

## CONFERENCE PROGRAM

8:00 a.m. to 8:30 a.m.	Registration	Hall of Nations, 1 <sup>st</sup> floor Centennial Hall
8:00 a.m. to 8:30 a.m.	Refreshments	Room 3214, Centennial Hall
8:30 a.m. to 8:40 a.m.	Welcome	Room 3214, Centennial Hall
8:45 a.m. to 9:15 a.m.	Presentations	3 <sup>rd</sup> floor Centennial Hall
9:20 a.m. to 9:50 a.m.	Presentations	3 <sup>rd</sup> floor Centennial Hall
9:50 a.m. to 10:15 a.m.	Break (coffee)	Room 3214, Centennial Hall
10:20 a.m. to 10:50 a.m.	Presentations	3 <sup>rd</sup> floor Centennial Hall
10:55 a.m. to 11:25 a.m.	Presentations	3 <sup>rd</sup> floor Centennial Hall
11:30 a.m. to 12:00 p.m.	Presentations	3 <sup>rd</sup> floor Centennial Hall
12:05 p.m. to 1:00 p.m.	Luncheon	Hall of Nations, 1 <sup>st</sup> floor Centennial Hall

Join us for our featured luncheon presentation!

### **Community Partnership Portal: Connecting UWL with the Community**

*Luncheon Question and Answer Session with Dr. Scott Cooper,  
Undergraduate Research Director and Professor of Biology*

Learn more about the Community Partnership Portal that links UWL students, staff, and faculty with community members. The portal serves as a means to establish volunteer opportunities, internships, student research, and service learning projects.

<https://www.uwlax.edu/info/community-portal/>

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# UNIVERSITY of WISCONSIN LA CROSSE

## 22<sup>nd</sup> Annual Faculty Research Day

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**8:00 a.m. to 1:00 p.m.**  
**January 20, 2017**  
**Centennial Hall**

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**Celebrate**  
*research at UWL and  
share in the endeavors of colleagues  
and their students*

**Learn and Share**  
*about research, scholarly, and  
creative activities at UWL*

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This celebration of university scholarship is sponsored by the  
University of Wisconsin-La Crosse  
Provost & Vice Chancellor for Academic Affairs and the  
Office of Research & Sponsored Programs

Session I - Presentations: (8:45 – 9:15 a.m.)		Rm #
<b>A. Developing Brand Density Metrics</b> <i>Marco Vriens (Marketing)</i> <i>Song Chen (Mathematics and Statistics, Co-author)</i> <i>Chad Vidden (Mathematics and Statistics, Co-author)</i>	CENT3205	
<b>B. Future Computer Processors with Heterogeneous Cores</b> <i>Elliott Forbes (Computer Science)</i>	CENT3213	
<b>C. Parents' Influence on Early Childhood Learning</b> <i>Jocelyn Newton (Psychology)</i>	CENT3211	

Session II - Presentations: (9:20 – 9:50 a.m.)		Rm #
<b>D. Results from a Local Study on the Impact the Library Has on Student Learning</b> <i>William Doering (Murphy Library)</i> <i>Douglas Baumann (Mathematics and Statistics)</i>	CENT3201	
<b>E. Using Data Science to Pick National Football League Games</b> <i>Eric Eager (Mathematics and Statistics)</i>	CENT3205	
<b>F. INSECTS INCORPORATED: Creating a Database that Captures the Importance of Insects in Human Culture</b> <i>Barrett Klein (Biology)</i>	CENT3213	
<b>G. Characteristics Associated with UWL Student Participation in High-Impact Practices</b> <i>Enilda Delgado (Sociology)</i>	CENT3211	
<b>H. Increasing Independent Engagement in Children with Autism Spectrum Disorder (ASD) Using Video Self-Modeling with Video Feedback</b> <i>Lema Kabashi (Educational Studies)</i>	CENT3215	

Session III - Presentations: (10:20 – 10:50 a.m.)		Rm #
<b>I. Rapid and Dynamic Changes in the Gut Microbiome after Spring Arousal from Hibernation</b> <i>Christine Schwartz (Biology)</i>	CENT3201	
<b>J. A Permutation Test for Comparing Distributional Shapes in Three-Dimensional Rotation Data Sets</b> <i>Melissa Bingham (Mathematics and Statistics)</i>	CENT3205	

<b>K. Local Protected Areas and Payments for Environmental Services in Calakmul, Mexico</b> <i>John Kelly (Geography and Earth Science)</i>	CENT3213
<b>L. The Marriage of Stability and Malleability within the <math>\beta</math>-helix Structural Domain</b> <i>Todd Weaver (Chemistry and Biochemistry)</i>	CENT3211
<b>M. A Study on Volkswagen Emission Scandal, Analyzing Market Structure Using Social Network Analysis and Text Mining</b> <i>Song Chen (Mathematics and Statistics)</i> <i>Chad Vidden (Mathematics and Statistics)</i> <i>Marco Vriens (Marketing, Co-author)</i>	CENT3215

Session IV - Presentations: (10:55 – 11:25 a.m.)		Rm #
<b>N. Applying Digital Technologies to Archaeological Research and Teaching</b> <i>David Anderson (Archaeology and Anthropology)</i>	CENT3201	
<b>O. Improving Teacher-Student Relationships, Student Engagement and Student Achievement: The Impact of Evidence-Based, Intensive Coaching</b> <i>Dan Hyson (Psychology)</i>	CENT3205	
<b>P. Who Knew? The Hidden Danger of Soap</b> <i>Tisha King-Heiden (Biology)</i>	CENT3213	
<b>Q. Bike Battles: How Scholars Forgot, then Remembered, the History of Sharing the American Road</b> <i>James Longhurst (History)</i>	CENT3211	
<b>R. Promoting Question-Asking Initiations to Peers in Young Children with Autism Spectrum Disorder (ASD) Using Video-Based Instruction</b> <i>Ann Epstein (Educational Studies)</i> <i>Lema Kabashi (Educational Studies)</i>	CENT3215	

Session V - Presentations: (11:30 a.m. – 12:00 p.m.)		Rm #
<b>S. How Has Climatic Variability and Human Activities Impacted Vegetation Productivity Patterns in the Himalayas?</b> <i>Niti Mishra (Geography and Earth Science)</i>	CENT3201	

**T. Euphemia Lofton Haynes – Bringing Public Education Closer to the Goal of Perfection**  
*Susan Kelly (Mathematics and Statistics)* **CENT3205**

**U. Does Financial Development and Checks and Balances Act as Substitutes or Complements?**  
*Nabamita Dutta (Economics)* **CENT3213**

**V. Self-Affine Fractals: Dimension Theory and Diophantine Approximation**  
*Tushar Das (Mathematics and Statistics)* **CENT3211**

**W. Aristotle and Water Ethics**  
*Eric Kraemar (Philosophy)*  
*Mary Krizan (Philosophy)* **CENT3215**

## Presentation Abstracts

**A. Developing Brand Density Metrics**  
*Marco Vriens (Marketing)*  
*Song Chen (Mathematics and Statistics, Co-author)*  
*Chad Vidden (Mathematics and Statistics, Co-author)*

Brands that have richer, denser memory structures will be easier for consumers to have these brands come to mind first and find the associations that constitute reasons to believe. Therefore, on average, brands with richer denser memory associations should be more successful in capturing market share than brands with less rich and dense memory structures. We study the extent such association metrics are in line with actual market shares, and whether weighing such associations in some way could further improve the connections. Our paper shows how close the relationship is between the number of associations and a simple density measure with market shares data.

**B. Future Computer Processors with Heterogeneous Cores**  
*Elliott Forbes (Computer Science)*

Computer processors are the complex electronic circuits at heart of servers, desktops, laptops, and handheld devices. Modern computers contain multiple processors, called cores, on a single processor chip. Each individual core is identical to the other and allows for running several programs or apps simultaneously. My research, and this talk, involves the study of a potential future computer system where the cores are not identical. Instead, the cores are tailored to needs of the wide variety of programs that may run on a given system.

**C. Parents' Influence on Early Childhood Learning**  
*Jocelyn Newton (Psychology)*

Previous research has established that high quality early childhood education is predictive of subsequent educational performance in elementary and secondary school. However, less research has focused on environmental characteristics that predict later education performance. This presentation will summarize the results of a study that examined the impact of parenting beliefs and characteristics on early childhood learning in the areas of reading and math.

**D. Results from a Local Study on the Impact the Library has on Student Learning**  
*William Doering (Murphy Library)*  
*Douglas Baumann (Mathematics and Statistics)*

What impact does Murphy Library have on student learning? It seems that in today's budget-conscious world, libraries are continually asked by the community, government, accreditation teams and higher education administrators what impact we have on student learning. We count everything we can, do LibQual surveys, engage in instruction assessments, and yet there seems to be something missing. The real question is really more than counts of turnstile gates, the number of students attending information literacy instruction sessions, opinion surveys, and collection size. The ultimate question is: Did the student learn something? Murphy Library undertook a study to assess the impact Murphy Library has on student learning: statistics of who attended instruction classes, who checked out library materials, who placed resource sharing and ILL requests, and whether having participated in these activities actually improved student grades. But we did more, we went beyond the question of whether smart students use the library and studied the question of whether library use makes students smarter. I will discuss the question, the gathering of statistics, the research process and the statistical modeling that went on to conduct this study.

**E. Using Data Science to Pick National Football League Games**  
*Eric Eager (Mathematics and Statistics)*

In this talk I discuss a statistical model for picking National Football League (NFL) games, both against the spread and straight up, using a collection of openly-available and proprietary data. Features of the model include historical Vegas betting lines and spreads, as well as Pro Football Focus's individual player grades. Ranking algorithms including the Keener method are also used. The performance of this model, on test data from 2007-2015, as well as the 2016 NFL regular season, are compared with that of media experts. Future possible features of the model are also discussed.

**F. INSECTS INCORPORATED: Creating a Database that Captures the Importance of Insects in Human Culture**

*Barrett Klein (Biology)*

Cultural entomology is the study of insects' influence on human culture. Educating the public about the extent to which insects have affected humans throughout our history could increase awareness and appreciation of insects and insect diversity. No actively maintained, extensive online resource for cultural entomology exists. UWL's Pupating Lab recently launched an interactive, online museum-database on cultural entomology, with the eventual aim of crowdsourcing content: <http://www.culturalentomology.org/>.

**G. Characteristics Associated with UWL Student Participation in High-Impact Practices**

*Enilda Delgado (Sociology)*

Using UWL's 2014 National Survey of Student Engagement (NSSE), this research identifies the factors associated with student completion of high-impact practices. For the purpose of this presentation, the high-impact practices analyzed include undergraduate research with a faculty member, studying abroad, completing a capstone project and internship completion. Early logistic regression analysis indicates that transfer and first generation status, college of enrollment, race, sex, and quality of interaction with faculty significantly impact student's completion of at least one high-impact practice.

**H. Increasing Independent Engagement in Children with Autism Spectrum Disorder (ASD) Using Video Self-Modeling with Video Feedback**

*Lema Kabashi (Educational Studies)*

This research study used a multiple baseline across participants explored the efficacy of video feedback on increasing class engagement for two second graders with autism. The independent variable consisted of video self-modeling with video feedback whereas dependent variable consisted of class engagement, which included three different target behaviors for each participant. Positive results were noticed for both participants for each of the target behaviors. Both participants maintained skills two weeks after the intervention was withdrawn. Social validity assessed by teachers and parents showed positive outcomes for both participants from pre- to post-treatment.

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**I. Rapid and Dynamic Changes in the Gut Microbiome after Spring Arousal from Hibernation**

*Christine Schwartz (Biology)*

Thirteen-lined ground squirrels hibernate for 6-7 months during the winter, during which time they do not consume food. This has profound effects on the gut microbiome. In this study, we characterized changes in bacterial taxa populating the gut as the squirrels become active and start refeeding after hibernation, finding rapid shifts in bacterial populations and interesting parallels to studies of the microbiome in human obesity.

**J. A Permutation Test for Comparing Distributional Shapes in Three-Dimensional Rotation Data Sets**

*Melissa Bingham (Mathematics and Statistics)*

Nonparametric inference will be used to test for a difference in distributional shape for two 3-dimensional rotation data sets through a permutation test. After the test is developed, its validity will be examined through a simulation study. The permutation test will then be applied to a small example in biomechanics.

**K. Local Protected Areas and Payments for Environmental Services in Calakmul, Mexico**

*John Kelly (Geography and Earth Science)*

Since the 1980s, over fifty village settlements (ejidos) have been established within the forest margins of the the Calakmul Biosphere Reserve, Mexico. In 2016, the author conducted mapping-enabled interviews in 16 villages. Contrary to expectations, only a few villages set aside land for conservation as a part of local, "organic" process. Instead, a new program of Payments for Environmental Services (PES) implemented by the Mexican federal government is having a direct impact on local conservation, in a way the Biosphere Reserve never achieved.

**L. The Marriage of Stability and Malleability within the  $\beta$ -helix Structural Domain**

*Todd Weaver (Chemistry and Biochemistry)*

$\beta$ -helix structural domains form via the cooperative formation of consecutive on-edge main chain hydrogen bonds between adjacent parallel  $\beta$ -strands. This cooperatively folded structural domain affords both (1) stability and (2) malleability. Therefore, the  $\beta$ -helix structure has been recruited as a robust structural domain for numerous bacterial virulence factors, including adhesins, hemolysins, and heme-binding proteins.

**M. A Study on Volkswagen Emission Scandal, Analyzing Market Structure Using Social Network Analysis and Text Mining**

*Song Chen (Mathematics and Statistics)*

*Chad Vidden (Mathematics and Statistics)*

*Marco Vriens (Marketing, Co-author)*

Analyzing market structure helps companies to position themselves better. However, traditional survey based research is very expensive and sometimes misleading. On the other hand, the rise of internet social media (such as online forums) generates a large amount of text data, which is cheap to get and contains additional business insights. Such data is usually not structured, which creates great difficulties for analysis. We will introduce a practical way to extract variables from such open data to create a market structure map and perform basic analysis. The method will be illustrated on the Volkswagen emission scandal in 2014 using online forum data.

**N. Applying Digital Technologies to Archaeological Research and Teaching**

*David Anderson (Archaeology and Anthropology)*

This presentation will present information on the application of advanced digital technologies to the documentation of archaeological excavations and research and teaching currently being used by UWL's Department of Archaeology and Anthropology. Technologies to be discussed are aerial drones, three-dimensional photogrammetry, 3D printing, and CNC cutting.

**O. Improving Teacher-Student Relationships, Student Engagement and Student Achievement: The Impact of Evidence-Based, Intensive Coaching**

*Dan Hyson (Psychology)*

This presentation will discuss the results of a UWL Faculty Research Grant study demonstrating that early elementary school teachers who participate in one school year of monthly, evidence-based, intensive consultation regarding their teacher-student interactions can significantly improve the quality of those interactions, as well as the engagement and academic achievement of students in their classrooms.

**P. Who Knew? The Hidden Danger of Soap**

*Tisha King-Heiden (Biology)*

Despite their prevalence in the environment, we know very little about the risks that personal care products pose to human health. Triclosan, a broad-spectrum antimicrobial agent, is suspected to disrupt the hormones that regulate embryonic development. Using zebrafish, we have shown that triclosan disrupts embryonic development, maturation, and impairs reproduction. This work contributes to our understanding of the potential environmental and human-health impacts of personal care products.

**Q. Bike Battles: How Scholars Forgot, then Remembered, the History of Sharing the American Road**

*James Longhurst (History)*

Americans have been riding bikes for more than a century now. So why are most American cities still so ill-prepared to handle cyclists? James Longhurst, a historian and cyclist, tackles that question by tracing the contentious debates between American bike riders, motorists, and pedestrians over the shared road. His work is part of an interdisciplinary re-appraisal of the bicycle, cities, and the meaning of transportation.

**R. Promoting Question-Asking Initiations to Peers in Young Children with Autism Spectrum Disorder (ASD) Using Video-Based Instruction**

*Ann Epstein (Educational Studies)*

*Lema Kabashi (Educational Studies)*

The efficacy of video self-modeling with video feedback to increase the frequency of question-asking initiations by two young children with Autism Spectrum Disorder (ASD) was investigated using a multiple baseline single subject study design. Results showed an increase in appropriate question-asking initiations with peers for both participants. One of the participants maintained the skills one month after the intervention was withdrawn. Social validity findings indicated positive results related to asking questions for information as well as other social skills.

**S. How Has Climatic Variability and Human Activities Impacted Vegetation Productivity Patterns in the Himalayas?**

*Niti Mishra (Geography and Earth Science)*

Using satellite derived environmental proxy measures, field and ancillary data, this presentation will highlight how ongoing environmental changes in the Himalayas are impacting the vegetation productivity patterns. Along with identifying areas where vegetation health is either improving (greening) or degrading (browning) across the entire Himalayas, the causation of changing productivity patterns will be discussed based on existing theories of mountain vegetation dynamics and ancillary data.

**T. Euphemia Lofton Haynes – Bringing Public Education Closer to the Goal of Perfection**

*Susan Kelly (Mathematics and Statistics)*

Euphemia Lofton Haynes was born in Washington, D.C. in 1890 and became the first African American woman to earn a PhD in Mathematics in 1943. She spent her career teaching and later serving on the Board of Education for D.C. public schools and was a tireless fighter for equal education. This interdisciplinary talk will look at her mathematics, the historical context of her life, and racial and gender issues that she faced and worked to improve.

## **U. Does Financial Development and Checks and Balances Act as Substitutes or Complements?**

*Nabamita Dutta (Economics)*

A vast strand of studies has established the importance of financial development and institutions in the context of various development outcomes. In the face of resource constraints and bureaucratic bottlenecks, what happens if a country works toward a better financial system but fails to improve on its institutional quality? Similarly, does development suffer if a country can strengthen its institutional quality but does not have sufficient resources to better its financial system? Focusing on checks and balances as a measure of institutions, we explore the interactive impact of financial development and checks and balances on a specific development outcome: gross domestic investment. We explore whether financial development and checks and balances act as substitutes or complements in the context of domestic investment. Using data for 131 countries during the period 1975-2012 and a 5-year interval panel, we employ Ordinary Least Squares (OLS), Fixed Effect (FE), and Dynamic Panel estimators (System GMM) to test our hypothesis. We undertake rigorous empirical techniques to carve out a clear identification strategy. We find a significant interactive impact of checks and balances and financial development on domestic investment. More specifically, we find a substitutability impact of these factors on investment. In the presence of poor checks and balances, financial development mitigates the negative impact of checks and balances and vice-versa.

## **V. Self-Affine Fractals: Dimension Theory and Diophantine Approximation**

*Tushar Das (Mathematics and Statistics)*

We report on ongoing research supported by my 2016-17 Faculty Research Grant. Highlights include the resolution of a long standing open problem in the dimension theory of dynamical systems. Our theorems compute the Hausdorff and dynamical dimensions of a large class of self-affine sponges, a problem that previous techniques could only solve in two dimensions. We prove that badly approximable vectors are ubiquitous in such fractals, obtaining the first results to advance beyond the conformal setting.

## **W. Aristotle and Water Ethics**

*Eric Kraemer (Philosophy)*

*Mary Krizan (Philosophy)*

Aristotle's view of the telos [or goal] of water is difficult to determine: three different views [anthropocentric, biocentric and cosmocentric] occur in his works. We consider the implications of each account for water ethics. We demonstrate why water ethics per se is not viable in the Aristotelian framework, and develop and defend a neo-Aristotelian account utilizing information not available to Aristotle regarding the significance of water for different aspects of existence and limitations regarding water's availability.