DNA damage associated with free radicals as demonstrated by greater total antioxidant activity in the mutants. These data suggest that *WRNexo* may play a role in preventing aging pathologies caused by increased oxidative damage.

Our lab has recently begun to study Tyrosyl-DNA phosphodiesterase (TDP1), which is another DNA end processing factor involved in removing proteins and functional groups from DNA during abnormal DNA repair. This fall, we have confirmed that our mutants contain a deletion in the fly homolog of TDP1, *glaiKit (gkt)*. We have also confirmed published data that the *gkt* mutant flies are sensitive to the DSB-generating drug bleomycin and display diminished locomotor activity with aging. Our current efforts focus on determining sensitivity of these mutants to oxidative stress and assessing transcription levels of oxidative stress genes. These and future mechanistic studies will contribute to our knowledge of DNA repair mechanisms and their role in cancer prevention.

EXPLORING HOME ASSISTANT DEVICES IN BREAST CANCER EDUCATION

Francisco Iacobelli, Computer Science; Xiwei Wang, Computer Science

Caregivers play a fundamental role supporting breast cancer patients, but low health literacy in caregivers is associated with poorer care recipient self-management behaviors and increased caregiver burden.

Computer technologies are widely used in medical practice and has achieved great successes. In health care, computer applications have been a way to increase caregivers' health literacy. However, to this day, many of the computer based interventions for cancer patients and caregivers have been based on the delivery of pre-formatted and pre-curved information. More precisely, these applications are usually text based and provide sections where patients can read pertinent information. Therefore, they rely on users knowing exactly what to look for and where to go to find answers to specific questions. This is a skill that makes these applications less accessible to vulnerable populations with lower literacy levels.

More interactive systems can provide a way for low literacy patients and caregivers to find information at their own pace, and acquire necessary health literacy to alleviate some

stress. These systems are usually guided by the users and, in some settings, have proven to be effective in helping low literacy patients find pertinent information or alleviate stress in caregivers of children with cancer through dialogue and interactive drama interactions.

In this research we explored the feasibility of building a home assistant devices based spoken dialogue system, trained on educational content about breast cancer, which is able to interact with a caregiver/patient to quickly find useful information.

We built this system in three steps: (a) first, in collaboration with medical social scientists, patient navigators, and educators, we edited content about breast cancer so that it would be simpler to understand; (b) we developed an information-retrieval based dialogue system that is able to match user's questions with answers and is able to further talk about a given question; (c) we have integrated our system with two personal assistants: Google Home and Amazon's Alexa.

The significance of this project is twofold: (a) it is an important step towards an interface that can be commonplace to increase health literacy among low literacy cancer patients and caregivers; and (b) it serves as a base to advance research on dialogue systems interacting with low literacy patients.

Work Work: “CONFLUENT TIDES OF SWARM”

Olivia Cronk, English; Amanda Goldblatt, English; Larry Dean, English

This is a literary event. This is an artistic event. This is: a collaged performance of works by three English Department Creative Writing Faculty (Olivia Cronk, Larry Dean, Amanda Goldblatt), all of whom are contingent laborers and all of whom are acting as three fourths of a grassroots “Creative Writing Minor Committee” and all of whom are writers outside of the University and all of whom confront and exist within the “tides of swarm” that comprise *work* of all sorts. Teaching work overlaps with writing work overlaps with intellectual work overlaps with editing work overlaps with mentoring work overlaps with performance work overlaps with committee work overlaps with household work. Our title comes from Modernist poet Mina Loy, who mothered, wrote sculptural poetry, edited journals, sewed, designed lamps, and collected garbage. Our collective work is in the realms of teaching, editing, curating, writing fiction, writing poetry, writing nonfiction, mentoring, parenting, performing in literary settings, performing in musical settings. Here, we seek to showcase and reveal: what work--even though its subtle inflections might occasionally be trackable/be present in our other life--is *invisible* when we are “at work” at NEIU? This is a glimpse into the swarm. We will make *visible*, in the way we so often demand of our creative writing students, our work.

CAN ONE GET OUT?: STAYING WOKE IN CONTEMPORARY BLACK HORROR MOVIES

Ryan Poll, English

A troubling paradox exists at the heart of Jordan Peele's 2017 horror movie *Get Out*. Why doesn't the movie's protagonist Chris Washington (Daniel Kaluuya), and the other characters of color, recognize the racist violence behind the veil of "I support Obama" until it's almost too late? For characters who are introduced as woke and aware of how racism structures institutional and everyday social relations in the United States, why does the contemporary form of racialized slavery come as a complete surprise, especially to the central Black protagonist? My paper, "Can One *Get Out*?: Staying Woke in Contemporary Black Horror Movies," argues that Peele's movie opens important perspectives on how Black millennials recognize, map, and critique systemic forms of racism. More specifically, as I argue, *Get Out* recognizes the centrality of developing a radical Black aesthetics to staying woke. To analyze the complex relationship between aesthetics and remaining woke, my paper is divided into three interrelated parts. In part one, I explore Peele's choice to tell his critical narrative of contemporary slavery through the genre of horror. In its dominant, national form, the horror genre has functioned as a racialized project that reproduces and naturalizes White supremacy. As *Get Out* suggests, though, for Black Americans, the "horror movies" is not a contained genre, but rather, a structuring paradigm that foregrounds the nation-state foundational, violent racism. To be Black in America, in a very real way, is to be trapped in an unending horror movie without any chance to "get out." In the second section, I center on Chris's profession as a photographer and place his aesthetics within a larger context of contemporary Black photography. What, this section asks, does it mean that Chris's aesthetic eye can be appropriated by Whiteness? In the final section of the paper, I examine the close relationship between *Get Out* and "Afro-pessimism," a political philosophy we must take seriously in the continuing wake of the law's and civil society's systemic failures to redress the most egregious, structural forms of State-sanctioned violence against African Americans.

Decoding Elevators and Racial and Class Supremacist Thought in Colson Whitehead's THE INTUITIONIST

Tim Libretti, English

This presentation will focus on Colson Whitehead's novel *The Intuitionist* (2000), exploring how the novel creatively deploys and plays upon the conventions of detective fiction to critique racial and class ideologies that, the novel suggests, have historically structured and continue to structure U.S. society. I will analyze the novel in terms of how

Whitehead critiques class society and offers a kind of utopian economic imagination that prefigures, through an elaborate allegory of the elevator industry with all its ups and downs, a new set of socio-economic relationships as an alternative to those of a vertical or hierarchical class society informed by the commodity structure and characterized by exploitive relations of domination and subordination. Hybridizing the detective fiction form with the slave narrative form, a form born of class struggle and developed precisely as a response to an exploitive mode of production and class system, Whitehead, like the authors of slave narratives, calls for or points toward freedom to be attained through the abolition of systems of labor exploitation and attempts carefully to tell readers the story of how our world can be re-ordered and to persuade them of the efficacy of the newly imagined order.

In particular, I explore how Whitehead works to develop a new epistemological framework for producing knowledge. One of the key pieces of knowledge his protagonist Lila Mae Watson acquires is a new understanding of the relationship between subjects and objects. In fact, it is not accurate to say Lila Mae acquires new knowledge; rather, to state it more precisely and appropriately, she fundamentally transforms her epistemology, re-grounding and re-structuring her consciousness according to a new epistemological paradigm, thus transforming how she apprehends and processes the world and hence how she develops new knowledge about the world, transforming how she conceptualizes not just human relationships but subject-object relationships more broadly, which relationships are part and parcel of class society.

From early on in the novel, Whitehead introduces ways of reading, interpreting and interacting with the world as contested hermeneutic practices that underwrite and ratify different ways of knowing that implicitly endorse different political perspectives and material socio-economic relationships. Lila Mae, as she detects, learns to read anew and to detect the class system itself as she develops a class consciousness and new epistemology for apprehending the world. Whitehead's treatment of class issues begins with his representation of the class basis of and class dynamics involved in the very processes of detecting and of reading the world. As Lila Mae learns to read differently and to detect the presence of class itself at work in her world, shaping her relationships and her vision, she then can detect new possibilities for organizing social relationships and foster hopes for creating another world beyond this one.

IF ANYONE SAYS SINGULAR “THEY” IS FOR NONSEXIST LANGUAGE, THEY’RE WRONG!

Lewis Gebhardt, Linguistics

Though the use of “singular *they*” has been criticized as “ungrammatical” due to the

mismatch with a singular antecedent (e.g. *If anyone comes, ask them to wait*), *they* is overwhelmingly used in speech instead of the prescriptive masculine *he*. In the spoken language, *they*, more natural and less clumsy than *he/she*, seems to be a strategy for achieving nonsexist language, related to a desire for gender equality. However, singular *they* precedes gender equality and political correctness by centuries, and the historical origin of the expression and deeper synchronic analysis lie in other purely grammatical factors. What really distinguishes singular *they* from *he* is the degree of specificity in a quantified context. The form *he* (or *she*) is ruled out not because of a desire for gender equality in language but rather because *he* is too specific in certain environments. The nonsexist result is felicitous but not explanatory.

CAN WE CREATE NON-VIOLENT MOVEMENT?: CRITICAL QUESTIONS ABOUT METAPHOR IN EDUCATION NEWS

Jill Hallett, Linguistics

Discourse surrounding education in Chicago tends to be fraught with considerable hostility. After a breakdown in negotiations surrounding teacher merit pay, longer school days, and school closings, the Chicago Teachers Union (CTU) voted to strike for the first time in 25 years. The eight-day strike in September 2012 further polarized Mayor Rahm Emanuel and CTU President Karen Lewis, and by proxy, many Chicagoans.

This research attempts to uncover conceptual disparities among education stakeholders evident in the use of metaphor in their discourse. Santa Ana (1999) discusses metaphor as a shared cultural frame; Archakis and Tsakona (2009) understand the use of metaphor in news as a tool to make the reader feel involved in the political discourse. According to Argaman (2008: 483), "...a metaphor, which varies among participants, reflects the different ways by which people orient themselves to the context of organizational change."

Examples of metaphor were culled from Chicago Tribune News articles about education in Chicago during the month of September 2012. The timeframe was limited to these thirty days in order to capture the discourse surrounding education in the Chicago Public Schools immediately before and after the strike. The metaphors were classified by user, source and target domains, and typed according to conceptual metaphors outlined by Lakoff and Johnson (1980) and detailed on the Berkeley Conceptual Metaphor Home Page.

Due to the positioning of Emanuel and Lewis as the leading figures of the 2012 contract negotiations and strike, it was expected that they would be the main sources of metaphorical discourse in the news articles under study.

Many of Lewis' metaphorical discourse relates negotiations to a journey. There is no pattern to the few metaphors Emanuel employs. In fact, it was the reporters who generated the most prolific use of metaphor in their commentary, as in (1).

- (1) Tribune reporters, September 9, 2012 [the day before the strike]
If Chicago teachers go on strike Monday, the walkout would set up a political minefield for both Mayor Rahm Emanuel and Chicago Teachers Union President Karen Lewis, adding the explosive element of a blame game to contract negotiations that already are highly combustible.

The reporters employed war metaphors heavily, referring, for example, to weaponry, victory, battles, and sides.

Given the notion that metaphor shapes public understanding of abstract ideas, this research examines the use of metaphor by different stakeholders in the CTU strike of 2012, focuses on the role of the media in framing issues of education in Chicago as divisive and violent, and initiates a conversation about more productive framing.

LOGINS FROM 14,894 UNIVERSITY STUDENTS REVEAL SOCIAL JETLAG AFFECTS A MAJORITY OF STUDENTS AND CORRELATES WITH DECREASED ACADEMIC PERFORMANCE

Aaron Schirmer, Biology; Benjamin Smarr, Psychology

Human circadian rhythms modulate learning, attention, and memory. Sudden, large changes in the phase relationship between endogenous circadian phase (chronotype) and the environment (e.g. jetlag) result in temporary learning deficits. A common cause of such misalignment is social jetlag - effective jetlag imposed by social constraints - such as shift work or school times. SJL is increasing in modern society, but the real-world impacts of daily SJL are not clear, though they are assumed to be almost universal for people living under modern infrastructure. Here we explore the interaction of chronotype, SJL, and academic performance. We analyzed learning management system login events for 14,894 Northeastern Illinois University students over a two year period. We found that 60% of students show average daily SJL of at least half an hour between class and non-class days. SJL correlates with decreased academic performance, negatively impacting students with both delayed and advanced rhythms on class days relative to non-class days. Our data also reveal that late chronotypes remain at a significant disadvantage even in evening classes. This is counter to previous proposals that later classes for later chronotypes could alleviate the negative effects of social jetlag. Either the latest classes are not late enough to align with late chronotypes, or the chronic SJL

imposed on late chronotypes overwhelms any advantages that arise from within-day alignment. These findings demonstrate that SJL affects a wide portion of population, and arise routinely from daily demands, such as school, even in populations of diverse age and demographics. Given the abundance of similar data structures on academic, professional, and social networks, analyses like these could be expanded as a complement to circadian research approaches, enabling large, real-world populations to be investigated economically. Such analyses also have the potential to improve academic counseling by enabling individuals to generate schedules accounting for their chronotype.

DECONSTRUCTING THE MANTIS VISUAL SYSTEM: MERGING LITERATURE, PSYCHOLOGY, NEUROSCIENCE, AND COMPUTER PROGRAMMING

Frederick Prete, Biology

Praying mantises are charismatic, enigmatic, and charming visually guided predators that have been the object of people's fascination at least since the Egyptian Book of the Dead. That interest notwithstanding, virtually everything I read about this creature after serendipitously discovering my first mantis on the steps of the biology library at The University of Chicago turned out to be erroneous. My decades-long quest to understand this animal's visual system has lead me on an intellectual journey through the dusty shelves of rare book rooms, treatises on the evolution of cognition, empirical research papers on the cellular physiology of photoreceptors, and technical instruction manuals on the computer programming languages used to construct robotic seeing systems. Finally, with the help of a diverse group of dedicated undergraduate research students, I think that I'm beginning to understand how at least one part of the mantis' visual system works and how that knowledge can be used model relatively simple (but useful) computer vision algorithms. The intellectual journey begins with the understanding that the nervous system was the *first* physiological system to evolve. All other systems evolved in its shadow and under its management. One unique characteristic of the nervous system is its ability to generate remarkable emergent properties, such as vision. The conversion of a relatively small band of electromagnetic energy into a delicious, variegated visual world is almost too much to fathom. Arguably, the most intriguing task that vision performs is to accurately, reliably, and repeatedly recognize objects (irrespective of the perspective from which they are viewed), and localize them in three-dimensional space. So remarkable is this ability that a three-year-old human can outperform the most sophisticated object recognition computer programs. However, as robust as this phenomenon is, it is still not well understood. Interestingly, however, the mantis has the uncanny ability to do this task in at least one domain: It can identify a variety of very different objects as members of the one abstract category, 'prey'. This is analogous to a human's ability to recognize a variety of objects as 'chairs' despite their unique (and often quite different) appearances. Using experimental psychophysics (informed by ecology, cognitive psychology, and common

sense), and standard electrophysiological techniques, our research has revealed that mantises rely on a unique computational algorithm to classify objects into the abstract categories 'prey' vs. 'non-prey' based on assessing a finite number of identifiable stimulus parameters. If a sufficient number of these parameters reach threshold values (and the physiological context is appropriate), the mantis will recognize the object as a potential prey item and try to capture it. This basic methodology can be used to model relatively parsimonious object recognition computer programs which, in turn, can provide usable metadata on the location, velocity and movement trajectory of objects in the real world.

IN SEARCH OF AN ALTERNATIVE CONTROL MECHANISM FOR MULTIDRUG RESISTANT PSEUDOMONAS AERUGINOSA

Emily Booms, Biology

Pseudomonas aeruginosa is an opportunistic, nosocomial pathogen that poses a serious risk due to its rise in antibiotic resistance. Infection and mortality rates due to nosocomial *P. aeruginosa* infections are also increasing. Taken together, it is imperative to discover new methods to control *P. aeruginosa* in both environmental and clinical settings. One potential resource may be essential oils (EOs). EOs are naturally occurring, volatile aromatic compounds found in a variety of plants. They have demonstrated antimicrobial properties against both bacteria and fungi, however, it is unknown if EOs are effective against bacteria that are resistant to several antibiotics. In our study, we anticipate that EOs with a high concentration of terpenes and oxygenated-derivatives will disrupt cell membrane integrity, thus inhibiting growth of multidrug resistant *P. aeruginosa*. The inhibitory effects of 17 EOs and four antibiotics (ampicillin, ciprofloxacin, gentamicin and sulfamethoxazole w/ trimethoprim) were assessed independently, and then tested together for potential synergistic effects against two clinically infectious strains and one multidrug resistant strain of *P. aeruginosa*: ATCC 9027, ATCC 33347, and ATCC BAA 2110. The inhibitory effect of each oil was evaluated using a standard disk diffusion assay with two-fold dilutions from 10% to 1.25% in triplicate. Preliminary results demonstrate that oregano wild, wintergreen, cinnamon branch, clove bud, tea tree, mugwort, and sage oils were potent inhibitors of bacterial growth and displayed a dose dependent inhibitory trend against all three strains. Of the antibiotics tested against these potent oils, ciprofloxacin demonstrated synergistic potential with all oils except sage oil when tested against the multidrug resistant strain. Cloves bud may be the strongest synergistic candidate especially when used together with ampicillin. Multidrug resistant *P. aeruginosa* is already resistant to ampicillin, making the increased efficacy when cloves bud oil and ampicillin are used together, all the more exciting. To better understand the inhibitory effects of these oils, their active component(s) must be isolated and identified. The shared components among the top EOs are eugenol, linalool, γ -terpinene, β -

caryophyllene and eucalyptol. The oxidative activity of these compounds may serve as the antimicrobial components of these EOs and may work synergistically to increase the efficacy of antibiotics against multidrug resistant *P. aeruginosa* infections.

DOES THE ALS ASSOCIATED PROTEIN TDP-43 SPREAD LIKE A PRION?

Cindy Voisine, Biology

Cindy Voisine¹, Zelene Figueroa¹, Quan Nguyen¹, Emily Rendleman¹, Bernd Bukau² and Carmen Nussbaum-Krammer²

¹ Department of Biology, Northeastern Illinois University, Chicago, IL 60625

² Center for Molecular Biology of Heidelberg University (ZMBH), 69120 Heidelberg, Germany

Many neurodegenerative disorders such as Alzheimer's disease (AD), Parkinson's disease (PD), amyotrophic lateral sclerosis (ALS) and prion diseases are characterized by abnormal accumulation of disease proteins in nerve cells leading to selective neurotoxicity. Moreover, a prion-like spreading mechanism might play a role in disease progression, where misfolded disease proteins spread from affected to unaffected neurons. Interestingly, ALS exhibits a focal clinical onset followed by a regional spreading of protein misfolding and cell death. Evidence points towards TAR DNA-binding protein 43 (TDP-43) as the major pathological protein in sporadic and certain familial forms of ALS where aggregates in affected neurons contain full length and fragmented forms of TDP-43. Despite recent advances in biomedical research on ALS disease associated proteins like TDP-43, a mechanistic explanation that links toxicity with cell to cell transmission remains unclear.

To examine TDP-43 related toxicity, we have established *C. elegans* models that express human TDP-43 fused to fluorescent proteins. Using well-established behavioral assays, we found that neuronal expression of full length TDP-43 decreased motility and lowered chemosensory and mechanosensory detection compared to wild type suggesting defects in neuronal functionality. In addition to neuronal dysfunction associated with TDP-43 expression, we observed a decline in organismal health as measured by a reduction in fecundity, embryogenesis, larval development and lifespan. These results demonstrate both a cell autonomous and non-autonomous toxic effect associated with TDP-43 neuronal expression. To explore whether spreading of TDP-43 could contribute to organismal decline, we employed high-resolution time-lapse imaging and observed the intercellular movement of a C-terminal fragment of TDP-43 from body wall muscle cells to the hypodermis, intestinal cells and gonad in living animals. These results confirm that at least certain fragments of TDP-43 are released from expressing cells into neighboring

non-expressing cells, which may contribute to the decline in organismal health. Our *in vivo* evidence for the spreading of TDP-43 supports the model that cell to cell transmissibility of toxic forms of TDP-43 contribute to disease progression.

USE OF MOLECULAR TOOLS TO DETERMINE INVASIONS AT AN EARLY STAGE: A CASE STUDY WITH TYPHA DOMINGENSIS INVASION TO THE MIDWEST REGION

Pamela Geddes, Biology

Typha domingensis is a wetland plant native to temperate and tropical regions such as Florida and the Caribbean. There has been speculation that *T. domingensis* is moving north from its native habitat to areas in the Midwestern United States, presumably by human transport and increased global warming. The presence of *T. domingensis* can be a threat to the native cattail species of the Midwest region, *T. latifolia*, because *T. domingensis* could hybridize with the native, or the other Midwestern species, exotic *T. angustifolia*. In the Midwest, we already have a hybrid cattail, *T. x glauca*, which is a product of the cross between *T. latifolia* and *T. angustifolia*. *T. x glauca* is an extremely aggressive invader that reduces native plant biodiversity and it is very hard to control and eradicate. It is difficult to accurately identify cattail species morphologically due to hybridization that causes similar phenotypes. In order to determine whether *T. domingensis* has indeed migrated and established in the Midwest, we used molecular tools (microsatellites) to address if this technique was useful in distinguishing *T. domingensis* from the other *Typha* species. We tested 6 microsatellite primers that have been previously used by our lab to distinguish among the 3 *Typha* species on 11 *T. domingensis* samples. Our preliminary results showed that out of the six primers used, all 6 amplified *T. domingensis* DNA. However, only 4 primers provided possible “unique” molecular signals for *T. domingensis*; the other 2 primers’ molecular signals overlapped with those of *T. angustifolia* and *T. latifolia*. Further testing is needed to accurately conclude if the primers are specific enough to distinguish *T. domingensis* from the other three cattail species. By using microsatellites, ecologists could more accurately identify certain species rather than mistaking them for native or invading species that may have been incorrectly identified morphologically.

LESSONS FROM WORMS: ELUCIDATING THE MOLECULAR MECHANISMS OF HOW CELLS TALK TO EACH OTHER IN MULTICELLULAR ORGANISMS

Michael Stern, Biology; Cindy Voisine, Biology; Te-Wen Lo, Biology; Victoria Puccini de Castro, Biology; Omar Payan Parra, Biology; Mariya Stefinko, Biology

Michael Stern¹, Victoria Puccini de Castro¹, Omar Payan Parra¹,

Mariya Stefinko¹, Te-Wen Lo², and Cindy Voisine¹

Departments of Biology

¹Northeastern Illinois University, Chicago, Illinois, 60625

²Ithaca College, Ithaca, NY, 14850

Cells within multicellular animals “talk” with each other to coordinate the processes that generate and maintain the normal structures and functions of complex, multicellular animals. Protein receptors that sit on the surface of cells can “hear” specific extracellular signals and then respond to those signals by initiating a cascade of intracellular biochemical responses that ultimately effect the changes in cellular behavior that are triggered by those signals. Diseases, such as cancer and a wide range of other pathologies, arise from aberrations in the normal functioning of these processes.

Receptor tyrosine-kinases (RTKs) are one class of cell-surface receptors, and fibroblast growth factor receptors (FGFRs) are a sub-class of these RTKs. These receptors trigger downstream responses by phosphorylating specific tyrosine residues on the receptors themselves (autophosphorylation) as well as other components of the signaling cascade. The study of FGFR signaling in the nematode (“worm”) *Caenorhabditis elegans* has served as a paradigm for understanding principles of FGFR signaling, since defects in the processes mediated by the *C. elegans* EGL-15 FGFR result in striking phenotypes that can be used to discover components of the EGL-15 signaling pathway. For example, hyperactivation of EGL-15 results in the excessive accumulation of clear fluid within the worm’s body (the Clr phenotype). The isolation of suppressor of Clr (*soc*) mutants has led to the identification of many of the core components of EGL-15 signaling. For example, the original set of *soc* mutations identified the Grb2/SEM-5 adaptor protein that links RTK activation to essential downstream components.

Although SEM-5 is required for EGL-15 signaling, a key component that links activated EGL-15 to SEM-5 has yet to be identified, since an *egl-15* mutation, *n1457*, that eliminates the known SEM-5 binding sites on EGL-15 does not confer a Soc phenotype. To identify these missing components, we conducted a modified, “enhancer” *soc* screen in an *egl-15(n1457)* background and identified new *soc* mutations that define at least two new *soc* genes. Genetic analysis and whole-genome sequencing is being used to identify the molecular identities of these new FGFR signaling genes.

EXCITING PROPERTIES OF ORGANIC PHOTOVOLTAICS AND METALLOPOLYMERS FOR SOLAR FUEL GENERATION

Samantha Brown-Xu, Chemistry; Lin Chen, Chemistry

Organic photovoltaics (OPVs) are a solar cell technology that utilize carbon-based

materials for light absorption and charge separation. Light is absorbed by a conjugated polymer to produce an exciton, which can be split into free charges at an interface with a C₆₀ fullerene electron acceptor. High-performance polymer materials incorporate an alternating donor-acceptor structure to encourage exciton splitting, leading to higher device efficiency. To study the how the energy alignment of the donor and acceptor groups affect device performance, femtosecond transient absorption (TA) studies were performed on a series of polymers that varied the conjugation of the donor unit, PTR3, PTR5, PTR7 and PTR9 (Figure 1).

After excitation by a femtosecond laser pulse, a short-lived polymer excited state (exciton, $\tau \sim 1$ ps) is formed. The exciton can diffuse through the polymer chain until it encounters a fullerene acceptor, or decay back to the ground state. At the interface with the acceptor, the exciton can undergo charge separation to transfer an electron to the fullerene, leaving a positively-charged hole on the polymer. Both the exciton and the polymer cation produce unique spectroscopic signatures in the near-IR that can be used to monitor their lifetimes as well as the relative amounts of each state produced.

In these TA studies, it was observed that PTR3, with the smallest donor unit, showed the highest degree of charge separation while PTR9, with the largest donor unit, showed the lowest degree of charge separation. Density functional theory calculations were performed to support these results and showed that increased donor conjugation produced localized excitons that do not readily move through the polymer and that are therefore unable to reach the interface with the fullerene acceptor. In device performance studies, the power conversion efficiency ranged from 7.4% for PTR3 to 2.0% for PTR9. These results can be used to inform polymer design in order to produce more efficient materials in the future. Additionally, similar polymers can be used for the production of solar fuels such as hydrogen through the addition of catalytic metal sites along the polymer backbone. To achieve high catalytic efficiencies, exciton transport and charge separation at the metal site must be optimized. Transient absorption spectroscopic studies on these metallopolymer systems are currently ongoing.

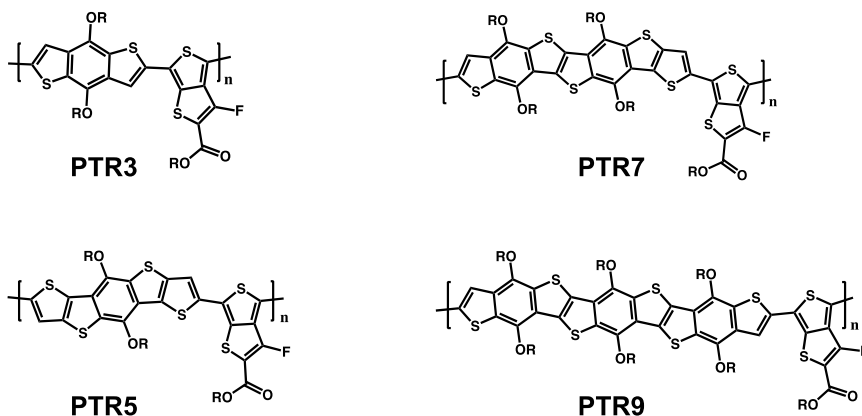


Figure 1. Structures of the donor-acceptor polymers under investigation.

INGAP PEPTIDE PROTECTS PANCREATIC RIN5F CELLS FROM METHYLGLYOXAL-INDUCED DEATH

Jing Su, Chemistry; Shubhangee Mungre, Biology

Diabetes mellitus is a metabolic disease characterized by high level of blood sugar. In a healthy person, the hormone insulin from β -cells of pancreatic islets regulates blood sugar level. In diabetic patients, there is a continuous loss of pancreatic β -cells mass and dysfunction of β -cells that result in deficiency of insulin. Methylglyoxal (MG), a by-product of glycolysis, is believed to cause the deleterious effects observed in diabetes by causing oxidative stress. The level of MG is found to be higher than normal in diabetic patients. In this study, we determined whether MG is responsible for the death of β -cells. RIN5mF cells (rat β -cells) were grown in the absence or presence of different concentrations of MG. Cell viability was examined through changes in cell morphology and quantitatively measured by colorimetric assay. Our data showed that MG treatment at 40 μ M causes 50% cell death in 24 hours. We also tested the cytoprotective effect of a pentadecapeptide segment of Islet Neogenesis Associated Protein (INGAP-P), Ac-IGLHDPSHGTLPNGS-NH₂. INGAP-P alone did not have any harmful effect on cells, and at 1 μ M was able to increase cell viability by 20% compared to untreated cells at 24 hours. When cells were treated with MG and INGAP-P together, RINm5F cells showed no cell death suggesting that INGAP-P effectively protects the cells from cytotoxicity of MG.

In the next stage of research, we are interested in determining the mechanism of MG-induced cell death (whether apoptosis or necrosis). The mechanism of INGAP-P action on β -cells will also be investigated, which can guide the design of new peptide drugs for treating diabetes.

PEER ENHANCED EXPERIENTIAL RESEARCH

Ken Nicholson, Chemistry; Paulo Acioli, Physics; Sudha Srinivas, Physics; Elisabet Heah, Earth Science; Joseph Hibdon, Mathematics; Lidia Filus, Mathematics, Marcelo Sztainberg, Computer Science, Rachel Trana, Computer Science

Northeastern Illinois University (NEIU) has received a National Science Foundation Improving Undergraduate STEM Education (NSF-IUSE) grant to improve the engagement, learning, and retention of its undergraduate majors in Science, Technology, Engineering and Mathematics (STEM). The title of this program is, "Peer Enhanced Experiential Research in STEM" (PEERS). The PEERS project at NEIU is a

multidisciplinary curricular initiative that embeds research modules into entry-level courses in Chemistry, Earth Science, Physics, Mathematics and Computer Science. These modules take 3-5 weeks to complete and have been integrated into the laboratory and discussion sections of these courses. Students who have successfully completed the course are recruited to serve as peer leaders for these courses, particularly the research modules. The leaders are trained through a newly designed, multi-disciplinary research workshop course in addition to weekly or biweekly meetings with faculty members teaching the introductory courses. This presentation will describe specific examples of open-ended, inquiry based, interdisciplinary research projects in the fields of statistics, computer science, chemistry, and physics that are being integrated into the curriculum. Challenges, revisions, and next steps will be discussed. Data involving the student assessment of learning gains as well as student attitudes before and after the research experiences will be presented. The challenges of engagement, retention, and success of STEM majors in are not unique to NEIU; therefore, the outcomes of the project and assessments are relevant to other urban institutions with a large percentage of students with financial, familial, as well as other challenges which often delay or impede graduation.

MAGNETITE CRISIS IN MINIATURE: VANADIUM, SULFUR, AND IRON VALENCE STATE MEASUREMENTS IN NYAMURAGIRA VOLCANO (AFRICA) MELT INCLUSIONS

Elisabet Head, Earth Science

Sulfur (S), vanadium (V), and iron (Fe) K-edge micro-X-ray absorption near edge structure (micro-XANES) spectroscopy of melt inclusions (MI) from Nyamuragira volcano (D.R. Congo, Africa) shows that diffusive loss of H from olivine-hosted melt inclusions may lead to crystallization of submicron magnetite and sulfide crystallites that are imperceptible petrographically or via electron microscopy. Micro-XANES was used to constrain the evolution of oxygen fugacity (fO_2) and sulfur speciation for MI preserved in Nyamuragira tephra (1986 and 2006) and lava (1938 and 1948). The S, V, and Fe valence state oxybarometry for 1938, 1948, and 2006 MI are all consistent with equilibration at ~ FMQ-1, and sulfur in MI from these three eruptions are sulfide-dominated (< 9% sulfate). However, Fe and V micro-XANES data for 1986 MI appear to be more reduced by 1-2 log units, while S micro-XANES data indicate more variable sulfate content. The 1986 data are best explained by diffusive loss of H from the entrapped melt. Submicron magnetite forms as Fe oxidizes in the melt in response to the loss of H, and V strongly partitions into these magnetite nanolites due to its compatibility. The nanolites are consistently analyzed within the beam volume and, thus, the measured V XANES appears more ordered. Magnetite crystallization from the melt also triggers precipitation of crystalline FeS phases within the inclusion, leading to a more ordered S

XANES spectra as well. This may suggest a different magma storage history for the 1986 eruption compared to the other eruptions. Results demonstrate that coupled S, V, and Fe micro-XANES analysis of alkalic MI can provide accurate measures of the fO_2 of entrapped melts, and that V and S micro-XANES spectroscopy are potentially highly sensitive tools for identifying diffusive water loss in olivine-hosted MIs.

A RAPID ASSESSMENT OF NIGER DELTA EX-MILITANTS' EXPERIENCES IN MILITANCY PARTICIPATION IN THE FEDERAL AMNESTY PROGRAMME'S SKILLS DEVELOPMENT CURRICULUM

Isidore Udoh, Health Sciences and Physical Education

We used the Delphi method to examine the beliefs of 27 experts in HIV/AIDS and in Nigerian society about the possible influence of culture and religion on HIV/AIDS in the Niger Delta of Nigeria. Our Delphi survey included 16 statements on the relationship between traditional culture, religion, Christianity, sexuality, virginity, abstinence, and HIV/AIDS. The insights of the experts suggest that religion and culture may have played an important role in the HIV/AIDS epidemic in the Niger Delta and potentially can influence, positively or negatively, future strategies for HIV prevention, care and support of people living with HIV/AIDS in the region.

HOW CINEMA EXCERPTS ENHANCE A CULTURALLY RELEVANT RESPONSIVE-VALUE DRIVEN PEDAGOGY

Sunni Ali, Educational Inquiry and Curriculum Studies

Most certainly “good styles of teaching” match the needs of students. As technology distractions within society grow more and more tearing students away from a classroom’s pedagogy, it becomes even more important today for teachers to find effective ways to engage students. Cinema clips is one-way educators can apply a cultural value driven pedagogy to connect students to lessons. For one, the use of cinema clips allows teachers to use multi-media resources to translate or deconstruct a lesson through video and auditory mechanism. Furthermore, it offers a differentiated style of teaching for students. What makes the use of Cinema clips noteworthy is its ability to provide students with multi-faceted information and different perspectives about an instructional topic.

Quite honestly, there is nothing really new about teachers applying cinema clips to connect students to learning content. What is different is how such a method adds cultural value and instructional meaning for students and teachers in a classroom. When

appropriately and strategically aligned, cinema clips promote powerful discussion webs and project-based learning assignments while at the same time creating a different set of menu options for students to choose from. Simply just showing a movie to show a movie is “bad teaching practice.” However, when used strategically, cinema clips provide teachers with the effective means to combat boredom aligning modern tech devices into a classroom experience.

My discussion with this article will review successful teaching strategies and practices that can be applied within an instructional setting to engage learners. In addition, provide a review of how media clips advances a pedagogy ability to respond and address students’ culture.

EXPLORING HOW FIRST-GENERATION ADULT LEARNERS’ MAKE MEANING OF THEIR TRANSITION EXPERIENCES TO FORMAL EDUCATION

Russel Wartalski, Literacy, Leadership, and Development

Adult learners and first-generation learners, as distinct groups, have been enrolling in increasing numbers at colleges and universities over the last few decades (Aslanian & Giles, 2009). Enrollment trends for these two groups will likely continue to increase in coming years, with a growing number of students being dually classified as adult and first-generation (National Center for Educational Statistics, 2011). Separate literature bases exist that document the characteristics, learning styles, and academic experiences of adult learners and first-generation learners. While some of the research found in each literature base can overlap at times, scant research exists that explores how dually-classified first-generation adult learners transition to formal education.

Recently, qualitative research was conducted that focused on exploring and describing the transition experiences of 10 first-generation adult learners to undergraduate education at one public, research-focused university (Wartalski, 2017). The framework used to guide the study was Schlossberg’s Transition Theory. The most recent iteration of the theory employs the 4S System, which is used to investigate an person’s (1) situation, (2) self, (3) support, and (4) strategies related to the transition (Anderson, Goodman, & Schlossberg, 2012). This presentation will focus specifically on two aspects of the study. Specifically, this presentation will highlight (1) the issues that prompted first-generation adult learners to pursue post-secondary education and (2) the initial challenges they faced within the first semester of their education. Some recommendations to enhance future first-generation adult learners’ initial transition experiences to formal education will be discussed.

REFERENCES

Anderson, M. L., Goodman, J., & Schlossberg, N. K. (2012). *Counseling adults in*

transition:

Linking Schlossberg's theory with practice in a diverse world (4th ed.). New York: Springer.

Aslanian, C., & Giles, N. G. (2009). *Hindsight, foresight, insight: Understanding adult learning trends to predict future opportunities*.

U.S. Department of Education [USDOE], National Center for Education Statistics [NCES]. (2011). *Digest of education statistics: 2011*.

Wartalski, R. (2017). *Exploring the transition experiences of first-generation adult learners to undergraduate education: A qualitative case study*. Doctoral Dissertation.

TRANSLANGUAGING: A CASE STUDY OF LATINX BILINGUALS SOLVING A MATHEMATICS PROBLEM

Hector Morales, Teacher Education

This presentation presents a perspective in which students use their agency to develop and affirm their Latinx bilingual mathematical identities in the context of high school mathematics. Although research has opposed deficit perspectives of using native language during mathematics learning, there is still much to learn about the intricate process by which Latinx bilingual students use their language and culture to engage in mathematical problem solving (Razfar 2013). Therefore, in the context of working collaboratively on a mathematical task for which a solution path was not known, this case study highlights how Latinx bilingual¹ students spontaneously and dialogically leveraged² their communicative practices and mathematical resources to persevere past obstacles along their path toward meaning making. Specifically, I hope to reveal the empowering effects of Latinx bilinguals' translanguaging and how they leverage their linguistic resources to persevere while problem solving to help develop their own mathematical meanings.

I draw on translanguaging to reconceptualize bilingualism as a liberating and empowering communicative practice capable of transforming learning. Translanguaging is more than just a simple shift between two languages (i.e., English and Spanish). It is a complex and

¹ We use the term “bilingual” or “bilinguals” to reflect that the students in this study are not learning English as a second language, but are multilingual along a continuum.

² We use the term “leverage” as students' agency to capitalize on their communicative and linguistic repertoires. See Martinez, Morales & Aldana 2017 for a review of how the term is used by scholars.

interrelated communicative practice that make up bilinguals' linguistic repertoire (Cenoz 2017). Garcia (2017) posits, "...speakers use their languaging, bodies, multimodal resources, tools and artifacts in dynamically entangled, interconnected and coordinated ways to make meaning (p. 258)". A translanguaging lens will allow me to better understand holistically how bilingual students use their linguistic, multimodal, and mathematical artifacts repertoire to make meanings as they wrestle with challenging mathematical ideas.

My observations are part of a larger study of Latinx bilinguals in mathematics (Morales, Jr. 2004) and were made in a twelfth-grade mainstream class in a school that has a student population which was nearly 80% Latinx. The students – Carina, Jessica, Elena, Ines (pseudonyms) – had worked collaboratively all year and were selected based on their level of bilingualism while doing mathematics in small groups. Observations concentrated on the students' discourse patterns and particular attention was paid to how students used their linguistic resources (linguistic, visual-graphic, or gestures) while negotiating meaning, and how students interacted with available resources as a means for aiding the development of meaning.

My findings indicate that these students on their own exercised agency to engage in a translanguaging practice that played a central role in their learning and asserting their identities as bilingual Latinx mathematics students. These students were competent problem solvers who leveraged their translanguaging practices to help persevere with challenging mathematical ideas. In this way, this groups' in-the-moment perseverance was the coveted outcome of their translanguaging and not the arbitrary achievement of solving the problem.

We use the term "bilingual" or "bilinguals" to reflect that the students in this study are not learning English as a second language, but are multilingual along a continuum.

¹ We use the term "leverage" as students' agency to capitalize on their communicative and linguistic repertoires. See Martinez, Morales & Aldana 2017 for a review of how the term is used by scholars.

A THREE CONCEPT MODEL TO TEACH NOS: EMPIRICAL OBSERVATION, SUBJECTIVE PROCESS OF SCIENCE, AND INFERENTIAL EXPLANATIONS

Huseyin Colak, Teacher Education

Understanding of Nature of Science (NOS) informs what science is, how scientific knowledge is generated, and "the values and beliefs" inherent to scientific knowledge and its development (Lederman, 1992, p.498). Students should understand the power and limitations of science, use of scientific knowledge in decision-making, and science as an

important part of culture (NRC, 1996). In order to understand what science is and how it works, as well as the external limitations and internal consistencies of scientific theories, laws, and hypotheses, it is necessary to develop the skills, critical thinking, problem solving, and creativity, to construct scientific understanding and apply their understanding to real life issues. Incorporating NOS into teaching science will stimulate the development of these skills and promote the application of learned concepts in real life problems. This will foster a better understanding of science content (Olson, 1998). Teaching NOS encourages students to express their own ideas about science and scientists through discussing, writing, and modeling so that they can critically evaluate scientific concepts and the process of science (Hanuscin and Lee, 2008). As students develop a scientific habit of mind with critical thinking, reflective, and questioning skills through improving their NOS understandings, they will appreciate science more and be more willing to study and curb their interest in science, better understand the content with its strength and limitations, and better value the role of science in social decision making (Clough, 2011). Nature of Science entails seven concepts: tentative; empirical; theory-laden; creative; and socially and culturally embedded; observation and inference; the lack of a universal recipe like method for doing science; and the functions of and relationships between scientific theories and laws. These are not the same as the scientific process, but rather the epistemology underlying it (Lederman, 2002). From these seven aspects, it is clear that they overlap conceptually.

A characterization of the Nature of Science should focus on understanding the primary tension within science, the conflict between the pursuits of objective evidence given subjective constraints. As human beings experience the world through a subjective lens, rather than observing objective truth. From understanding the central tension of the nature of science, the pursuit of objectivity via inference constrained by subjectivity, the other aspects of the Nature of Science can be derived. Empiricism is the practical response to the effects of subjectivity in the pursuit of objectivity. The social and cultural embeddedness of science is self-apparent by the distinction that science is an activity carried out by inherently subjective scientists. The tentativeness of science is produced from the interplay between the subjective conditions of observation and the continuous goal of revealing objective truth. Further aspects, such as the creative qualities of science and the distinction between theories and laws, of the NOS are contained within, and derived from this central tension, which is based on empirical observation of facts and/or scientific laws and constructing inferential explanations through a subjective process.

THE POWER OF HIDDEN LANGUAGE

Sunni Ali, Educational Inquiry and Curriculum Studies

How a teacher responds and communicates to a student often sets the tone, climate, and

culture of a person's educational journey for years to come. This does not just entirely deal with the interactions that take place between a teacher and student for a school term. People's memories of experiencing a terrific or terrible educator are often etched into their minds. Quite simply, no one forgets a good or bad teacher.

The power of hidden language has a lot to do with the type of rapport that will be established between teachers and students. Without it, poor communication, ineffective behavioral responses, and negative attitudes toward learners constantly manifest through the canons of implicit or explicit language. A teacher's mannerism, behavior, and expressions to learners convey whether or not the teacher cares for them. Most certainly, students pick up on such a "vibe" whenever an educator is in front of them and "doesn't like them."

To reaffirm the establishment of an excellent learning environment while supporting the academic needs and excellence of students, patience, support, and love are necessary to build social capital between students and teachers. Student fallibilities should be seen as genuine human responses apart of a person's learning curve whether than an innate genetic deficit or racial bias lens. Without improving the power of language in a classroom space, cafeteria, or building, negative behaviors between students and teachers will continue to interfere with the teaching and learning process.

I will discuss and review best practices teachers and schools should incorporate within their setting to engage students, especially when learners exhibit challenging behavior. Emerging from my conversation will occur examples and scenarios that incorporate effective strategies that help students become more responsive within schools, but also address the pros and cons of implicit and explicit communication.

YOUNG CUBANS, TRANSNATIONALISM, AND CITIZENSHIP

J. Ruth Dawley-Carr, Educational Inquiry and Curriculum Studies

In the early 1990s, Cuba opened its markets to tourism and foreign investment. With this opening came new ideas about products and technologies that have catapulted Cubans into the present millennium and magnified citizens' curiosity about life outside of Cuba. Simple forms of technology, such as a *memoria* (a USB drive), have transformed the landscape of what Cubans know and see: after decades of isolation, a *memoria* can quickly provide Wikipedia downloads and international news as well as foreign music, television, and film. Such content is quickly copied, sold, and circulated, often without state intervention.

Already generations away from the Cuban Revolution, young people look eagerly outside of Cuba, seeking to build relationships with friends and family now living abroad, and in search of adventure, entertainment, and employment. This qualitative study seeks to

understand how Cuban youth in their early and mid-twenties make sense of what it means to be Cuban in an increasingly transnational era. Drawing upon social contract theory, it investigates what youth see as their roles and responsibilities as Cubans to the state, to society, and to themselves, as they are exposed to ideas that add nuance to their nationalistic upbringings. This paper centers on three young people in their mid-twenties who engage in different forms of transnationalism: Tomás, whose transnationalism stems from two years of work in Venezuela, Sandra, whose transnationalism originates in her access to technology, and Paúl, who reaches outside of Cuba through his language and media studies. Participants engaged in taped one-on-one and focus group interviews conducted in Spanish in February of 2017. Part of a larger study, their experiences are juxtaposed to government-sponsored, ideal notions of citizenship.

Early findings indicate that for young people, balancing nationalistic ideals with international curiosity is complicated, and socioeconomic status persists as a barrier to their transnationalism. Although Tomás maintains international friendships from his time living outside of Cuba, his short-term, unofficial employment does not provide a steady income. Not uncommon for people his age, his limited income prevents him from accessing the internet and texting to communicate with friends abroad. Sandra, in contrast, has had a computer most of her life along with internet access, and sits in a better position to maintain a link to the world and markets outside of Cuba. She buys the weekly *paquete*—a collection of applications and other media sold on *memorias*—teaches herself the technology, and then charges \$1-\$2 to teach others how to use the apps. This constant learning and teaching keeps her at the forefront of technology conversations. Paúl, the only one of the three who is pursuing a college degree—a key form of citizenship—has regular access to technology yet his university-based internet is censored. Thus he maintains his open connection to the world outside of Cuba through means such as his language studies at the Alianza Francesa and through foreign film. An examination of these three young people's experiences seeks to make sense of youth citizenship in a steadily globalizing Cuban nation.

STATE POLICY AND EQUITY ON ATTAINMENT OUTCOMES: THE IMPACT OF ADOPTING A COMMUNITY COLLEGE BACCALAUREATE POLICY ON STATES' ATTAINMENT INDICATORS FOR LATINO STUDENTS

Angela Vidal-Rodriguez, Educational Inquiry and Curriculum Studies

This work in progress study aims to 1) add to the body of literature concerning policy changes in states' higher education systems and their relationship to college completion rates, and 2) to inform policy makers whether the adoption of a community college baccalaureate policy contributes to the goal of increasing college four year completion

rates in their states. The study hopes to unveil the relationship between a state's adoption of a CCB policy and higher education attainment in that state. To guide this study I explore the following **Research Questions: What is the relationship between a state's adoption of a CCB policy and higher education six-year completion rates in that state, specifically for Latino students? And to what extent have CCB policies affected degree completion rates in participating states specifically for Latino students?** This study examines the effects of adopting a CCB policy on degree-attainment indicators in adopter versus non-adopter states. I use a longitudinal panel data analysis of 50 states over an approximate period of 23 years (i.e. 1990-2013). District of Columbia was excluded from the sample. Preliminary results will be discussed on light of the guiding questions.

INCORPORATING COMPUTATIONAL THINKING INTO BIOLOGY, PHYSICS, AND MATHEMATICS CLASSROOMS FOR EDUCATORS: A COLLABORATIVE RESEARCH AND CURRICULAR EXPERIENCE

Rachel Adler, Computer Science; Joseph Hibdon, Mathematics; Hanna Kim, Teacher Education; Brittany Pines, Math, Science, and Technology for Quality Education; Jennifer Slate, Biology; Sudha Srinivas, Physics

Computational thinking is a crucial component of the eight key STEM education practices defined by the Next Generation Science Standards (NGSS) in K-12 education. Thus, as part of a National Science Foundation STEM + C Grant, we developed modules designed to cultivate computational thinking skills into biology, physics, and mathematics courses taken by preservice elementary and middle school teachers in NEIU's Math, Science, and Technology for Quality Education (MSTQE) Program. Faculty teamed up with nine undergraduate students from the Departments of Computer Science, Mathematics, Physics, Biology, and MSTQE for a collaborative, interdisciplinary Summer Research and Curricular Experience. Students worked closely with their faculty mentors, participated in weekly workshops and activities designed to enhance their understanding of the integration of CS with STEM. The summer experience resulted in the incorporation of computational modules into the introductory biology, geometry, and physics courses for educators beginning in Fall 2017. In Biology, a computer simulation using NetLogo was developed to examine factors and model the mechanisms through which the Zika virus becomes an epidemic, so that students gain insight not only into how diseases spread, but also how the spread can be modeled. In addition to manipulating factors that influence disease spread, students will also learn how to modify the computer code of the model to include additional factors. In Geometry, using Scratch, modules were developed for students to create code to draw various two- and three-dimensional figures. In addition, an original Android app was developed to allow practice of different aspects of planar geometry. In Physics, using VPython, simulations were created for students to understand concepts such as vectors, motion under the influence of gravity,

and the transformation of energy. With the vectors suite of programs, students explore the attributes of a vector and add vector displacements on a user selected map that can be customized. The modules are all annotated so students can understand and modify the code for their own purposes. Tracker, a video analysis and modeling tool, was also incorporated to use with experiments or projects as applicable. Integrating these new modules will not only increase preservice teachers' computational thinking skills, but will also foster a better understanding of science and math concepts. Furthermore, we created a computational thinking rubric which will be used by the instructors to assess the modules. By using computational tools to explore scientific and mathematical questions, future teachers will gain technological experience that will allow them to develop similar approaches as educators in their own classrooms, after school programs, or informal education sectors.

POPULATION DYNAMICS AND VIABILITY ANALYSES OF THE RARE AND ENDANGERED PLANT LEEDY'S ROSEROOT (*RHODIOLA INTEGRIFOLIA* SSP. *LEEDYI*)

Rachel Trana, Computer Science; Joel Olfelt, Biology

The dynamics of small, natural plant populations are not well understood, and long-term studies of them, though required for accurate estimates of the dynamics, remain rare. Leedy's roseroot (*Rhodiola integrifolia* ssp. *Leedyi*) is a rare plant species that is restricted to cool moist cliff habitats. It has only seven known populations in the states of Minnesota (4 populations), New York (2 populations), and South Dakota (1 population). Due to the rarity and the relatively recent discovery of several of the Leedy's roseroot populations, wildlife managers have known little regarding its population dynamics. These managers have called for demographic and population genetic data to inform their conservation efforts. In order to estimate the number of individuals passing genes from one generation to the next (N_e , the effective population size) and the effect of climate changes on persistence, traditional demographic data from Minnesota's Leedy's roseroot have been collected for 16 of the last 21 growing seasons (beginning in 1997). These data include plant size, flowering, seed production, and population censuses. Population dynamics, in particular, the probability that a species will persist for some duration in a specific environment, can be estimated with population viability analysis (PVA) methods using the collected census and demographic data. Students from the Mathematics and Biology departments collaborated with us to construct and implement two different PVA models. The first is a count-based PVA in which we estimated each study population's relative health and risk of becoming functionally extinct within a defined time frame. The second PVA is a preliminary model based on estimates of transitions between stages, for example infertile to fertile, (a demographic PVA) that we used to further inform the risk of extinction. Further development of the demographic PVA model can help us to identify

Leedy's roseroot's most vulnerable life history stages. This can highlight potential risks to management efforts, or interventions that are likely to improve the viability of Leedy's roseroot populations.

DIFFUSION FLAME DYNAMICS IN A ONE-DIMENSIONAL DOMAIN

Joseph Hibdon, Mathematics

The objective of this work is to examine the effects of temperature-dependent transport and thermal diffusion and of diffusive-thermal instabilities on the structure and characteristics of non-premixed flames (diffusion flames). The configuration adopted is the planar unstrained flame with a bulk flow directed toward the reaction zone from either the fuel or the oxidizer sides. Included in this discussion is the no bulk flow case, where the reactants reach the reaction zone purely by diffusion. The model also allows for non-unity and distinct Lewis numbers, for the fuel and oxidizer. Results show that the variations of the thermal conductivity and the diffusion coefficients with temperature affect the flame standoff distance and flame temperature and consequently the profiles of temperature and concentrations. These results were shown to be in accord with experimental data. Extinction criteria for diffusion flames are typically expressed in terms of a critical Damköhler number D_c below which the flame temperature is too low for the reaction to be maintained. This D_c is significantly smaller for the temperature dependent case when compared with previous analyses with constant properties. Thermal diffusion, also known as the Soret effect, affects the flame standoff distance by shifting it towards the fuel/oxidizer and affects the flame temperature by making it smaller/larger for heavy/light fuels respectively. Predicted extinctions D_2 are minimally affected by Soret effects, except for the cases in which the fuel is relatively heavy. Diffusive-thermal instabilities are examined for constant transport properties and no-Soret conditions. In the absence of a flow case the only mode of instability is planar oscillations. The effect a convection flow causes a general increase in the frequency of the oscillations. Now there is also a possibility of formation of cellular flames. Comparison is then made to experimental data to understand the effect the parameters have on cell size and on the frequency of oscillations. We examine the effect gravity has on the diffusive thermal instabilities. The addition of gravity in no bulk flow leads to cellular instabilities where unconditionally stable flames persist otherwise and has a relatively minor effect on the diffusive-thermal instabilities in the presence of a convective bulk flow.

HOW TO SOLVE SINGULAR AND ILL-CONDITIONED LINEAR SYSTEMS

Zhonggang Zeng, Mathematics

Solving systems of linear equations in the form of $Ax = b$ is a fundamental problem in

applied mathematics. A linear system is singular when the matrix A is rank-deficient and there are either infinitely many solutions or no solutions at all. Solving such a problem is a so-called ill-posed problem. In practical applications, singular linear systems are presented with empirical data and the matrices are highly ill-conditioned. As a result, solving such linear systems remains a formidable challenge. The elementary methods in linear algebra textbooks are available but not practical for numerical computation. In general, conventional wisdom suggests that singular linear systems should be avoided. As a result, the topic of solving singular linear systems is almost never mentioned in textbooks in numerical analysis. In this talk, we shall demonstrate the usual pitfalls of standard methods for solving singular linear systems and why they fail. It is well known that singular and highly ill-conditioned linear systems are hypersensitive to data perturbations and round off errors. A small perturbation can result in huge errors in the computed solution. On the other hand, the hypersensitivity is one directional: A tiny perturbation in the matrix entries can only increase the rank and never decrease it. In other words, tiny perturbations can only decrease the singularity. Furthermore, when the singularity is maintained, the solutions are Lipschitz continuous with respect to data. In geometric terms, linear systems of the same singularity form complex analytic manifolds of a positive codimension and embedded in similar manifolds of lower codimensions. From this observation, we can formulate the notion of the numerical general solution to linear systems within an error tolerance. The numerical general solution is a generalization of conventional general solution, uniquely exists and enjoys Lipschitz continuity. As a result, finding numerical general solutions becomes a well-posed problem and solvable in numerical computation. Assuming the data error is sufficiently small, we shall also demonstrate that the exact general solution can be accurately approximated by the numerical general solution and the accuracy is the same order of the data precision. In the applications where only a single solution is needed, every backward accurate solution approximates one of the infinitely many exact solutions and the error occurs in the matrix kernel. We shall also present strategies of computing the numerical general solutions and numerical results.

TOPOLOGICAL DATA ANALYSIS

Matthew Graham, Mathematics

In this talk we introduce Topological Data Analysis (TDA) which applies methods from topology to study the “shape” of data sets. TDA is particularly suited for high dimensional noisy data sets that have important underlying geometric structure but is not restricted to these types of spaces. Despite being a fairly new method of data analysis TDA has already been applied to oncology, astronomy, neuroscience, image processing, understanding and analyzing the player structure of the NBA. We introduce Persistence Homology, its bar codes, and discuss the programs Ripser and Mapper. To demonstrate the power and limitations of TDA we apply these methods and tools to a number of

visualizable data sets.

RIBBONLENGTH OF KNOT DIAGRAMS

Nancy Wrinkle, Mathematics

This talk is meant to be accessible to undergraduate mathematics students. The ropelength problem asks to minimize the length of a knotted curve in 3-dimensional space such that a unit tube around the curve doesn't intersect itself. In the plane, the analog of the ropelength problem has a much more combinatorial flavor: we consider a unit-width ribbon traveling along a knot projected into the plane, only crossing itself in controlled, "nice" ways. What shape would a shortest ribbon-knot take? If we consider the tube or ribbon to be shrinking to its shortest length, then that shrinking is constrained by two opposing forces: how much the knot curves and paces where the knot comes into contact with itself. We discuss how these opposing forces can be balanced to give a criterion for recognizing when a given knot shape is a "critical point" for ribbonlength. Attempting to characterize critical points for ribbonlength leads us to new results about the medial axis of an immersed disk in the plane. This is joint work with Elizabeth Denne of Washington & Lee University and John M. Sullivan of Technische Universitat (Berlin).

CLASSIFICATION OF ISOMETRIC IMMERSIONS OF PSEUDO-SPHERICAL SURFACES VIA DIFFERENTIAL EQUATIONS

Nabil Kahouadji, Mathematics; Niky Kamran, Mathematics; Keti Tenenblat, Mathematics

Abstract: Pseudo-spherical surfaces are surfaces of constant negative Gaussian curvature. A way of realizing such a surface in 3d space as a surface of revolution is obtained by rotating the graph of a curve called tractrix around the z-axis (infinite funnel). There is a remarkable connection between the solutions of the sine-Gordon equation ($u_{xx} = \sin u$) and pseudo-spherical surfaces, in the sense that every generic solution of this equation can be shown to give rise to a pseudo-spherical surface. Furthermore, the sine-Gordon equation has the property that the way in which the pseudo-spherical surfaces corresponding to its solutions are realized geometrically in 3d space is given in closed form through some remarkable explicit formulas. The sine-Gordon equation is but one member of a very large class of differential equations whose solutions likewise define pseudo-spherical surfaces. These were defined and classified by Chern, Tenenblat and others, and include almost all the known examples of "integrable" partial differential equations. This raises the question of whether the other equations enjoy the same remarkable property as the sine-Gordon equation when it comes to the realization of the corresponding surfaces in 3d space.

We will see that the answer is no, and will provide a full classification of second-order hyperbolic and k -th-order evolution equations. The classification results will show, among other things, that the sine Gordon equation is quite unique in this regard amongst all integrable equations.

References :

- [1] S. S. Chern and K. Tenenblat, *Pseudospherical surfaces and evolution equations*, Stud. Appl. Math., **74** (1986), 55-83.
- [2] J. A. Cavalcante and K. Tenenblat, *Conservation laws for nonlinear evolution equations*, J. Math. Phys., **29** (1988), no. 4, 1044-1049.
- [3] N. Kahouadji, N. Kamran, and K. Tenenblat, *Local Isometric immersions of pseudo-spherical surfaces and evolution equations*, Fields Inst. Commun., **75** (2015), pp. 369-381.
- [4] N. Kahouadji, N. Kamran, and K. Tenenblat, *Second-order equations and local isometric immersions of pseudo-spherical surfaces*, Comm. Anal. Geom., **24** (2016), no. 3, pp. 605-643.
- [5] N. Kahouadji, N. Kamran, and K. Tenenblat, *Local Isometric Immersions of Pseudo-spherical Surfaces and k -th Order Evolution Equations*. Arxiv:1701.08004v1 [math.DG] 27 Jan 2017, <https://arxiv.org/pdf/1701.08004v1.pdf>.
- [6] N. Kamran and K. Tenenblat, *On differential equations describing pseudo-spherical surfaces*, J. of Differential Equations., **115** (1995), no. 1, 75-98.
- [7] M. L. Rabelo and K. Tenenblat, *On equations of type $u_{xt}=f(u, u_x)$ which describes pseudospherical surfaces*, J. Math. Phys. **31** (1990), no. 6, 1400-1407.

ARCHAEOOMETRY AND THE MAPPING OF MOBILITY: XRF AND NAA OF OBSIDIAN ARTIFACTS UNVEIL ROUTES LINKING SOUTHERN SOUTH AMERICAN PEOPLES (10,000 BC-AD 1500).

Martin Giesso, Anthropology; Michael D. Glascock, Physics

Archaeometry and the mapping of mobility: XRF and NAA of obsidian artifacts unveil routes linking southern South American peoples (10,000 BC-AD 1500).
Martin Giesso, Michael D. Glascock (University of Missouri at Columbia)

Archaeometric studies have become an important element in archaeological research in the last decades. In particular, these physico-chemical analyses are being used to orient and answer questions that deal with interactions and circulation of goods between prehistoric societies in the Americas and throughout the world. Here we will address the use of X ray fluorescence and neutron activation analysis we have conducted during the last 25 years to identify obsidian sources in southern South America, and the distribution of obsidian artifacts in archaeological sites. These two methods (XRF and NAA) measure chemical elements present in small parts per million in volcanic rocks – elements like rubidium and strontium -, but they differ in the number of elements analyzed, the timing and the cost, as well as that NAA is destructive and XRF isn't. In particular the use of portable spectrometers has become a valuable tool to increase the sample size and speed of the identification process, by making analysis less expensive compared to those of the traditional, and extremely precise neutron activation, and by their ability to be transported to the field.

Obsidian, a vitreous volcanic rock with sharp edges crafted into flaked tools for daily activities such as hunting, is one of the most important lithic raw materials used before the invention of metallurgical techniques, and was quarried in volcanic regions of the world. In South America there are Andean sources and sources found east of the Andes, with the first being the most abundant and commonly utilized. The sources differ in their compositional patterns, internally or externally, as some have significant differences between individual outcrops. Our research includes areas of central and southern Argentina, central Bolivia and central Chile, spanning several millennia, as the earliest settlers of these regions were already quarrying obsidian and manufacturing tools some 12000 to 10000 years ago. We will refer to several of these cases, their problems, and results, which show long distance interaction throughout vastly dispersed societies. This project was made possible with the collaboration of colleague archaeologists from Argentina, Bolivia and Chile, and funding to the Missouri University Research Reactor from the National Science Foundation.

AFRICAN RESISTANCE TO THE ATLANTIC SLAVE TRADE: A VIEW FROM THE GAMBIA RIVER

Michael Tuck, History

The issue of African resistance has long received attention in the booming field of academic studies of the Atlantic Slave Trade, but the recent compilation of sources in the Trans-Atlantic Slave Trade database has turned research in new directions. This largely quantitative source allows us to examine some hitherto obscure aspects of the Atlantic slave trade, and use some “hard” data to investigate social and cultural issues in new ways. While scholars continue to discuss what constitutes resistance (especially in light

of few sources from Africans themselves), one of the eye-opening revelations has been that major rebellions on slave ships were more wide-spread than previously known: probably occurring on around 1 ship in 10. In addition, it has become clear that Africans along some areas of the coast violently resisted enslavement and transport more than others. One of these areas was along the Gambia River. Research shows that enslaved Africans on ships leaving ports in the Senegambia region revolted fourteen times more often than on ships leaving the region of the Bight of Biafra. A major question to researchers has been why, with factors explored including circumstances of trade, local culture, weather patterns, size of ships, and factors involving the crew.

My research explores the factors behind African resistance to enslavement and transport in this one area of the West African coast. I am able to use the quantitative information from the Slave Trade database to refute some prevailing arguments, and to more definitively identify the reasons behind slave revolts. My research also delves more into the overall nature of trade in the region, and makes an innovative argument about the nature of resistance in the region, and why Africans were more successful than elsewhere in resisting the slave trade. Finally, I demonstrate that it was Africans' involvement in a very strong commodity trade that gave them the resources necessary to avoid or resist the slave trade.

THE COSTS OF BELIEVING

John Casey, Philosophy

According to a common view, to argue is to engage in a kind of adversarial contest with a winner, a loser, attacks, defenses, strategic moves and so forth. Lakoff and Johnson (1980) call this the "war metaphor of argument." There are two main objections to such adversarial conceptions of argument. The first is a practical objection: whatever argument might ultimately be, adversariality tends to produce bad results (such as the silencing of less aggressive arguers). The second we might call the essential objection: adversarial notions are extraneous to the core concept of argument. This paper challenges the second objection. I begin by considering and rejecting the view that this is merely a definitional controversy, whereby we can "define in" or "define out" notions of adversariality among different definitions of argument. I then distinguish notions of adversariality from notions of aggressiveness and offer a rough definition of adversariality, which is a structured activity where one participant attempts to force a result on the other (e.g., chess). Whether this conception of adversariality applies to argument rests on whether we regard argument to be about acceptances (commitments) or beliefs. I will argue that argument is essentially adversarial when it is understood to concern beliefs (rather than acceptances). I offer two arguments for this thesis. The first is an argument from doxastic involuntarism. Acceptances are voluntary acts rather than psychological states. As such, they are easy to acquire and to give up. Beliefs, in

contrast, are psychological states which are to some extent involuntary. This means we do not directly control their creation and destruction. Others can, however, attempt to directly control specific beliefs of ours through argument. The second argument focuses on the costs of believing. Arguments can be costly because they involve time and effort. Beliefs are also costly both for the psychological states they provoke and for the fact that they are causally related to our actions. That argument is inherently adversarial does not mean, however, that it need be unpleasant or even unjust. To push the war metaphor somewhat, I conclude the presentation by sketching the outlines of a theory of just argument.

ACKNOWLEDGEMENTS

The Symposium could not have been made possible without the enthusiastic support and contributions of the following university leaders: Richard J. Helldobler, Interim President; Wamucii Njogu, Interim Provost; Liesl V. Downey, Vice President for Institutional Advancement; Daniel Lopez Jr., Vice President for Student Affairs; Sandra D. Beyda, Dean, Goodwin College of Education; Michael Bedell, Dean, College of Business and Management; Katrina E. Bell-Jordan, Interim Dean, College of Arts and Sciences; Lisa Wallis, Interim Dean, Ronald Williams Library; and Michael Stern, Dean, College of Graduate Studies and Research.

The Symposium Steering Committee is especially grateful to the Office of Academic Affairs for sponsoring the program and to Toula Welbrook, Director of Communication, Academic Affairs, and Michael Hines, Director of Public Relations, for publicizing the event.

The Committee wishes to acknowledge Angela Vidal-Rodriguez and Karen Segura, McNair Scholars Program, for their many hours of service to organize the Symposium. Special thanks to Mary Thill, Library, for facilitating the creation of this year's online registration process and program.