

Previous Award Recipients

2016

Carlos Casanova, *School of Education*
Daniela Flores, *Interdepartmental Genetics & Genomics*
Chassidy Bozeman, *Mathematics*
Jorrell Fredericks, *Toxicology*

2015

Maria Alcivar-Zuñiga, *Human Development & Family Studies*
Damarius Fleming, *Genetics and Genomics*
Augustine Beeman, *Plant Pathology*
Julia Anderson-Lee, *Mathematics*
Randie Camp, *Human Development & Family Studies*
Porsha Thomas, *Toxicology*

2014

Melissa Irizarry, *Plant Pathology and Microbiology*
Syed Maaz Gardezi, *Sociology*
Kelly Addelmassih, *Apparel Events and Hospitality Management*
Christine Hutchison, *Food Science and Human Nutrition*

2013

Andres Lopez, *Sociology*
Elease McLaurin, *Industrial Engineering*
Christine Hutchison, *Nutritional Science*
David Manu, *Food Science and Technology*
Rafael Martinez-Feria, *Sustainable Agriculture*

2012

Dedrick Davis, *Soil Science and Environmental Science*
Jose Guzman, *Agronomy*
Pedro Martinez, *Immunology*
Jessica Tate, *Psychology*

2011

Elizabeth Asque, *Genetics Development & Cell Biology*
Stephanie Link, *Applied Linguistics and Technology*
Kofi Whitney, *Human Computer Interaction*
Derrick Coble, *Food Science and Technology, Interdepartmental Genetics*

2010

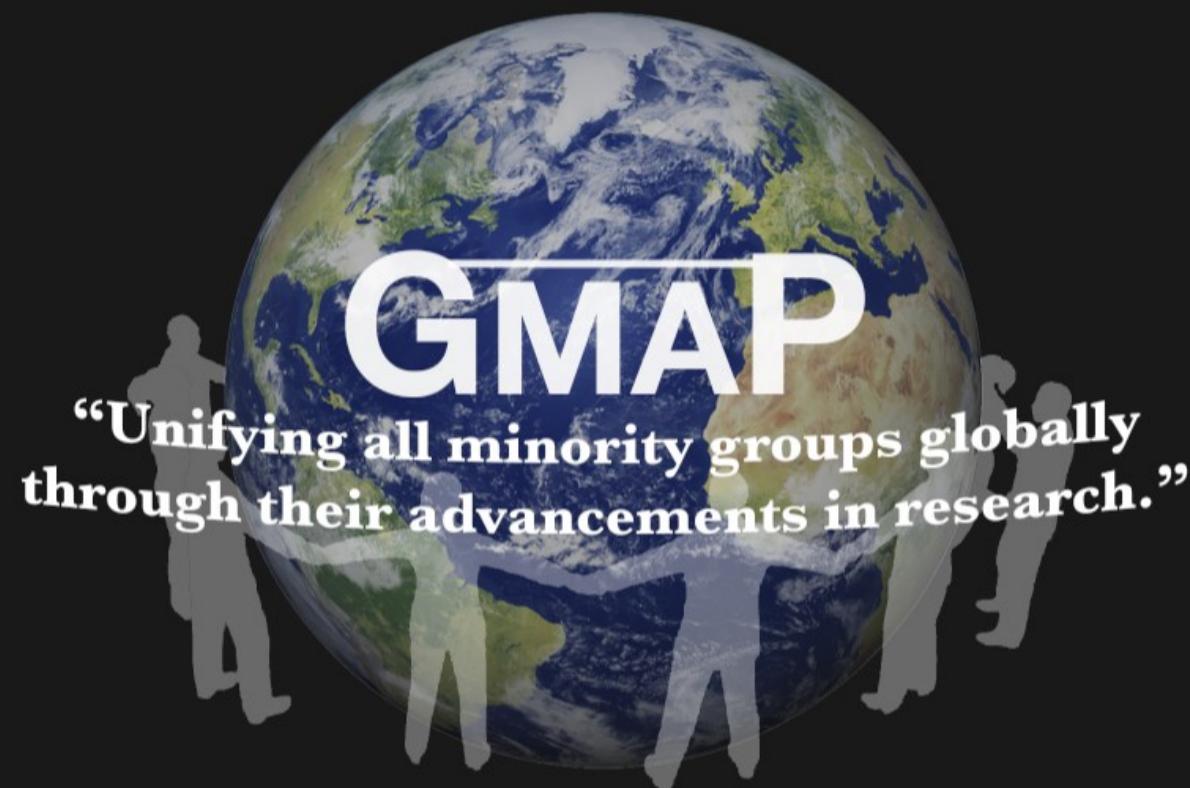
James Delgado, *Toxicology*
Jeremy Brown, *Electrical Engineering*
Tyrone Moore, *Mechanical Engineering*
Brittany Porter, *Food Science and Technology*

2009

Dedrick Davis, *Agronomy*
Pedro Martinez, *Ecology, Evolution & Organismal Biology*
Ricardo Acevedo, *Agriculture & Biosystems Engineering*
Teske Drake, *Human Development and Family Studies*
J. Francisco Hernandez, *Interdisciplinary Graduate Studies*
Kendra Malone, *Anthropology*

IOWA STATE UNIVERSITY

Graduate College



11th Annual Research Symposium

Saturday, October 14, 2017

Gallery, Memorial Union

A message from the 11th Annual GMAP Research Symposium Planning Committee

We, the planning committee, welcome you to the 11th GMAP Research Symposium. GMAP is a collection of initiatives designed to recruit and retain underrepresented students to the many graduate programs offered at Iowa State University. The symposium was created to showcase our research contributions.

The symposium is organized by graduate students supported by GMAP funding and it is our goal to highlight some of tomorrow's leaders in education, social sciences, humanities, mathematics, science, and technology.

It is our hope that the excellence and commitment demonstrated by the presenters will not only attest to the legacy of greatness for Iowa State University graduate students, but also uphold the assurance of research excellence.

Today we are graduate students presenting our research. Tomorrow we will be the leaders in our respective fields. Thank you for your presence, enthusiasm, and support.

Best Regards,

2017 GMAP Research Symposium Planning Committee

Dr. Amy Ramos



Professor of Psychology
Behavioral Sciences Department
Grossmont Community College
El Cajon, CA

Education
PhD, Cognitive Psychology and Neuroscience,
Iowa State University

Master of Arts, Experimental Psychology,
California State University, San Marcos

Bachelor of Arts, Experimental Psychology, Cali-
fornia State University, San Marcos

Amy combines her training as an experimental psychologist and neuroscientist with an extensive background in both academic and community research. As a professor, Amy takes pride in helping non-traditional and first generation students fulfill their higher education goals. Prior to joining the California Community College systems, Amy conducted research examining the human selective attentional process. Dr. Ramos changed her career trajectory by leaving the research laboratory environment to focusing on teaching and applied community research.

Amy uses her quantitative research expertise to create and validate research tools and assessments, as well as conduct sophisticated statistical analyses for some of several complex community research projects. Amy blends this skill set with a passion for using research to address the needs of underserved communities.

Amy is a tenured faculty member of the Behavioral Sciences Department at Grossmont Community College in El Cajon, California. She regularly serves on grant review panels for the Children's Bureau, an office of the federal Administration of Children and Families and several other federal, CA state and local county review panels. Outside of the office, Amy enjoys spending time in her organic garden. She cultivates sustainable living and is always eager to help friends start their own gardens!

Lunch and Closing Session

12:15– 1:30pm

WELCOME

MASTER OF CEREMONY

Jennifer Major

Psychology

LUNCH

SPEAKER

Dr. Amy Ramos

Professor of Psychology

Department of Behavioral Sciences

Grossmont Community College, El Cajon, CA

AWARDS

Dr. William Graves

Dean, Graduate College

Professor of Horticulture

Iowa State University, Ames, IA

CLOSING REMARKS

Dr. Craig Ogilvie

Assistant Dean, Graduate College

Morrill Professor of Physics

Iowa State University, Ames, IA

GMAP Research Symposium 2017 Schedule

8:00 - 11:30am

Registration

8:30 - 8:50am

The Gallery

Opening Session

Welcome

*Dr. William Graves, Dean of the Graduate Collage
Iowa State University*

9:00 - 10:00am

Cardinal Room

Gold Room

Oak Room

Concurrent Oral Presentations

1.A—Mathematics/Physical Sciences

1.B—Biological Sciences

1.C—Social Sciences/Humanities

10:00– 11:00am

Pioneer Room

Poster Presentations

11:00 am- 12:00pm

Room 3534

**Workshop—“Career Development: Searching for Jobs in Industry
after the Ph.D.”**

Dr. J. Adin Mann, Distinguished Principal Engineer

Simulation Technology Group Lead, Emerson, Marshalltown, IA

11:00 - 12:00pm

Cardinal Room

Gold Room

Oak Room

Concurrent Oral Presentations

2.A—Mathematics/Physical Sciences

2.B—Biological Sciences

2.C—Social Sciences/Humanities

12:15 - 1:30pm

Campanile Room

Luncheon and Awards

SPEAKER:

Dr. Amy Ramos, Professor of Psychology

Department of Behavioral Sciences

Grossmont Community College, El Cajon, CA

Oral Presentations at a Glance

9:00 a.m.—10:00 a.m.

Session 1.A Mathematics/Physical Sciences—Cardinal Room

- 1.A.I **Derek Young, Mathematics** -Generalized Petersen Graphs for which the Maximum Multiplicity is equal to the Zero Forcing Number
- 1.A.II **Mark Aguilar, Material Science and Engineering** -Characterization of Lithium Thiosilicophosphate Glasses
- 1.A.III **Jamiahus Walton, Human Computer Interaction** -Developing an Optimized UI for Traffic Incident Managers

Session 1.B Biological Sciences—Gold Room

- 1.B.I **Erika Rodbell, Sustainable Agriculture**-Effect of crop rotation on soybean aphid
- 1.B.II **Alexander Litvin-Zabal, Horticulture**-Supplemental Light Sources and Spectra affect Basil Dill and Parsley Growth Gas Exchange and Flavor Profiles
- 1.B.III **Jaques Overdiep, Food Science and Technology**-Educating Small Fruit and Vegetable Processors in the North Central Region about the Food Safety Modernization Act

Session 1.C Social Sciences /Humanities—Oak Room

- 1.C.I **Brandon Johnson, Education**-Black Families Matter: Varying Degrees of Support within A Rigid Institutional Dichotomy
- 1.C.II **Brandon Clark, Education**-A Comparative Exploratory Analysis of Principals' Perceptions of Effective Leadership
- 1.C.III **Courtney Johnson, Apparel Merchandising and Design**-Swagger Like Us: Black Millennial's Perceptions of 1990s Urban Brands
- 1.C.IV **Chelsea Smith, Education**- White Tears in the Class Room

Planning Committee

Zachary Hudson, Committee Chair
Horticulture

Ph.D. Candidate, Ecology and Evolutionary Biology

Charles Kofi Adarkwa Nyamekye
Chemistry

Ph.D. Candidate, Analytical Chemistry

Elizabeth Carino

Plant Pathology and Microbiology

Ph.D. Candidate, Interdepartmental Genetics and Genomics

Nichelle'Le Carrington

Electrical and Computer Engineering

Ph.D. Student, Electrical and Computer Engineering

Jennifer Major

Psychology

Ph.D. Student, Counseling Psychology

Thelma Harding

Coordinator, Graduate Recruitment and Retention

Director, ISU McNair Program

Dr. Craig Ogilvie

Assistant Dean, Graduate College

Morrill Professor of Physics

Acknowledgements

The Graduate College

Faculty Judges

Dr. J. Adin Mann	Dr. Craig Ogilvie
Dr. Linda Ambrosio	Dr. Nick Peters
Dr. Clark Coffman	Dr. Nick Serao
Dr. Daniela Dimitrova	Dr. Nicole Valenzuela
Dr. Jeff Essner	Dr. David Vogel
Dr. William Graves	Dr. Olga Zabolina
Dr. Laura Jarboe	Dr. Suzanne Zilber

Session Moderators

James A. Walker
Antionette Fowlkes
Austin Gimondo

Oral Presentations at a Glance

11:00 a.m. – 12:00 p.m.

Session 2.A Mathematics/Physical Sciences – Cardinal Room

- 2.A.I **David Morandeira-Alonso, *Civil Engineering***-Rapid Bridge Deck Joint Repair Investigation Phase III
- 2.A.II **Armando Grez, *Mathematics***-Families of bipartite graphs constructed by twinning and maximum nullity equal to zero-forcing number

Session 2.B Biological Sciences – Gold Room

- 2.B.I **Bridget Perry, *Food Science and Technology***-North Central Region Produce Needs Assessment for FSMA Produce Safety Rule
- 2.B.II **Mattea Allert, *Entomology***-Analysis of Contrasting Microbiomes of Two co-occurring Fungus-Gardening Ants *Trachymyrmex septentrionalis* and *Trachymyrmex turrifex*
- 2.B.III **Rafael Martinez-Feria, *Crop Production and Physiology***-High Crop Nitrogen-Use Efficiency Does Not Translate into Low Environmental Losses in the Midwestern US

Session 2.C Social Sciences /Humanities – Oak Room

- 2.C.I **Brandon Clark, *Education***-What We Know What We Don't Know: A Review of Intersectionality Research Within Core Educational Administration Journals
- 2.C.II **Courtney Johnson, *Apparel Merchandising and Design***-The Revolution Will Be Stylized: An Analysis of 1960s Black Panther Party Uniforms as a Catalyst for Social Change and Modern-Day Protest Aesthetic
- 2.C.III **Shannin Moody, *Human Development and Family Studies***-Effects of Race and Income on Cortisol during the transition into Early Adulthood
- 2.C.IV **Vanessa Castillo, *Psychology***- When do members of honor culture forgive?

Poster Presentations At A Glance

10:00 a.m. — 11:00 a.m.

Pioneer Room

- I.P.1** **Eric Britt Moore, Soil Science**-*The Potential of Rye Cover Crops to Improve Soil and Water Management in the U.S. Corn Belt*
- I.P.2** **Maria De Lourdes Perez, Kinesiology**-*Physical Activity Trackers in Combination with Motivational Interviewing to Increase Activity*
- I.P.3** **Ohene Adjei Akuoko, Environmental Science**-*Comparison of Surface Energy Balance Components on a Tilled and Un-tilled Bare Soil in Central Iowa*
- I.P.4** **Jonathan Cerna, Dietetics Internship**-*Effects of Pyruvate Kinase on FDG and Grey Matter Volume*
- I.P.5.** **Mouhamad Said Diallo , Materials Science and Engineering**-*Investigating Structural Characteristics of Mo-based High Entropy Alloys*

GMAP Symposium History

In the Fall of 2006, three graduate students (Aurelio Curbelo, Erik Otarola-Castillo, and Brian Campbell) accepted the challenge of planning the very first Graduate Minority Assistantship Program (GMAP) Research Symposium. Their vision was to highlight the research contributions of underrepresented minority students receiving GMAP funding. Students were invited to present their research in a professional environment allowing them to engage in fruitful discussion and to network with faculty and administrators.

In early 2008, the Graduate College allocated funding for the symposium and the three founders established a planning committee. Since then, the number of participants has grown each year. With the ongoing support of the Graduate College, the GMAP Research Symposium will continue to be an avenue for underrepresented graduate students to share their knowledge.

Poster Presentations (*continued*)

I.P.4 Jonathan Cerna, *Dietetics Internship*

Effects of Pyruvate Kinase on FDG and Grey Matter Volume

Jonathan Cerna, Brandon Klinedinst, Joseph Webb, Auriel Willette

Characteristic pathologies of Alzheimer's Disease (AD) have been previously attributed to accumulation of beta-amyloid, neurofibrillary tangles of hyper-phosphorylated tau, along with genetic predispositions to the disease. However, compiling evidence is now showing that another root cause that might have been overlooked is the critical role that mitochondrial function and other bioenergetic pathways might play in the progression of AD. Considering the recent acknowledgement of the importance of bioenergetic pathways in the progression of AD, my research focus attempts to identify critical biomarkers that might aid to identify signs of dysfunction in the mitochondria and surrounding cytoplasmic proteins in order to understand and potentially foresee ongoing degradations in the cellular machinery of the brain.

I.P.5. Mouhamad Said Diallo, *Materials Science and Engineering*

Investigating Structural Characteristics of Mo-based High Entropy Alloys

High-entropy alloys (HEAs) are multiple principal elements in equimolar or near equimolar ratios which contain at least 5 principal atomic concentrations between 5 and 35 %. HEAs containing Molybdenum (Mo) are known for their hightemperature strength and superior corrosion resistance. In the present work, we aim to characterize Mo-based HEAs (quaternary and quinary like Mo-Ta-W-Ti-Zr) to analyze phase stability, structural characteristics and oxidation behavior. First, homogeneous material casting experiments would be carried out to make the alloys at desired concentration which will then be subjected to techniques like x-ray diffraction (XRD) to analyze structural characteristics.

Session 1.A. Oral Presentations

LOCATION: Cardinal Room

FACULTY JUDGES: Dr. Laura Jorboe, Dr. Olga Zobotina, Dr. Adin Mann

1.A.I. Derek Young, *Mathematics*

Generalized Petersen Graphs for which the Maximum Multiplicity is equal to the Zero Forcing Number

Joseph S. Alameda, Emelie Curl, Armando Grez, Leslie Hogben, O'Neill Kingston, Alex Shulte, Derek Young, Michael Young

The maximum nullity of a simple graph G , denoted $M(G)$, is defined to be the largest possible nullity over all symmetric real matrices whose ij^{th} entry is nonzero exactly when $\{i, j\}$ is an edge in G for $i \neq j$, and the ii^{th} entry is any real number. The zero-forcing number of a simple graph G , denoted $Z(G)$, is the minimum number of blue vertices needed to force all vertices of the graph blue by applying the color change rule. It is known that the zero-forcing number is an upper bound for the maximum nullity of a graph. The motivation for this research is to characterize graphs for which $M(G) = Z(G)$. We focused on a family of graphs called the Generalized Petersen Graphs (a graph containing two cycles of the same size and specified edges connecting them) and were able to identify two sub-families of this larger family that have the desired property. Moreover, to possibly expand our results to the entire family more effective tools with regards to maximum nullity will need to be developed.

Session 1.A. Oral Presentations

Mathematics/Physical Sciences (*continued*)

1.A.II Mark Aguilar, *Material Science and Engineering*

Characterization of Lithium Thiosilicophosphate Glasses

A growing demand in battery-powered electronics for renewable energy has catalyzed investigations for higher energy dense, longer lasting, and safer battery materials. Research must go into developing high ionic conductivity and chemically stable materials to achieve industrial production of solid-state batteries. Glassy material contains short-ranged order and intermediate-ranged order structures such as tetrahedral units. Knowing more about a structure will help determine the process behind higher ionic conductivity and electrode stability materials. In these investigation, amorphous $0.6 \text{Li}_2\text{S} + 0.4 [x \text{SiS}_2 + 1.5 (1-x) \text{PS}_5/2]$ were prepared via mechanochemical synthesis. Infrared, Raman, and Differential Scanning Calorimetry were explored.

1.A.III Jamiahus Walton, *Human Computer Interaction*

Developing an Optimized UI for Traffic Incident Managers

Jamiahus Walton, Stephen Gilbert, Quinn Monaghan, Andrina Helgerson, Anuj Sharma, Pranamesh Chakraborty, Hesham Hassan

There are many tools in the toolbox of traffic incident management, however, low-quality tools and an unorganized toolbox will lead to slower and less effective work. This is the problem faced by traffic incident managers (TIMs) as they use a complicated system of software to deploy the tools of traffic incident management. The aim of this study is to highlight and quantify the human-computer system challenges faced by TIMs within a Midwestern DOT, so that traffic incident management may be improved by providing TIMs with better tools and an organized toolbox from which to work. The authors of this work identify the challenges and areas of inefficiency faced by TIMs by using behavioral coding and constructing a hierarchal tasks analysis.

Poster Presentations (*continued*)

I.P.3 Ohene Adjei Akuoko, *Environmental Science*

Comparison of Surface Energy Balance Components on a Tilled and Un-tilled Bare Soil in Central Iowa

Ohene Akuoko, Dilia Kool, Thomas Sauer, Robert Horton

Partitioning of energy balance components is important to water and energy budgets in agricultural environments. No-till agriculture is becoming more readily utilized as a conservation agriculture technique, though the conventional practice of pre-seed and post-harvest tillage is still the dominant practice. The disturbance and alteration of the surface can have a major impact on the way in which the different components of the surface energy balance (net radiation, soil heat flux, sensible heat flux, and latent heat flux) are partitioned. Few studies have investigated the influence of tillage on the partitioning of energy balance components with time.

The objective of this study is to compare energy balance components of a tilled bare-soil to an un-tilled bare soil following rainfall events. Measurements were conducted at a silty clay loam site in Iowa and included net radiation and soil heat flux. Sensible and latent heat fluxes were derived from micro-Bowen ratio measurements of water vapor and air temperature at 1 and 6 cm heights. It is hypothesized that net radiation will be similar for these two treatments but due to both surface and subsurface disturbance caused by tillage, the latent heat flux will occur at higher rates post rainfall events on the tilled plot as compared to the no-till plot. It is also hypothesized that the ground heat flux of the tilled soil will occur at a higher level after rainfall events on the tilled plot rather than on the no-till plot.

Poster Presentations (*continued*)

I.P.2 Maria De Lourdes Perez, *Kinesiology*

Physical Activity Trackers in Combination with Motivational Interviewing to Increase Activity

Maria Perez; Laura Ellingson; Yang Bai; Karissa Peyer; Gregory Welk

Evidence is equivocal regarding the benefits of wearable technology for increasing physical activity (PA). Use of these devices, such as a Fitbit, in combination with health coaching strategies like motivational interviewing (MI) may be more effective. PURPOSE: The study examined if the use of a Fitbit increase PA levels in healthy adults and if the addition of MI results in greater benefits. METHODS: Ninety-four healthy men and women (mean age 41±9 years) were randomly assigned to one of two groups for a 12-week intervention. Groups received either 1) a Fitbit alone, or 2) a Fitbit and three sessions of MI (FB+MI). Average steps per day assessed with accelerometers were compared within and between groups pre- and post-intervention using paired and independent sample t-tests. Participants were then split into two groups based on whether they increased their mean daily step count from baseline. These post-hoc groups were then compared on demographic and baseline PA characteristics. RESULTS: Complete data were collected on 84 individuals. PA measured in average steps per day did not increase significantly for either group (FB+MI – pre: 7496±2895 steps/day, post: 7624±3557 steps/day; FB – pre: 7519±2259 steps/day, post: 7097±2179 steps/day; $p>0.05$); further, no group differences were observed ($p>0.05$). However, those who improved over the intervention accumulated significantly fewer steps at baseline (6650±2056 vs. 8522±2871, $p < 0.0001$). CONCLUSION: The provision of a Fitbit (with or without brief MI sessions) was not sufficient to increase PA in this sample; however, individuals who are not very active may benefit from the use of a Fitbit more than those who are already active.

Session 1.B. Oral Presentations Biological Sciences

LOCATION: Gold Room

FACULTY JUDGES: Dr. Nicole Valenzuela, Dr. Nick Serao, Dr. Nick Peters

1.B.I Erika Rodbell, *Sustainable Agriculture*

Effect of crop rotation on soybean aphid

Erika Rodbell, Erin W. Hodgson, Matthew Liebman, Matthew E. O'Neal

Crop rotation can modify the soil environment altering plant physiology which in turn may affect pest abundance. Research at Iowa State University, found that including an additional crop in a conventional corn and soybean rotation improves farm profitability by reducing inputs needs for weed management and reduces risk of sudden death syndrome (*Fusarium virguliforme*). Soybean aphid, *Aphis glycines* (Hemiptera: Aphididae), is a relentless soybean pest in the Midwest, causing economic losses if populations are left unmanaged. In this study, we examined how three crop rotation series (corn-soybean; soybean-oat/red clover-corn; and soybean-oat/alfalfa-alfalfa-corn) could affect plant-pest dynamics. In 2016 and 2017 near Ames, IA, we artificially infested soybean plants in each of the rotation series, caging them to assess the aphid population growth rates (8 cages per crop rotation treatment). Aphids were measured every 2-3 days over a period of 14 days. From the data, population growth rates were estimated by taking the slope of the regression line for each plant, calculating a mean growth rate for each crop rotation treatment, and subsequently analyzed in R-Studio for significance. In 2016, the Aphid population growth rates were significantly higher in the corn-soybean rotation compared to the soybean-oat/alfalfa-alfalfa-corn rotation ($p=0.00057$). A significant reduction in aphid population growth rate was noted in the soybean-oat/red clover-corn rotation compared to the corn-soybean rotation ($p=0.023$). No significant differences were noted when comparing soybean-oat/red clover-corn rotation and the soybean-oat/alfalfa-alfalfa-corn rotation ($p=0.189$). Our preliminary results suggest that soybeans grown in an extended rotation are less a suitable host for soybean aphids compared to soybeans grown in a rotation with only corn.

Session 1.B. Oral Presentations

Biological Sciences (*continued*)

1.B.II Alexander Litvin-Zabal, *Horticulture*

Supplemental Light Sources and Spectra affect Basil Dill and Parsley Growth Gas Exchange and Flavor Profiles

Alexander G. Litvin, Christopher J. Currey

Light is absorbed, transmitted, or reflected by plants at varying efficiencies and responses in relation to the light quality of the irradiance. Because of the role of light quality on photosynthesis, our objectives were to quantify the effect of supplemental light source on growth and flavor of culinary herbs. Basil (*Ocimum basilicum* L.), dill (*Anethum graveolens* L.), and parsley (*Petroselinum crispum* (Mill.) Fuss.) were transplanted into hydroponic systems in a greenhouse. Plants were provided with a supplemental light intensity of 100 $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ from a 400-W high-pressure sodium (HPS) lamp or light emitting diodes (LEDs) with red:blue ratios of 93:7 (low blue – LB) or 70:30 (high blue – HB). Gas exchange, fluorescence, and phenolics were measured using an infrared gas analyzer, fluorometer, and high-performance liquid chromatography (HPLC), respectively. Both LED treatments increased photosynthesis for basil ($P < 0.001$) and parsley ($P < 0.001$), as well as chlorophyll fluorescence ($P < 0.001$), versus HPS. Plants grown under HB lighting were shorter than HPS for basil ($P = 0.039$) and parsley ($P = 0.002$). Comparatively, parsley fresh mass (SFM) was lower for HB-treated plants compared to HPS ($P = 0.043$), while dill SFM was unaffected by light source. Lighting from LEDs resulted in increased concentration of several phenolic compounds compared to HPS and was species-specific in magnitude. Increased content of flavor compounds demonstrate the potential of spectra-specific lighting for increasing crop value and altering morphology.

Poster Presentations

FACULTY JUDGES: Dr. Nick Peters, Dr. Linda Ambrosio, Dr. Nicole Valenzuela

I.P.1 Eric Britt Moore, *Soil Science*

The Potential of Rye Cover Crops to Improve Soil and Water Management in the U.S. Corn Belt

There is increasing interest in using cover crops as conservation management tools. However, despite a substantial increase in research efforts devoted to cover crops over the past decade, cover crop effects on soil hydraulic properties are still not completely understood. This research will examine the long-term effects of a winter cereal rye (*Secale cereale*) cover crop on soil water retention and movement, as well as explore the extent to which soil structure and organic matter interactions influence soil hydraulic properties. Furthermore, soil organic carbon will be fractionated to better understand differences between active, slow, and passive soil carbon pools as they relate to soil water retention. The series of experiments outlined in this poster are predicated on the hypothesis that winter cover crop biomass and root growth will increase soil water retention through improved soil structure and an augmented soil organic matter pool. The tentative schedule for soil data collection is 2016-2018. The experiment plots used in this study were established in 2001 near Ames, IA and have been managed with winter rye cover crops in a no-tillage corn-soybean rotation every year since. Soil water potential, hydraulic conductivity, soil texture, soil aggregation, and soil organic matter will all be measured in the proposed series of experiments. The treatments compared in these experiments are: (1) rye cover crop following corn silage and soybean; and (2) no cover crop following corn silage and soybean. Data from this study will provide much needed information on the potential of winter cover crops to enhance plant available water, conserve and improve soil resources, increase resilience to climate variability, and advance sustainable intensification of corn-soybean cropping systems in the U.S. Corn Belt.

Session 2.C. Oral Presentations Social Science/Humanities (*continued*)

The transition into adulthood provides a unique opportunity to study income and cortisol in African(AA) and Caucasian(CA) American youth.

Population samples were collected over a 10-year period from the Parents Who Care substance abuse prevention intervention in Seattle Washington. During waves 5 and 7 salivary cortisol was collected over 3 days. Data was analyzed from wave 5 (Age: R=18.5-22.4), and wave 7 (Age: R=20.5-23.9). Forty-six percent identified as AA and 53% of AA identified as female.

We hypothesized 1; differences in diurnal cortisol and waking cortisol between AA and CA youth, 2; as AA's continued into early adulthood waking cortisol intercepts would increase while CA's cortisol levels remained static, 3; an effect of income, 4; diurnal cortisol remaining the same or flatter in AA when compared to CA.

Results indicated a main effect in the intercept of Cortisol between AA and CA in both waves 5 ($\beta = 8.07$, $p < .001$) and 7 ($\beta = 8.37$, $p < .001$). Wave 5 was a significant predictor of wave 7 ($\beta = .49$, $p < .001$) with race indicating an increase in cortisol for AA ($\beta = 1.16$, $p = .004$). Between waves there was a flatter overall slope in diurnal cortisol in ($\beta = -20$, $p = .004$) for AA. There were no significant effects of income.

2.C.IV Vanessa Castillo, *Psychology*

When do members of honor culture forgive?

Vanessa A. Castillo and Susan E. Cross

Research on honor cultures has rarely examined prosocial behaviors, such as forgiveness. The goal of this study was to explore relations between culture and situational factors in decisional and emotional forgiveness. Participants were 138 students who recalled a previous conflict and answered questions regarding the conflict. Results showed that compared to members of a dignity culture (European Americans), members of an honor culture (Latinx participants) were less likely to decisionally forgive a distant other than members of a dignity culture but more likely to forgive a close other. Members of both honor and dignity culture were more likely to emotionally forgive a close other than a distant other. Compared to members of a dignity culture, members of an honor culture were also less likely to decisionally forgive an offender if the conflict occurred in public but more likely to forgive if it occurred in private. Culture and conflict location did not predict emotional forgiveness. These findings suggest that when a person's reputation or social image is at stake in a conflict, members of an honor culture are more likely to hold a grudge than are members of a dignity culture.

Session 1.B. Oral Presentations Biological Sciences (*continued*)

1.B.III Jaques Overdiep, *Food Science and Technology*

Educating Small Fruit and Vegetable Processors in the North Central Region about the Food Safety Modernization Act

Each year, 48 million contract a foodborne illness, causing 128,000 hospitalizations and 3,000 deaths each year. The Food Safety Modernization Act (FSMA) is a new food safety law that changed the way food companies are regulated to prevent foodborne illnesses. The FSMA Preventive Controls for Human Food rule was released September 2016 for facilities in manufacturing, processing, packing, and holding of human food. The North Central Region (NCR) Center for FSMA Training, Extension and Technical Assistance was founded by the Food and Drug Administration to assist with the education of processors around the Midwest. The NCR Center funded a project with three phases designed to help small fruit and vegetable processors in the Midwest understand their relationship with FSMA.

An audit checklist for processors to use in their facilities was designed in phase one. This checklist provided processors with a tool to determine their compliance with several parts of FSMA. Extension facts sheets were developed in phase two to help processors know their state food safety regulations. Topics included freezing, dehydrating, fermenting, and pickling of produce as well as jam and jelly products. The final phase was the design and dissemination of a needs assessment survey to processors in the NCR. Questions were asked about the processor's understanding of the FSMA. The needs assessment, ending October 31st 2017, will result in educational materials based on low understanding areas of FSMA. Overall, the project aims to increase the knowledge of FSMA among fruit and vegetable processors in the NCR.

Session 1.C. Oral Presentations Social Science/Humanities

LOCATION: Oak Room

FACULTY JUDGES: Dr. David Vogel, Dr. Jeff Essner, Dr. Clark Coffman

1.C.I **Brandon Johnson, *Education***

Black Families Matter: Varying Degrees of Support within A Rigid Institutional Dichotomy

When applying the theoretical framework around the concept of familism the primary goal of this study is to examine the experiences of black male collegians with an emphasis on how those collegians' families or whoever they deem as their family enhance or diminish their experiences in terms of support. Within the literature, there are narratives which depict black family as showing little to no support, but counter narratives offer the black family as not being given enough recognition for the contributions to their collegians. In terms of the overall study itself literature draws from three overall themes in relation to black families and black male collegians' success. Those three themes are persistence factors parental involvement and historically black colleges and universities versus predominantly white institutions. The overall study still currently a work in progress is designed using qualitative methods relying heavily on interviews.

1.C.II **Brandon Clark, *Education***

A Comparative Exploratory Analysis of Principals' Perceptions of Effective Leadership

Educational leadership research has identified and described effective principal leadership behaviors that positively influence schools and student learning. Through the development of comprehensive models like the Unified Model of Effective Leadership (UMEL), scholars have advanced specific dimensions and domains of principal practice that are considered necessary for student achievement and school improvement. Scholars have also asserted that leadership is shaped by context, and international perspectives of principals' leadership activity is likely more nuanced when compared to holistic and generalized models of effective practice.

Session 2.C. Oral Presentations Social Science/Humanities (*continued*)

2.C.II **Courtney Johnson, *Apparel Merchandising and Design***

The Revolution Will Be Stylized: An Analysis of 1960s Black Panther Party Uniforms as a Catalyst for Social Change and Modern-Day Protest Aesthetic

After the assassination of Dr. Martin Luther King and Malcolm X, there was an uprising for Black liberation in America. The Black Panthers were led by African Americans who are highly educated and powerful orators, and who had a great deal of influence in the Black community in a tumultuous time in American history. The demeanor of the Black Panthers was very different than that of other Civil Rights activists in that time. The Black Panthers were often viewed as thugs or nothing more than a gang of criminals, despite their aim to push revolutionary change through community service (Kirkby, 2011). Aside from their attitudes' being different, their uniforms were the main way to distinguish a member of the Black Panther Party. The uniforms of this organization made a powerful statement in American history, and to this day the Black Panther style of dress is referenced. The appearance of Black Panther members and leaders had a deeper meaning to them. Fast-forward to today, there is still a need for Black liberation in America, and many activists are speaking out from groups such as Black Lives' Matter. This study aims to analyze the history of this organization and to take a deeper look in to how their appearance played a role in the Civil Rights movement of the 1960s, specifically 1966, to the mid-1970s, as well as analyzing what modern-day supporters of the Black Lives' Matter movement to discover 'what does a protestor look like?'

2.C.III **Shannin Moody, *Human Development and Family Studies***

Effects of Race and Income on Cortisol during the transition into Early Adulthood

Shannin N. Moody, Kevin Haggerty, Martie Skinner, Elizabeth Shirtcliff

Whether constructs of income or race are the driving cause of stress outcomes (i.e. biomarkers) may be neglected because of difficulty isolating socioeconomic variables from racial predictors. Biopsychosocial racial differences in cortisol output must be understood for meaningful between group interpretations to be made.

Session 2.C. Oral Presentations Social Science/Humanities

LOCATION: Oak Room

FACULTY JUDGES: Dr. Suzanne Zilber, Dr. William Graves, Dr. Daniela Dimitrova

2.C.I **Brandon Clark, *Education***

What We Know What We Don't Know: A Review of Intersectionality Research Within Core Educational Administration Journals

The purpose of this research was twofold. First, using conceptualizations of educational leadership for social justice and a multilevel intersectionality framework for educational research analysis, this study systematically reviewed how research published within core educational administration journals has incorporated intersectionality frameworks to investigate social justice and leadership identity at the K-12 level. Second, this study serves to encourage a dialectical engagement among scholars that considers the integration and efficacy of intersectionality within ontological, epistemological, methodological, and analytical approaches to educational leadership for social justice research.

As such, two questions guided this study: 1) How have scholars considered and integrated intersectionality within their analysis of educational leadership for social justice? 2) How have scholars positioned intersectionality as a category of analysis within their examination of educational leadership for social justice?

Findings confirmed that peer reviewed educational leadership for social justice scholarship that employs intersectionality frameworks for analyses are present within predominant educational administration journals. However, findings also suggest that intersectionality frameworks can be more widely employed to contest hegemonic asymmetrical power dynamics within schools, which support the silencing, and oppression of marginalized students. Similarly, intersectionality frameworks applied to educational leadership for social justice research can expand our understanding of how principals can be prepared to support student voice, engagement and learning within schools, and how socially-just leaders support advocacy work across difference in schools and local communities.

Session 1.C. Oral Presentations Social Science/Humanities (*continued*)

As such, our current understanding of effective principal leadership cross-nationally remains emergent.

Therefore, the purpose of this study was to encourage additional scholarly discourse and study of how we conceptualize and measure principals' perceptions of leadership represented across international contexts. Cross-national research on principals' leadership practices have the potential to inform and refine leadership policy, preparation, and practice and subsequently impact school organizations in positive ways.

Two research questions were investigated: 1): As measured by factored survey items on the Progress in International Reading Literacy Study (PIRLS) 2011, how do principals from a selected sample of G-20 nations perceive domains of leadership practice compared to UMEL leadership domains? 2): As measured by factored survey items on the PIRLS 2011, do these principals' perceptions of leadership practice dimensions and domains differ across cross-national contexts?

Findings revealed measured differences in principal perceptions of leadership based on national-level antecedents, raising further questions about the applicability of standardized leadership models cross-nationally, as well as the degree to which principals emphasize particular domains of effective leadership practice.

1.C.III **Courtney Johnson, *Apparel Merchandising and Design***

Swagger Like Us: Black Millennial's Perceptions of 1990s Urban Brands

Early hip-hop culture has laid the foundation for what is now a million-dollar business. Since its inception, hip-hop has created a style, aesthetic, and a dialect all its own that relates to the youth (Aldridge & Stewart, 2005). As hip-hop grew in popularity, it became a spokesperson for luxury brands constantly being referenced in hip-hop music. But, before hip hop culture caught the attention of mainstream marketing and advertising, there was an array of Black-owned brands that solely wanted to cater to the underrepresented African-American market. These designers, many of whom were not connected to the fashion industry began to create a segment of the fashion industry called urbanwear (Romero, 2012). The purpose of this study is to examine Black millennials, attending Historically Black Colleges and Universities, perceptions and opinions on five prominent Black-owned urban wear brands from 1989 to 1998.

Session 1.C. Oral Presentations Social Science/Humanities (*continued*)

The five brands featured in the study, FUBU, Karl Kani, Sean John, Phat Farm, and Cross Colours, were chosen based off their high popularity and sales during the height of the urbanwear era. The urbanwear style was created out of the urban ghettos of New York and was geared primarily to Black consumers, but eventually Black consumers stopped buying. I plan to interview African-Americans who were born in the years of 1990 to 1999 to get their insight as well as get their feelings regarding Black-owned urban brands and 1990s trends that are coming back into style today.

1.C.IV Chelsea Smith, *Education*

White Tears in the Class Room

Rachael Blansett, Chelsea Smith

White fragility, a side effect stemming from white privilege, has plagued social justice classrooms within higher education and can be viewed as a hindrance to the learning opportunities for students have when it comes to issues of racism and other forms of oppression. According to Robin DiAngelo, white fragility is “The insulated environment of racial protection builds white expectations for racial comfort while at the same time lowering the ability to tolerate racial stress.” This can be manifested in various ways in the classroom in the form of silence, dismissal of feelings, triggering, and unfortunately even tears during conversations centering race and privilege. There is little published literature around topic white fragility and the way it pervades classroom dynamics. Using a case study details an incident of white fragility surrounding police brutality against black bodies we seek to explore how to create a more beneficial atmosphere for students of color development, empowerment, and to build stronger ally-ship opportunities with white students. Using the Privileged Identity Exploration Model our study will further engage and examine the behaviors accompanied by white fragility.

Session 2.B. Oral Presentations Biological Sciences (*continued*)

2.B.III Rafael Martinez-Feria, *Crop Production and Physiology*

High Crop Nitrogen-Use Efficiency Does Not Translate into Low Environmental Losses in the Midwestern US

Rafael A Martinez-Feria, Michael J. Castellano, Matthew J Helmers, Matt Liebman, Ranae Dietzel, Isaiah Huber, Sotirios V Archontoulis

Increasing nitrogen (N)-use efficiency (NUE) is necessary for improving crop production and environmental quality. Cropping system NUE is often evaluated based on the long-term balance between the inputs of N into soil and its removal in harvested yield. A long-term N surplus (i.e. N inputs > N yield) is widely accepted as indicative of environmental N losses. Here, we evaluate this assumption in the context of the predominant rainfed maize and soybean cropping systems of the Midwestern US. We used a process-based model (APSIM), trained and tested with experimental datasets from Iowa, US, to calculate N balances across cropping systems that differed in fundamental biophysical controls on N dynamics. Modeling results indicated that despite the high NUE (87%) and a low N surplus (21 kg N ha⁻¹ yr⁻¹) in these systems, the actual environmental N losses (47 kg ha⁻¹ yr⁻¹) were substantially greater than what would be predicted by these metrics. Because the soil N pool in these systems is not in long-term equilibrium (-26 kg N ha⁻¹ yr⁻¹), the N surplus did not adequately characterize environmental N losses. Additionally, efficiency improvements resulting from the inclusion of a rye cover crop, which mitigated environmental N losses by 22%, were not captured by the N surplus method. This suggests that mitigating the high environmental losses in these systems requires more than reducing the N surplus alone, but also enhancing the N recycling with practices such as cover crops. Results also highlight the need for developing NUE metrics that can concurrently evaluate the efficiency attributable to improvements in both fertilizer management and N cycling. This would aid in the identification of win-win management scenarios that increase production while mitigating environmental N losses.

Session 2.B. Oral Presentations Biological Sciences (*continued*)

2.B.II Mattea Allert, *Entomology*

Analysis of Contrasting Microbiomes of Two co-occurring Fungus-Gardening Ants Trachymyrmex septentrionalis and Trachymyrmex turrifex

The fungus gardening-ant system is considered a complex, multi-tiered symbiosis between the ants, their fungus, and their corresponding microbes. We examine the bacterial microbiome of *Trachymyrmex septentrionalis* and *Trachymyrmex turrifex* ants and their corresponding fungus, using 16S rRNA, over a large geographical region to determine if horizontal transmission was occurring. The goals of this study was to determine how the ant microbiome was transmitted and how the fungus microbiome was transmitted. We determined that the microbiomes of *T. septentrionalis* and *T. turrifex* ants were different because of the ant species, while the microbiomes of *T. septentrionalis* and *T. turrifex* fungi were spatially structured and were not determined by the species of ant growing them but the region in which the fungus resided. The most abundant bacterial orders found with *T. septentrionalis* ants were Actinomycetales, Soilrubrobacteriales, Xanthomonadales, and Burkholderiales. In *T. turrifex* ants the most abundant bacteria found were Actinomycetales, Entomoplasmatales, and Burkholderiales. The most abundant bacteria associated with the Central Texas fungus gardens, regardless of the ant species growing it, were Entomoplasmatales, Streptophta, and Enterobacteriales. The most abundant bacterial orders in East Texas fungus was Entomoplasmatales and Streptophta.

Session 2.A. Oral Presentations Mathematics/Physical Sciences

LOCATION: Cardinal Room

FACULTY JUDGES: Dr. Laura Jorboe, Dr. Olga Zabolina, Dr. Craig Ogilvie

2.A.I David Morandeira-Alonso, *Civil Engineering*

Rapid Bridge Deck Joint Repair Investigation Phase III

David Morandeira , An Chen

Accelerated Bridge Construction (ABC) technologies are changing the ways State Departments of Transportation (DOTs) do business. Subsequently, a three-phase project on the Rapid Bridge Deck Joint Repair Investigation is originated. Phase I of this project focused on documenting the current means and methods of bridge expansion joint maintenance and replacement, and then identifying improvements. Based on the findings from Phase I, Phase II focused on the concept development. It was decided that a desirable approach would be to develop a design to move the joint away from the bridge deck at the face of the abutment to the approach slab that acts as a transition between roadway pavement and the previously mentioned bridge deck. By using this concept, a more effective joint can be created, where possible deicing chemical laden water leakage on the substructure components is no longer a concern for deterioration and its construction time can be comparable to that required for traditional joint replacements. This concept is being investigated in Phase III. Finite Element (FE) modeling of the existing conditions of two distinct bridges has been realized. A testing plan has been completed and test results will be compared with FE results. A post-construction testing plan is being investigated that should provide verification of the models permitting their confident use for designing such expansion joints in the future

Session 2.A. Oral Presentations Mathematics/Physical Sciences (*continued*)

2.A.II Armando Grez, *Mathematics*

Families of bipartite graphs constructed by twinning and maximum nullity equal to zero -forcing number

*Joseph S. Alameda, Emelie Curl, Armando Grez, Leslie Hogben, O'neill Kingston, Alex Schulte
Derek Young, Michael Young*

The maximum nullity of a simple graph, G , denoted $M(G)$, is defined to be the largest possible nullity over all symmetric real matrices whose ij th entry is nonzero exactly when $\{i,j\}$ is an edge in G for i not equal to j , and the ii th entry is any real number. The zero-forcing number of a simple graph G , denoted $Z(G)$, is the minimum number of blue vertices needed to force all vertices blue by applying the color change rule. The motivation for this research is the longstanding question of characterizing graphs G for which $M(G) = Z(G)$. By using the technique of independent vertex twinning we form a new family of bipartite graphs, called s,r -Jewel Necklaces, for which $M(G) = Z(G)$.

Session 2.B. Oral Presentations Biological Sciences

LOCATION: Gold Room

FACULTY JUDGES: Dr. Nick Serao, Dr. Linda Ambrosio, Dr. Clark Coffman

2.B.I Bridget Perry, *Food Science and Technology*

North Central Region Produce Needs Assessment for FSMA Produce Safety Rule

Bridget Perry, Arlene Enderton, Catherine Strohbehn, Angela Shaw, Linda Naeve

The increase in the number of produce recalls and outbreaks due to contamination has resulted in focus toward industry practices and evidence based education from farm to market.

The purpose of this research is to assess knowledge and educational needs of produce growers in the north central region (NCR) of the U.S. for compliance with the Food Safety Modernization Act (FSMA) Produce Safety Rule.

A two-phase, modified Delphi approach was used to gather information from growers; Round One is presented here. Paper and electronic questionnaires were distributed by a total of 30 educators and organizations in 12 Midwest states part of NCR. A five-point Likert rating scale was used to assess current knowledge and educational needs in areas of water testing; biological soil amendments; animal controls; worker health and hygiene; worker training; and equipment, tools, and buildings. A similar scale was used to identify preferred methods of information delivery. Space for comments was available and theming occurred with results.

Findings indicated respondents that the sample size of 299 were concerned about regulations, on farm best practices pre and postharvest, organic standards, and recordkeeping. The top four areas of information needs identified were water and biological soil amendments testing, training, and animal controls. Qualitative data identified concerns with understanding regulations and cost of compliance. Preferred information delivery methods were identified as in person approaches and use of technology such as online modules and downloadable fact sheets. These findings will be utilized to develop a focused educational curriculum for growers in the Midwest.