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Conference

2020, 31st Annual JWP Conference

Apr 4th, 8:30 AM - 9:00 AM

Complete 2020 Program

Illinois Wesleyan University

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SATURDAY, APRIL 4

2020

www.iwu.edu/jwprc

Named for explorer and geologist John Wesley Powell, the Student Research Conference gives undergraduate students at Illinois Wesleyan University the opportunity to share their intellectual and creative work. The Conference showcases the accomplishments of students across programs, providing a forum for research in a variety of fields to be presented to an engaged audience. Honoring John Wesley Powell's commitment to a broad, student-centered education in the liberal arts, the Conference celebrates student achievement and the sharing of cross-disciplinary knowledge.

Thirty-first Annual

John Wesley Powell

Student Research Conference



Saturday, April 4, 2020

8:30 a.m. – 3:00 p.m.

Official Program

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Acknowledgements

In light of the rampant spread of the coronavirus, this year's conference is cancelled. However, with the publication of this booklet we recognize the engaging research projects and the work so many Illinois Wesleyan students have already undertaken.

The John Wesley Powell Research Conference Committee would like to acknowledge the contributions of several individuals.

This conference could not have been a success without the contributions of Amy Jo Perez, Associate Provost's Office, and Jenny Hand, Institutional Research and Planning, in organizing many aspects of the conference and assembling and printing the program booklet.

The invaluable assistance provided by Bob Kelch and his staff at Sodexo Campus Services in setting up breakfast, luncheon and other refreshments is gratefully acknowledged.

The assistance of Information Technology Services, Ray Martinez, in setting up computer equipment in all rooms along with Curtis Kelch for website consultation is greatly appreciated.

The photography and videography coverage by Nick Helten and Michael Limacher.

The Undergraduate Research Advisory Committee:

Carolyn Nadeau (chair), Todd Fuist (fall), Given Harper (fall), Seung-Hwan Lee (spring), William Munro, Gabe Spalding, Aaron Wilson (spring) and Rebecca Roesner (ex officio)

Annual Intellectual Theme

All participants that feel their work fits with the theme will be designated with the logo below.



Fact or Fiction

Learning to discern fact from fiction is a truly interdisciplinary challenge that requires the full array of skills developed through a liberal education. Mathematics and economics teach us quantitative literacy so we are not so easily misled by biased data. The sciences teach a tried and true method for evaluating scientific facts. Psychology helps us to understand the underlying cognitive processes that make it so hard to see through fake news with which we agree. Philosophy pushes us to consider epistemological questions about the nature of all knowledge. When studying actual works of fiction, we often learn something about how to be our best selves in the real world, while history shows us that fake news and propaganda are nothing new and have been contended with before.

<https://www.iwu.edu/annual-theme/2019/>

Schedule of Events

Saturday, April 4, 2020

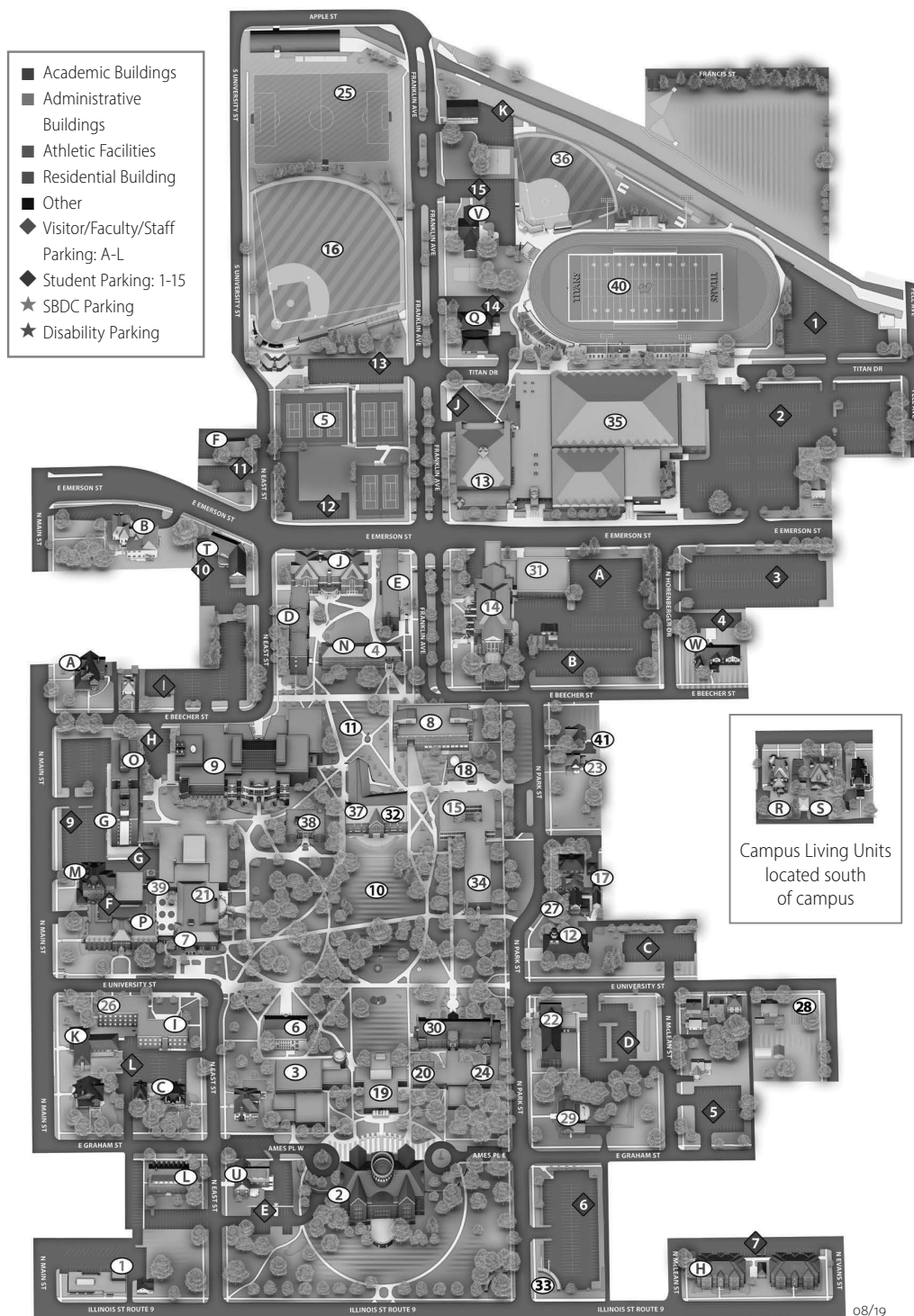
Time	Event	Location
8:30 a.m. – 9:00 a.m.	Continental Breakfast and Poster Setup	Atrium of CNS and State Farm Hall
9:00 a.m. – 10:00 a.m.	Poster Session A (Odd Numbered)	Atrium of CNS
10:00 a.m. – 11:00 a.m.	Oral Presentations – Sessions 1-4	CNS
11:00 a.m. – 12:00 p.m.	Oral Presentations – Sessions 5-8	CNS
12:00 p.m. – 2:00 p.m.	Luncheon (for conference participants, parents and advisors)	Young Main Lounge
	Music Composition Performance	
	Keynote Address: John D'Agata	
2:00 p.m. – 3:00 p.m.	Poster Session B (Even Numbered)	Atrium of CNS

CAMPUS BUILDINGS AND SITES

- 1) Alumni Relations Office
- 2) The Ames Library
- 3) Joyce Eichhorn Ames School of Art*
(Magill Hall, north entrance)
- 4) Arnold Health Center
(Magill Hall, north entrance)
- 5) Beadles-Morse Courts
- 6) Buck Memorial Library
- 7) Campus Safety
- 8) Center for Liberal Arts
• Mellon Center
- 9) Center for Natural Science
• The Wilson Atrium
- 10) Eckley Quadrangle
• Family with Dog Sculpture
- 11) Egbers Quadrangle
• Aspiration Water Sculpture
- 12) Evelyn Chapel
- 13) Fort Natatorium
- 14) Hansen Student Center
and University Bookstore
- 15) Holmes Hall
• Business Office
• Dean of Students Office
• Financial Aid Office
• President's Office
- 16) Horenberger Field
- 17) Information Technology
- 18) Mark Evans Observatory
- 19) McPherson Theatre*
(School of Theatre Arts)
- 20) E. Melba Kirkpatrick Lab Theatre*
- 21) Memorial Center
• Joslin Atrium
• Young Main Lounge
• Idea Center
- 22) Myers Welcome Center
• Admissions Office
• Hart Career Center
- 23) Multicultural Center
- 24) Music Building*
- 25) Neis Soccer Field
- 26) Office of Residential Life
(Gulick Hall, north entrance)
- 27) Park Place
- 28) Peace Garden
- 29) President's House
- 30) Presser Hall* (School of Music)
• Westbrook Auditorium
- 31) Physical and Heat Plant
- 32) SBDC (State Farm Hall,
3rd floor)
- 33) Sesquicentennial Gates
- 34) Shaw Hall
- 35) Shirk Center
• Basketball/Volleyball Arena
• Indoor Track
• Recreation Center
- 36) IWU Softball Field
- 37) State Farm Hall
• Kemp Plaza
- 38) Stevenson Hall (School of Nursing)
- 39) Titan Print & Mail
- 40) Tucci Stadium
• Keck Track
- 41) Wilder House

* Alice Millar Center for the Fine Arts
(Schools of Art, Music, and Theatre Arts)

ILLINOIS WESLEYAN UNIVERSITY



CAMPUS LIVING UNITS

- A) Acacia (Adams Hall)
- B) Alpha Gamma Delta
- C) Blackstock Hall
- D) Dodds Hall
- E) Dolan Hall

- F) East Street Apartments
- G) Ferguson Hall
- H) Gates at Wesleyan Apartments
• Fricke Hall
- I) Gulick Hall
- J) Harriett Fuller Rust House
- K) Kappa Delta

- L) Kappa Kappa Gamma
- M) Kemp Hall
- N) Magill Hall
(International House)
- O) Munsell Hall
- P) Pfeiffer Hall
- Q) Phi Gamma Delta

- R) Phi Mu Alpha
- S) Sigma Alpha Iota
- T) Sigma Chi
- U) Sigma Kappa
- V) Tau Kappa Epsilon
- W) Theta Chi

08/19

Keynote Speaker

“Reflections on a Passing Resemblance”

John D’Agata, M.F. Carpenter Professor of English and Director of the Nonfiction Writing Program at the University of Iowa

John D’Agata is the author of *Halls of Fame*, *About a Mountain*, and *The Lifespan of a Fact*, as well as the editor of the 3-volume series *A New History of the Essay*, which includes the anthologies *The Next American Essay*, *The Making of the American Essay*, and *The Lost Origins of the Essay*. He is currently working on a collection of translations and a book about a famous ancient Greek letter. John D’Agata lives in Iowa City where he teaches creative writing at the University of Iowa and directs The Nonfiction Writing Program.



Student Participants

Music, Poster and Oral Presentations

Presentation Key:

O – Oral Presentation Example: O1.3 = Session 1, 3rd in order

P – Poster Presentation Example: P12 = Poster number 12

Name	Order
Evan Anderson	O3.2
Philip Andrango	P26
Megan Baker	O2.2
Amanda Best	P17
Leah Bieniak	P1
Madeline Bollinger	O4.2
Davida Boron	O1.1
Meghan Bowler	P3
Nicole Brennan	O7.4
Nicholas Brown	P32
Sarah Buchmann	O7.2
Adam Cady	O7.3
Christopher Callahan	Music
Olivia Causer	O8.3
Rebecca Cauthorn	P49
Panxi Chen	O6.2
Julia Chen	P13, P34
Minghao Chen	P21
Sam Churchey	P7
Emma Cottrell	O2.1
Maxwell Crowninshield	P33
Graham Dano	O8.1
Alexa Dawson	P50
Brooke Dominski	P18

Hayden Dudek	P9
Laurin Ebert	P3
Sierra Eidsmoe	P34
Megan Frederick	O5.1
Matthew Fritsch	P30
Aidan Garrett	P7
Amber Gauthier	O3.1
Gabrielle Ghaderi	O7.1
Amy Gourley	P23, P34, P36
Madeleine Hall	O8.2
Makena Harris	P24
Alivia Hay	P20
Allison Henry	P51
Amelia Hoffbeck	P19
Calvin Holliday	P34
Raya Hussein	O1.3
Lakshmi Jayam	P3
Paraskevi Kakares	P40
Ali Khatai	P30
Joseph Kiper	P14
Kevin Kugler	P6
Zoephia Laughlin	P12
Alexa Letourneau	O1.4, Music
Emily Lezcano	O5.2
Yutong Li	O6.2, P16

Yushan Liu	P10
Minzhao Liu	P25, P46
David N. Lopez	P25
Erick Lopez	P6
Rylie Loux	P45
Sarah Luce	P47
Man Luo	P52
Caroline Marchi	P4, P41
Yesenia Martinez Calderon	P35
Mark Mathison	Music
Peter Matteson	P8
Joselyn Molinar	P9
Cecelia Moran	P31
Shannon Murphy	P11
Zihan Nie	P21
Katie North	P28
Chase Ochsner	O3.3
Alexander Palacios	P22
Anjali Patel	P5, P10
Shivam Patel	P11
Ria Patel	P13, P34
Manish Pathuri	P10
Amanda Pippin	O2.3
Sarah Pombar	P15
Danielle Ponsot	P29
Michael Privett	P39
Skyler Reisig	P34

Christian Rohland	P37
Angela Roman	P53
Sydney Rowley	P27, P34
Nykia Rutledge	P38
Rebecca Rymarcsuk	P8
Richa Sapkota	P44
Christopher Sawicki	O3.4
Haley Scheller	P48
Rachel Schoenecker	P1
Alex Sentowski	P30
Sydney Shanks	O5.3
Aditi Sharma	P2
Katy Smit	P6
Samuel Soto	O4.3
Sherman Sun	P52
Anna Ta	P5
Crystal Valadez	O4.4
Katie Vogler	P3
Shiqi Wang	P42, P43
Patrick Ward	O6.1
Grant Werner	P34
Evan White	O4.1
John Whitfield	O1.2
Ian Wilkey	P30
Julie Xu	P13
Tec Yan Yap	O6.3
Jillian Yonan	P8

Presentations Organized by Department

Department	Name	Project Title
School of Art	Raya Hussein	Inner Voice
Biology	Sam Churchey Aidan Garrett	The Journey of Discovering Kvothe
	Megan Frederick	Man's Best Friend at the Center of an Ecological Crisis: Analyzing the concentration of dog populations and discovering local opinions in the Northern Andes of Angochagua, Ecuador
	Lakshmi Jayam Laurin Ebert Katie Vogler Meghan Bowler	The "Sweet" Truth about Cornea Development - Glycosaminoglycan Regulate Corneal Innervation
	Zoephia Laughlin	Exploration of Genes Responsible for Host-range Expansion
	Caroline Marchi	Revealing Misconceptions in Evolution to Better Teach Biology
	Joselyn Molinar Hayden Dudek	The Life of Fede: Discovery and Analysis of a Novel <i>Microbacterium foliorum</i> Bacteriophage
	Shannon Murphy Shivam Patel	A New Age of Finding Phage: The Meachum Story
	Anjali Patel Manish Pathuri Yushan Liu	No Bones About It - Inhibition of Ocular Skeleton Formation by the Glutamine Analog DON
	Ria Patel Julie Xu Julia Chen	Unlocking the Evolutionary Secrets of Xuper's Host-Jumping Mechanisms
	Anjali Patel Anna Ta	The Discovery of Joli Good Fellow
	Rachel Schoenecker Leah Bieniak	Determining Species Abundance and Habitat Preferences of Breeding Birds in Bloomington-Normal, Illinois
	Aditi Sharma	Separating the Effects of Water Viscosity and Temperature on the Clearance Rates of the rRotifer <i>Brachionus plicatilis</i>
	Katy Smit Erick Lopez Kevin Kugler	Cracking the Peripeteia Code: Discovering and Characterizing a Newfound Virus
	Jillian Yonan Rebecca Rymarczuk Peter Matteson	One Year with Aesir: The Discovery and Analysis of a New Bacteriophage
Chemistry	Joseph Kiper	Introduction of Green Chemistry Concepts into Undergraduate Chemistry Lab: A Greener

		Approach to Aspirin Synthesis
	Sarah Pombar	Ion Chemistry in Space
Computer Science	Tec Yan Yap	Text Anomaly Detection with ARAE-AnoGAN
Economics	Evan Anderson	The Migration of Illinois Cities and the Impact It Has on the People Left Behind
	Amber Gauthier	Women, STEM, and Gender Differences in Higher Education Attainment
	Chase Ochsner	Do Graduates from Female-Dominated Majors Earn Less than Graduates from Male-Dominated Majors?
	Christopher Sawicki	The Economic Assimilation of Young Southern European Immigrants in the United States' Labor Market
Educational Studies	Madeline Bollinger	Dynamic Learning: Using Dynamic Geometry Software to Boost Conceptual Understanding
	Rebecca Cauthorn	Arts Integration and Student Engagement
	Maxwell Crowninshield	Strategies and Benefits of Incorporating Student Interests
	Allison Henry	Let's Read Into It: The Effect of Children's Literature Integration on Student Engagement
	Rylie Loux	Let's Read Into It: The Impact of Social Emotional Learning on Student Emotional Behavior
	Sarah Luce	Learning Styles in the Classroom
	Caroline Marchi	Engaging Underrepresented Students in STEM: A Study in Casting a Wide Net
	Yesenia Martinez Calderon	What Strategies Can Be Incorporated in World Language Curriculum to Promote Post-secondary Empowerment for High School Students?
	Cecelia Moran	Getting Students Involved: Examining HS Teachers' Techniques for Encouraging Student Participation
	Danielle Ponsot	Creative Writing: What's It Worth?
	Michael Privett	Creative Community: How Creative Writing Contributes to Student Autonomy
	Christian Rohland	Integration of Storylining within STEAM for Differentiated Learning
	Angela Roman	Better Questions, Better Learning: Deeper than "Do you get it?"
	Samuel Soto	Exploring the Impact of Extracurricular Activities on Student Performance and Environment
	Shiqi Wang	Adaptation for International Students in the United States: Factors and Implications

	Evan White	Morning Meetings for Student Mindfulness and Class Cooperation
	Crystal Valadez	Teaching Students How to Teach Themselves: Socratic Seminars in the ELA Classroom
English	Megan Baker	Legitimate Leadership: A Comparative Analysis of Shakespeare's <i>Richard II</i> and Recent U.S. Presidents
	Davida Boron	Black Girl Magic
	Adam Cady	Corresponding with Keats: A Tragedy in Five Acts
	Gabrielle Ghaderi	The Damaging Rhetoric of Female Deception in Arthur Miller's <i>The Crucible</i> and its Modern Day Influence
	Amanda Pippin	From Page to Home Page: Turning Shakespearean Plays into Memes
	Emma Cottrell	Venus of Egypt: Symbolic Imagery of Queen Elizabeth I and Shakespeare's Cleopatra
	Nicole Brennan	Women's Reproduction and Mary Shelley's <i>Frankenstein</i>
	Sarah Buchmann	An Analysis and Lesson Plan of Queerness Across Media
	John Whitfield	which will tip the scales
Environmental Studies	Amanda Best	An Index to Measure Walkability in Urban Environments
History	Graham Dano	Ronald Reagan: Facts and Fallacies Regarding A Political About-Face
International Studies	Madeleine Hall	Found(n)ation: Immigrant Narrative through Imagery as Utopian Science Fiction in <i>The Arrival</i> and <i>Wall-E</i>
Mathematics	Minghao Chen Zihan Nie	Recursive Sequences and Girard-Waring Identities with Applications
	Amelia Hoffbeck	Properties of the Fibonacci-Lucas Sequence Mod m
	Yutong Li Panxi Chen	Maximum SK packing for A-fold complete graph
	Yutong Li	On Total Positivity of Riordan Arrays
	Patrick Ward	Decompositions of Complete Multipartite Hypergraphs

Music Performance	Alexa Letourneau Mark Mathison Christopher Callahan	Five Miniatures for Flute, Bassoon, and Piano
Music Composition	Alexa Letourneau	Discovering Compositional Voice: An Examination of Conceptions of Style, Authenticity and Originality in Twentieth and Twenty-first Century Classical Music
Neuroscience	Brooke Dominski	Effects of Acute Ethanol Exposure on Learning in Zebrafish
	Makena Harris	Using a Reach Quality Analysis, How Does Intermittent Exercise and Rehabilitation Affect the Range of Motion in C57BL/6 Mice Post Ischemic Stroke?
	Alivia Hay	Feedback-Processing during Speeded Response Tasks: Expertise Effects on Performance
	Alexander Palacios	The Effect of Chronic Stress on Stroke Rehabilitation
	Haley Scheller	Effects of Intermittent Exercise and Good Limb Training following Stroke in Mice
School of Nursing	Emily Lezcano	Improving Timing of Capillary Blood Glucose Monitoring and Insulin Administration through Patient Education
	Sydney Shanks	Content Validity: A Measure of Knowledge, Attitude, Behaviors, and Experiences of Muslims from the Nurse Perspective
Physics	Philip Andrango	Thresholds of Dimensionality in Physical Systems
	Matthew Fritsch Alex Sentowski Ian Wilkey Ali Khatai	Characterizing and Eliminating Magnetic Fields in an Electron Spectrometer
	Minzhao Liu David N. Lopez	Experimental Implementation of Wavefront Sensorless Real-time Adaptive Optics Aberration Correction Based Upon a Deep Neural Network
	Man Luo Sherman Sun	Transformation of Light in Anisotropic Materials and Devices
	Katie North	Absorption Spectra of Silicate Cosmic Analog Dusts Obtained with a Custom-made Spectrometer
	Richa Sapkota	A Computational Approach to the Study of Ultralow Field Reversal of Two-body Magnetization

	Minzhao Liu	Effects of Edge Roughness on Magnetoresistance Signatures in an Artificial Spin Ice System
Psychology	Nicholas Brown	Glutamate Inhibition within the Amygdala during Positive Memory Formation in Rats
	Amy Gourley	The Happy Campaign: Assessing the Effectiveness of a Community-wide Intervention on the Well-being of Elders in Public Housing
	Amy Gourley	Examining the Implications of Acculturation on Body Image Ideals and Dissatisfaction: A Systematic Literature Review
	Sydney Rowley	False Beliefs in Dogs
	Nykia Rutledge	Deconstructing Racial Battle Fatigue
	Shiqi Wang	Youtube, Social Media and Website Exposure on Body Dissatisfaction: A correlational survey study
	Grant Werner Julia Chen Amy Gourley Skyler Reisig Sydney Rowley Calvin Holliday Sierra Eidsmoe Ria Patel	Admissions and Marketing at IWU: Findings from Focus-Group Discussions
Sociology and Anthropology	Olivia Causer	Exploring the Effectiveness of Corporate Social Responsibility
	Alexa Dawson	Communal Healing Among the Ojibwe: Past and Present
World Languages, Literatures and Cultures	Paraskevi Kakares	The Salt of our Tears: Journalism as a Form of Justice

Music Composition Student Presentation
Young Main Lounge, Memorial Student Center
(as part of the conference luncheon program)

Five Miniatures for Flute, Bassoon, and Piano

- I. from within...
- II. Flight
- III. Echo
- IV. Flow
- V. Train Ride

Alexa Letourneau and Roy Magnuson*
School of Music, Illinois Wesleyan University

Alexa Letourneau (Flute), Mark Mathison (Bassoon), Chris Callahan (Piano)

Five Miniatures began as a sort of compositional exercise, allowing me to free myself of the pressure of trying to compose a large-form masterpiece. The genre of the miniature is, by definition, very small, thus allowing creativity to run its natural course, without having to worry about composing themes that will survive large scale musical development while still sounding fresh. Throughout this piece, I utilize musical material taken from careful observation of my surroundings. From the tense, pensive opening piano motive in movement one, taken from the sound of a broken washing machine, to the transcription of a squeaky underground train in Slovenia providing fast and driving seven-note motive present in every measure of movement five, *Five Miniatures* was a way for me to let go of my expectations and appreciate the beauty in the music of everyday life.

Oral Presentations
Center for Natural Sciences, Rooms E101-E104

10:00-11:00 a.m. Sessions 1-4

Session 1 – Room E101

English, Art and Music

10:00 (1.1) Davida Boron
10:15 (1.2) John Whitfield
10:30 (1.3) Raya Hussein
10:45 (1.4) Alexa Letourneau

Session 2 – Room E102

English

10:00 (2.1) Emma Cottrell
10:15 (2.2) Megan Baker
10:30 (2.3) Amanda Pippin

Session 3 – Room E103

Economics

10:00 (3.1) Amber Gauthier
10:15 (3.2) Evan Anderson
10:30 (3.3) Chase Ochsner
10:45 (3.4) Christopher Sawicki

Session 4 – Room E104

Educational Studies

10:00 (4.1) Evan White
10:15 (4.2) Madeline Bollinger
10:30 (4.3) Samuel Soto
10:45 (4.4) Crystal Valadez

11:00 a.m.-12:00 p.m. Sessions 5-8

Session 5 – Room E101

Biology and Nursing

11:00 (5.1) Megan Frederick
11:15 (5.2) Emily Lezcano
11:30 (5.3) Sydney Shanks

Session 6 – Room E102

Mathematics and Computer Science

11:00 (6.1) Patrick Ward
11:15 (6.2) Yutong Li, Panxi Chen
11:30 (6.3) Tec Yan Yap

Session 7 – Room E103

English

11:00 (7.1) Gabrielle Ghaderi
11:15 (7.2) Sarah Buchmann
11:30 (7.3) Adam Cady
11:45 (7.4) Nicole Brennan

Session 8 – Room E104

History, International Studies and Sociology

11:00 (8.1) Graham Dano
11:15 (8.2) Madeleine Hall
11:30 (8.3) Olivia Causer

Presentations are 12-15 minutes in length. There will be 12-15 minutes designated for a question-and-answer period for all presenters following the final presentation.

Note: Student's name is underlined, faculty advisor is designated with *

Oral Presentation O1.1

Black Girl Magic

Davida Boron and Michael Theune*

Department of English

Black Girl Magic is not just a phrase or an aesthetic. Black Girl magic is the way of life for black women. Black Girl Magic brings a rhythmic feel through poetry. Black Girl Magic is not just about Black women though, it is about blackness. Black women live in a day in age where they are not valued, they are stereotyped, and they are used as props. My project will be a series of poems that give you an insight of what Black Girl Magic means to me. I'd like for my poems to be seen as the "Meditations of a Black Woman". I want to use my voice to help people better understand what blackness is and life experiences from a Black woman's view. I also want to show some insights into how I feel as a black woman and the experiences I have faced throughout my life. I want to express the things that are hard to talk about for others through a personal lens and uplift the black community. Being able to be a voice for other people and continuing to create poetry where the people of my community can relate brings joy to me. I want the audience to indulge in the creative aspects of my experiences and poetry.

Oral Presentation O1.2

which will tip the scales

John Whitfield and Michael Theune*

Department of English, Illinois Wesleyan University

Losing someone or something that was once a constant in a person's life is a universal experience, and it will be felt by every single person at one time or another. No matter what it is – the loss of a family member, end of a relationship, losing an object that held sentimental value – at its root, it is a similar phenomenon. My project specifically is a collection of poems about my father and his passing, examining grief and loss through creative writing. Additionally, this project dives deeper into the art of elegy, and how poetry and writing is used as a form to honor those we have lost and processing the emotions their absence brings. This research also investigates the spoken word world, as much of my writing style is based in slam poetry, and there is often much healing in verbalizing one's feelings.

Oral Presentation O1.3

Inner Voice

Raya Hussein and Joshua Lowe*

Ames School of Art, Illinois Wesleyan University

Combining my knowledge and skills in studio art and graphic design, I propose to create a body of work for my senior art exhibit that explores various interactions between people and their inner voices. Inner voices can be invisible entities or sub conscious activities that are felt but not often seen. They are not materialized, but art has the ability to bring forth this abstract concept into a visual medium. There are many ways we approach our inner voices; they can be our guides in decision making, or a voice that either encourages or puts your values down. Upon surveying people's ideas, I would translate these images visually to allow people to see what is invisible. The exhibit would include three large portraits displayed as digital collages, animated shorts, and smaller illustrations in a dimmed light setting to allow the viewers to experience the inner workings of the soul.

Oral Presentation O1.4

Discovering Compositional Voice: An Examination of Conceptions of Style, Authenticity, and Originality in Twentieth and Twenty-First Century Classical Music

Alexa Letourneau and Adriana Ponce*

School of Music, Illinois Wesleyan University

In the teaching of composition, the term "compositional voice" is often referred to as a goal young composers should strive to attain. However, despite its pervasiveness, the term remains nebulous. Over half of composition students have been told in lessons to "find" or "develop" their voice, with a vast majority receiving no further instruction or clarification as to what this "voice" actually is. Thus, the aspect of their music which they have been instructed to develop remains frustratingly elusive.

Through interviewing high-profile composers active in the field, surveying composers in the early phases of their career, and examining primary bibliographic sources from 20th and 21st-century composers, I examine conceptions of the compositional voice and its role in pedagogy and personal compositional process. This project explores the use of the compositional voice, provides several contextual definitions of the phrase, and offers insight into the value of developing a concrete understanding of one's compositional voice. Furthermore, the relationship between a composer and their music is contrasted with that between an author and their literary works, as composing and writing are artistic processes that scholars typically conceptualize very differently. This paper argues that, given the variety of definitions and contextual disparities, the compositional voice is a concept better suited to a composer's understanding of their own music, than as a pedagogical tool.

Oral Presentation O2.1

Venus of Egypt: Symbolic Imagery of Queen Elizabeth I and Shakespeare's Cleopatra

Emma Cottrell and Joanne Diaz

Department of English, Illinois Wesleyan University

Iconography in the Renaissance was an influential tool for individuals to portray and retain power. Queen Elizabeth I used this tool frequently during her time as ruler of England. In their journals, Fischlin and King analyze symbols in paintings of Queen Elizabeth I that center around her religious and political power, her wealth and her impenetrability. She used this type of iconography to maintain power as a female ruler under constant threat. Soon after the end of Queen Elizabeth's reign, Shakespeare wrote his play *Antony and Cleopatra*. This work also displays an iconographic image of the female ruler of Egypt, Cleopatra. However, Shakespeare does not paint her as the powerful queen that Elizabeth was. Rather than simply analyze Shakespeare's treatment of Cleopatra, I use the iconography in portraits of the Queen of England and apply it to the Queen of Egypt and create an iconographic portrait of Cleopatra that emphasizes her power, wealth, and sexuality. I focus on exemplifying how both of these royal women used the imagery of their bodies to convey a message about who they are.

Oral Presentation O2.2

Legitimate Leadership: A Comparative Analysis of Shakespeare's *Richard II* and Recent U.S. Presidents

Megan Baker and Joanne Diaz*

English Department, Illinois Wesleyan University

When students study leadership in Shakespeare's *Richard II*, it's often a discussion surrounding divine rights to leadership and other concepts relating to a medieval, monarchical England. However, the question of legitimacy in this play offers timeless notions and criteria for leadership of any kind. In her article "A Crisis of Legitimacy: Shakespeare's *Richard II* and the Problems of Modern Executive Leadership," Dr. Andrea Ciliotta-Rubery uses the leadership criteria of legitimate ascension to power, job performance, and personal morality to examine the leadership of Richard, Bolingbroke, as well as Presidents Bill Clinton and George W. Bush. Her argument follows along with a classroom experiment she conducted on her undergraduate political science students who analyzed these leaders according to these criteria. The conclusion showed that for each leader, the individual criteria had different value. There was no real resolution as to what makes a leader completely legitimate, as no leaders analyzed perfectly embodied each criterion. By analyzing our two most recent American presidents, Donald Trump and Barack Obama, I hope to uncover more answers to the question of legitimate leadership through a comparative analysis with *Richard II*.

Oral Presentation O2.3

From Page to Home Page: Turning Shakespearean Plays into Memes

Amanda Pippin and Joanne Diaz*

Department of English, Illinois Wesleyan University

Shakespeare's plays have saturated Western culture. His plays and poems were so masterfully crafted that they have moved from the world of entertainment to the world of academic study. But Shakespeare was never an isolated genius; his plays had many sources from ancient and recent history, from myth, and from poets and storytellers who came before him. My goal in this project was to do for Shakespeare what he did for his sources: reshape them, reinvigorate them, and make them accessible for my audience. How do you make Shakespeare accessible in the 21st century? Simple. You make a ton of memes. I have created memes for the Henriad tetralogy: *Richard II*, *Henry IV Part 1*, *Henry IV Part 2*, and *Henry V*. These memes include direct quotations from the texts and/or summarization of themes, plot points, and characters—depending on the structure of the meme being created. The formats of the memes vary: some are from the early 2010s, some have gained traction much more recently. I have compiled all of the memes I've created on a Tumblr blog, www.shakespearesmemes.tumblr.com, using the hashtag #my post. This project will shed a new light on what we think we know about Shakespeare by bringing him up to date with our current sociocultural climate.

Oral Presentation O3.1

Women, STEM, and Gender Differences in Higher Education Attainment

Amber Gauthier and Phillip Oberg*

Department of Economics, Illinois Wesleyan University

Discussions and investigations of gender differences in earnings and human capital have seen a resurgence recently, specifically as they relate to women in Science, Technology, Math, and Engineering (STEM). Previous research, including my own, has uncovered inequality in earnings. Here, using data from the U.S. Current Population Survey, I examine the relationship between gender and (i) earning a professional certification; and (ii) pursuing graduate education: both means of career advancement and economic mobility. Simple ordinary least squares indicates women are less likely than men to obtain a professional certification, though this effect disappears in the presence of controls, including whether one works in a STEM occupation. Further analysis examines the probability of obtaining post-graduate education, as well as selection into a STEM occupation. The results can inform policies aiming to close gender gaps in higher education outcomes.

FACT OR FICTION

Oral Presentation O3.2

Migration Project Abstract

Evan Anderson and Michael Seeborg*

Department of Economics, Illinois Wesleyan University

The state of Illinois has had one of the highest rates of outbound migration of any state in America. This paper evaluates the impact of this out migration on the communities these people leave behind, in particular the financial hub of Chicago and the small city of Bloomington. These cities are compared to the growth city of Phoenix Arizona, whose population has exploded in this decade and is one of the most popular destinations for those migrating out of Chicago and Bloomington. Human capital theory suggests that highly educated people with high wage potential are more likely to migrate than less educated people. This paper uses the American Community Survey Census database to test the hypothesis that communities with outbound migration (Chicago and Bloomington) face increases in poverty and lower levels of educational attainment on average than the cities with inbound migration (Phoenix). This hypothesis is explored through difference-in-difference and OLS regression analysis of poverty, education, and wage variables.

Oral Presentation 3.3

Do Graduates from Female-Dominated Majors Earn Less than Graduates from Male-Dominated Majors?

Chase Ochsner and Michael Seeborg*

Department of Economics, Illinois Wesleyan University

While gender and pay equality is greater than ever, there are still college majors that have enrollments dominated by either males or females. This research explores those who have chosen to major in male- and female-dominated disciplines and how this choice has affected their earnings. Based on the Barbara Bergmann crowding theory, I hypothesize that men and women who graduate from female-dominated disciplines will have lower wages than men and women who graduate from male-dominated majors. I used the American Community Survey data set (ACS) and OLS multiple regression analysis to test this hypothesis. The results indicate that earnings for graduates from female-dominated disciplines are significantly less than earnings for graduates from male-dominated disciplines, even after controlling for the effects of race, marriage, age, degree level, and usual hours worked.

Oral Presentation O3.4

The Economic Assimilation of Young Southern European Immigrants in the United States' Labor Market

Christopher Sawicki and Michael Seeborg*

Department of Economics, Illinois Wesleyan University

Over the past few decades, youth unemployment levels have reached all-time highs in Southern Europe. The question arises: Do Southern European youth immigrants fare better in the U.S. labor market? This study is aimed to explore the assimilation of youth immigrants from Portugal, Italy, Greece, and Spain when compared to US native youth. By analyzing differences in wages and employment, I aim to determine how well this sample of immigrants have assimilated in the United States and whether they may better off in the United States. Human capital theory suggests that since not all immigrant skills can be applied in the United States, natives will perform better than immigrants. This paper uses regression analysis and the American Community Survey (ACS) database to test the hypothesis that Southern European youth immigrants to the U.S. will have lower earnings than U.S. native youth. Surprisingly, the results suggest that youth immigrants from these four countries seem more likely to assimilate in terms of wages and have a higher probability of employment than young U.S. natives.

Oral Presentation O4.1

Morning Meetings for Student Mindfulness and Class Cooperation

Evan White and Leah Nillas*

Educational Studies, Illinois Wesleyan University

Social emotional learning (SEL) has increasingly become a crucial aspect of instruction for the classroom. Within social emotional learning, morning meetings have emerged as a classroom practice. *Morning meetings* are a SEL strategy to develop classroom culture and support the emotional needs of students before the class day begins (Bruce, Fasy, Gulick, Jones, & Pike, 2006). The purpose of this research is to examine morning meetings around the topics of student mindfulness and classroom cooperation and to notice if the students prefer one topic over another. It takes place in a 5th grade class with 17 students who came from a spectrum of cultures and housing circumstances. Data collected consists of field notes, lesson plans, and student work samples. The significance of this study is to enlighten teachers on potential strategies to engage their classroom and think about how student mindfulness and classroom cooperation should be emphasized in their classroom to best support them.

Oral Presentation O4.2

Dynamic Learning: Using Dynamic Geometry Software to Boost Conceptual Understanding

Madeline Bollinger and Leah Nillas*

Department of Educational Studies, Illinois Wesleyan University

The use and integration of computing, constructing, and graphing software has been proven to help students' mathematical performance in a variety of ways in recent studies (Tatar, Zengin, 2016; Asmida, Sugiatno, Hartoyo, 2018; Bozkurt, 2018). The purpose of this study was to look at the effects of the use of Dynamic Geometry Software (DGS) on students' conceptual understanding. *Conceptual understanding* is the core of the five strands of mathematical proficiency defined by Kilpatrick, Swafford, and Findell (2001). Students who have conceptual understanding represent their knowledge of the content in multiple ways, make connections between concepts in an organized manner, and functionally apply those concepts. Conceptual understanding has three key components: direct understanding, functional understanding, and integrated understanding. Throughout the semester, 18 honors geometry students utilized DGS in learning activities as a way for them to visualize and interact with the content they were learning. Student work corresponding to the lessons involving DGS was analyzed for evidence of conceptual understanding. Results showed a clear connection between students' conceptual understanding and the use of DGS in delivering geometry content. Overall, the results of this study signify the use of DGS as a key practice that effectively fosters students' conceptual understanding.

Oral Presentation O4.3

Exploring the Impact of Extracurricular Activities on Student Performance and Environment

Samuel Soto and Leah Nillas*

Educational Studies, Illinois Wesleyan University

The purpose of this literature review is to explore and analyze the impact of extracurricular activities (ECAs) have on student performance and school environment. ECAs are activities that take place outside of the normal classroom curriculum and can be found in an academic or nonacademic context depending on the categorization of the activity (Bartkus, Namelka, Namelka, & Gardner, 2012). *Threshold framework* is utilized in this study which theorizes that ECAs have a positive effect on academic performance up to a certain point beyond which participation leads to negative academic outcomes (Seow & Pan, 2014). Peer-reviewed research studies were selected and content analyzed to critically review the different effects of ECAs on in class performance, mental health, achievement, and social environment and growth. This research doesn't explore the individual impact on students, but the skills and lessons that the student's take away from ECAs which are needed to fully understand the impact of ECAs on different aspects of the student's academic experience. When comprehension of the variables that existing literature covers is achieved, then the impact of ECAs on students can be effectively analyzed to determine the positive or negative nature of ECA participation.

Oral Presentation O4.4

Teaching Students how to Teach Themselves: Socratic Seminars in the ELA Classroom

Crystal Valadez and Leah Nillas*

Department of Educational Studies, Illinois Wesleyan University

In high school ELA classrooms, spaces to improve the reflective writing practices and critical thinking skills of students in literature is constantly evolving. In a quickly adapting digital world it is an ongoing hurdle for teachers to aid in student's abilities to understand the literature they are being taught. I incorporated *Socratic seminars* into my secondary education English classes in order to study how to overcome this. According to Tredway (1995), the Socratic method refers to "a form of structured discourse about ideas and moral dilemmas" (p. 26). This research is the result of my self-study to understand which pieces of teaching would be most vital for Socratic seminars in order to improve student's critical and literary skills. The data was lesson plans, teacher field and anecdotal records, and a survey sent to the students. For the purposes of this research, I examined my field observation notes taken from English II and English I classes of about thirty students at the average course level to assess how the difference in knowledge based on grade level may provide insight into how students progressed throughout the semester. Socratic seminars as a supplementary form of instruction significantly improved literary and analysis skills.

Oral Presentation O5.1

Man's Best Friend at the Center of an Ecological Crisis: Analyzing the concentration of dog populations and discovering local opinions in the Northern Andes of Angochagua, Ecuador

Megan Frederick and William Jaeckle*

Department of Biology, Illinois Wesleyan University

Known as loyal companions in domestic settings, dogs (*Canus lupus familiaris*) also assume a variety of roles in ecological communities, and, in Northern Ecuador, free-ranging dogs have forced some endemic fauna out of their habitats. The Andean bear (*Tremarctos ornatus*), native to Ecuador, is considered a "Vulnerable" species (IUCN Red List of Threatened Species). Andean bears inhabit the region surrounding the rural community of Angochagua, Imbabura, Ecuador, and may interact with dogs associated with Angochagua. To understand the relationship between dogs, community members, and Andean bears, I contributed to a government census by interviewing 50 households and reviewing data from 288 households to estimate the pet population densities and document opinions about dogs and Andean bears. In parallel, 5 camera traps were reviewed to determine relationships between bear, dog, and human presence. Many subjects expressed that dogs were a greater threat than bears, while others stated that bears were more dangerous. Photographs from camera traps revealed that dogs, bears, and people traveled through the same locations and could potentially interact. Since this study, conservation efforts to study Andean bears have been completed, while programs providing affordable care and education to dog owners have continued through the Ministry of Public Health.

FACT OR FICTION

Oral Presentation O5.2

Improving Timing of Capillary Blood Glucose Monitoring and Insulin Administration through Patient education

Emily Lezcano and Lydia Bertschi*
School of Nursing, Illinois Wesleyan University

Researchers have reported that it is challenging for the healthcare team to coordinate capillary blood glucose (CBG) monitoring and insulin administration with mealtimes. CBG testing that is done too early in relation to insulin administration can lead to inaccurate CBG results and errors in insulin dosage. Insulin that is given too early or too late in regards to meal consumption can lead to hypo- and hyperglycemia, which increases patients' risk of complications. Some hospitals have implemented policies aimed to improve the coordination of insulin administration and mealtimes. In this study, the effectiveness of an educational card placed on meal trays on the timing of CBG testing, insulin administration, and meal tray delivery was examined. The educational card prompted the patient to contact the nurse to receive meal-time insulin before the consumption of the meal. Data on the timing of CBG testing and insulin administration were collected through retrospective chart reviews, and meal tray deliveries were directly observed. Pre- and post-intervention data will be compared and analyzed. With the implementation of the educational card, the time intervals between CBG tests, insulin administration, and meal consumptions are expected to decrease.

Oral Presentation O5.3

Content Validity: A Measure of Knowledge, Attitude, Behaviors, and Experiences of Muslims from the Nurse Perspective

Sydney Shanks and Amanda Hopkins*
School of Nursing, Illinois Wesleyan University

Problem: Muslim healthcare providers struggle on a daily basis to incorporate religious practices into the work environment and additional anti-Muslim behavior from healthcare leaders and colleagues can lead to burnout, feelings of exhaustion, feelings of exclusion, and potential departure from the nursing profession. Purpose: The aim of this study was to establish reliability and validity of a newly developed instrument designed to measure nurses' knowledge, attitude, behaviors, and experiences of working with Muslim nurses. Statistical evidence and theoretical relevance of the measure will be used to develop interventions nurses can use to improve the creation of culturally competent healthcare work environments. Method: This project consisted of instrument development and collection of data from content experts to complete data analysis (using SPSS) to establish internal consistency and content validity of the instrument.

FACT OR FICTION

Oral Presentation O6.1

Decompositions of complete multipartite hypergraphs

Patrick Ward and Dan Roberts*

Department of Mathematics, Illinois Wesleyan University

A hypergraph is a generalization of a graph in which edges are allowed to have more than two vertices. In particular, a uniform hypergraph is a hypergraph in which each edge has the same number of vertices. A common problem in graph theory is to decompose a large graph into disjoint copies of a smaller graph. Our work extends this notion to hypergraphs. Here, we present a new technique for decomposing multipartite hypergraph.

Oral Presentation O6.2

Maximum S_k packing for λ -fold complete graph

Yutong Li, Panxi Chen and Daniel Roberts*

Department of Mathematics, Illinois Wesleyan University

A complete graph K_n is defined as a simple graph in which every vertex is connected to each other by exactly one edge. A k -star, denoted by S_k , is a graph on $k + 1$ vertices with exactly one vertex of degree k and all other vertices of degree 1. An S_k -decomposition of a K_n is a partition of the edge set of K_n where each block of the partition is isomorphic to S_k . A λ -fold complete graph is a complete graph where each edge is repeated λ times. The necessary and sufficient conditions for an S_k -decomposition of K_n are known. Particularly, we will study the cases where such a decomposition does not exist and characterize the number of copies of S_k that can fit into a regular complete graph ($\lambda = 1$) and a 2-fold complete graph ($\lambda=2$). We also intend to investigate the structure of the leftover edges.

In addition, we found possible general cases of leave cardinalities and some leave graphs of the leave of a maximum packing of K_n with k -stars by using Java and Python as the baseline of the experiment. We output CSV files of all possible leave cardinalities for S_k -packings of K_n and found leave graphs assisting with the computer programming language, which can shorten the construction time and make it easier to use switching argument.

Oral Presentation O6.3

Text Anomaly Detection with ARAE-AnoGAN

Tec Yan Yap and Mark Liffiton*

Department of Computer Science, Illinois Wesleyan University

Anomaly detection is the identification of events or observations that deviate from the expected behavior. In recent years, there has been extensive research in using deep learning methods to detect anomalies in images, but few have been applied to text data. Deep learning is a technique involving multiple layers of artificial neural networks for computers to discover patterns in data on their own through learning from examples. Successful applications of deep learning include image recognition, recommendation systems, and self-driving cars. In this work, to test the applicability of deep learning to text anomaly detection, we present ARAE-AnoGAN, a semi-supervised learning method that uses an adversarially regularized autoencoder (ARAE) to model discrete tokens in sentences of normal training data. Anomalies are then detected via a combined anomaly score based on the building blocks of the trained model - consisting of an autoencoder reconstruction error and a discriminator feature residual error. Finally, we present experimental results demonstrating the effectiveness of deep learning methods in text anomaly detection.

Oral Presentation O7.1

The Damaging Rhetoric of Female Deception in Arthur Miller's *The Crucible* and its Modern Day Influence

Gabrielle Ghaderi and Joanne Diaz*

Department of English, Illinois Wesleyan University

The Crucible by Arthur Miller is revered by many as a piece of canonical American Drama. Often, it is also a cornerstone of high school level literature courses. However, many times, *The Crucible* is discussed without proper sensitivity towards the stereotypes it perpetuates. *The Crucible* harbors the notion that women are deceptive and in the wrong. Failing to address the play's impurities allows for the preservation of institutionalized sexism. From the witch trials, to the writing of *The Crucible*, to the current #MeToo era, the oppression and disbelief of women is cyclically present in American history. If there is any hope of breaking this cycle, it must begin by recognizing fictitious narratives regarding women in various works. This presentation discusses how the underlying message about women and girls in *The Crucible* reinforces destructive portraits of women and how that reinforcement has helped shape a "witch-hunt" rhetoric that repeatedly damages and discredits the validity of females.

Oral Presentation O7.2

An Analysis and Lesson Plan of Queerness Across Media

Sarah Buchmann and Molly Robey
Department of English, Illinois Wesleyan University

I will present a course unit I have designed on queer media representation that would be taught as part of an upper level high school or intermediate level college course. This course unit includes films, plays, and songs that represent a variety of genres and perspectives on issues of identity in the LGBTQ community. To create this lesson plan, I drew upon research in educational studies, literary studies, and queer theory, especially Donald Hall's understanding of queer reading and pedagogy as breaking categorical identity boundaries. For my presentation, I will present an overview of the course unit, explaining the educational strategies and objectives of the various approaches I incorporate. I will look specifically at how I will teach the film *But I'm A Cheerleader!* and the play *The Laramie Project* in the course. I developed this lesson plan, because there is currently a lack of queer representation in classrooms.

Oral Presentation O7.3

Corresponding with Keats: A Tragedy in Five Acts

Adam Cady and Michael Theune*
Department of English, Illinois Wesleyan University

In recent decades, key scholarship and projects have affirmed—at long last—the importance and independent literary quality of John Keats's personal correspondence. And while creative endeavors like Tom Clark's *Junkets on a Sad Planet* have further engaged Keats's remarkable letters, none have gone so far as to audaciously assume a personal acquaintanceship with the long-dead Romantic. Uniquely processing a personal trauma which echoes Keats's biography in numerous, intriguing ways, *Corresponding with Keats: A Tragedy in Five Acts* does just that. Communicating a semi-autobiographical narrative via a prose-poem and accompanying analytical reflection, this project uses Keats's letters—specifically, his lengthy September, 1819, journal letter to George and Georgiana Keats—as a template and, with the necessary casualness of someone who has—in reality—voyeuristically probed the writer's many revealing letters, is addressed directly, intimately, and improbably to John Keats himself.

Oral Presentation O7.4

Women's Reproduction and Mary Shelley's *Frankenstein*

Nicole Brennan and Molly Robey

Department of English, Illinois Wesleyan University

Mary Shelley lived her life surrounded by men and made man the main focus of her famous horror story. However, the scariest thing in this 'ghost story' is a man's involvement and responsibility when it comes to reproduction. In my essay, I argue that this novel may be read as a commentary on how women are expected to reproduce and then made solely responsible for anything that goes wrong with the child, before, during, or after birth. My research shows that Shelley had a complex relationship to childbirth. Her own mother died soon after giving birth to Shelley, and Shelley experienced trauma with the loss of her first child, and she wrote *Frankenstein* after the birth of her son William. Shelley used the novel to convey her own emotions of fear, guilt, terror, and responsibility onto her characters. She had her male protagonist Victor Frankenstein experience the pressures and expectations of reproduction. I bring together biographical and feminist scholarship on *Frankenstein* to show how Mary Shelley represents her feelings about childbirth and men's relationship to childbirth in the novel.

Oral Presentation O8.1

Ronald Reagan: Facts and Fallacies Regarding a Political About Face

Graham Dano and Michael Weis*

Department of History, Illinois Wesleyan University

President Ronald Wilson Reagan is revered by conservatives. Ironically, he started his political career as a New Deal Democrat and an ardent supporter of FDR. He gradually changed political parties, it is accepted by the majority of historians, because of his union leadership with the Screen Actors' Guild (SAG), his work at General Electric in the 1950s and his divorce from Jane Wyman and subsequent remarriage to Nancy Reagan, and his gradual turn to conservatism with age and loss of money as his acting career dried up. In the recent past, however, the once factually-based, or at least "objectivist" view of Reagan's personal history, nuanced as it is, has been significantly challenged by some on the political right and their backers in the White House, especially the new rash of conservative "intellectuals," such as the recently-pardoned Dinesh D'Souza. They assert that the true story of the Gipper's political transformation is one in which, confronted with Communist infiltrators in his beloved Screen Actors' Guild (SAG) during the beginning of the Cold War, he realized the folly of his liberal leanings. As conservatives would tell it, this caused him to leave the various Democratic Party-affiliated unions upon their "infiltration" by the Red Menace, sometimes at risk of his life. The pursuit of the truth about Ronald Reagan's transformation from pro-communist liberal to neoconservative, is to learn how one can remake one's personal history to fit one's political persona, and in the process, further one's political ambitions.

IFACT OR IFICTION

Oral Presentation O8.2

Found(n)ation:

Immigrant Narrative through Imagery as Utopian Science Fiction in *The Arrival* and *Wall-E*

Madeleine Hall and Scott Sheridan*

International Studies, Illinois Wesleyan University

Within the genre of science fiction, the narratives of immigrants arriving in utopian societies are commonplace. Using critical theory rooted in robotics and the belief in human perfectibility, this presentation examines the science and imagery of the immigrant experience in Shaun Tan's wordless graphic novel *The Arrival* (2006) and the movie *Wall-E* (2008) compared to primary accounts of immigration. It will explore the question of: how do science fiction motifs in particular project and mirror dimensions of immigrant narrative? By analyzing specific scenes from each work of science fiction, the story of immigration tells the narrative of the immigrant and the society they enter through the powerful aspect of images. By understanding these works, and their relation to each other, the economic, societal, political, emotional, and psychological experience of the immigrant can be articulated in a form that reaches the general populous.

FACT OR FICTION

Oral Presentation O8.3

Exploring the Effectiveness of Corporate Social Responsibility

Olivia Causer and Meghan Burke*

Department of Sociology and Anthropology, Illinois Wesleyan University

Corporate social responsibility is a diverse and ever-changing field that presents refreshed opportunities for corporations to effectively utilize their expansive social capital networks, employees, expertise, and economic capital to benefit the communities they serve (Gond, Kang, and Moon 2011). I measure the effectiveness of local CSR efforts by utilizing expert interviews with representatives from corporations and local non-profit community organizations. An examination of who benefits from these complex, and often mutually exclusive, relationships between corporations and organizations suggests that current approaches to corporate social responsibility may not be ideal. The current focus of corporations is typically on providing financial capital for organizations, when in fact, a focus on human capital (i.e. volunteerism) is found to be more effective.

FACT OR FICTION

Poster Presentations

Location: Center for Natural Sciences

Poster Session A

9:00 – 10:00 a.m.

Odd-Numbered Posters

Poster Session B

2:00-3:00 p.m.

Even-Numbered Posters

Note: Student's name is underlined, faculty advisor designated with *

During each poster session the author will be present to discuss their research with conference attendees and answer questions.

Please remove your posters from CNS Atrium by 3:00 p.m.

Poster Presentation P1

**Determining Species Abundance and Habitat Preferences of Breeding Birds in
Bloomington-Normal, Illinois**

Rachel Schoenecker, Leah Bieniak, and R. Given Harper*

Department of Biology, Illinois Wesleyan University

Habitat destruction is forcing many bird species to rely upon alternative breeding habitats, including in urban areas. However, few studies have surveyed breeding birds in urban areas in Illinois. We conducted the first year of a two-year breeding bird survey and habitat analysis in Bloomington-Normal, Illinois, via a modified US Geological Survey (USGS) Breeding Bird Survey (BBS) protocol. We observed 69 species, including seven USGS-designated Species of Greatest Conservation Need. The densities of resident bird species and individual birds were higher at sites in closer proximity to ponds/lakes, while the density of woodland birds was higher at sites that had taller trees with greater canopy cover. The Shannon Diversity Index for all species in Bloomington-Normal was higher than four rural BBS routes, which is likely explained by intensive row-crop agriculture that dominates central Illinois. Bird populations have decreased substantially throughout North America, and this study will help determine ways to make urban areas more suitable as breeding sites.

Poster Presentation P2

**Separating the Effects of Water Viscosity and Temperature on the Clearance Rates of the Rotifer
*Brachionus plicatilis***

Aditi Sharma and William Jaeckle*

Department of Biology, Illinois Wesleyan University

The viscosity and temperature of water affect swimming and feeding rates of small planktonic organisms. Water viscosity is influenced by temperature, therefore, change in temperature combines the separate influences of temperature and water viscosity. Owing to their small size, members of the phylum Rotifera are predicted to be strongly affected by the viscosity of their surroundings. We evaluated the influence of both viscosity and temperature on feeding rates of the marine rotifer *Brachionus plicatilis*. The clearance rates (volume of water cleared of particles) of rotifers exposed to 4.5 μm polystyrene beads (10,000/mL) were measured in three seawater treatments: (1) filtered (0.2 μm pore size) 15 ‰ sea water, 20 °C, (2) filtered 15 ‰ sea water, 10 °C, and (3) filtered 15 ‰ sea water, 20 °C where the kinematic viscosity was made equal to that of 10 °C seawater by the addition of the polysaccharide dextran. Following a 10-minute incubation, the beads present within each rotifer were counted. In each of three experiments, the clearance rates of *B. plicatilis* were significantly influenced by both temperature and viscosity (ANOVA, $p < 0.001$). Rotifers in the 20 °C treatment had the highest clearance rates, animals in the 10 °C treatment had the lowest clearance rates and individuals in the 20 °C (10 °C viscosity) treatment revealed intermediate clearance rates; within each experiment all treatments were significantly different ($p < 0.05$). The influence of water viscosity and temperature on feeding by *Brachionus plicatilis* averaged 57.7% and 42.3% respectively.

Poster Presentation P3

The “Sweet” Truth about Cornea Development – Glycosaminoglycan Regulate Corneal Innervation

Katie Jo Vogler, Sravya Jayam, Meghan Bowler, Laurin Ebert and Tyler Schwend*

Department of Biology, Illinois Wesleyan University

The cornea, the outermost tissue of the eye, harbors the most nerves of any tissue on the body's surface. The acquisition of nerves by the cornea during embryonic development occurs in a series of highly regulated steps. Despite this, the molecular mechanisms that coordinate nerve guidance and growth into the cornea are poorly understood. Here we evaluate a potential role for sulfated glycosaminoglycans (GAGs) which are long polysaccharides (sugars) that comprise the bulk of the corneal extracellular matrix. Before arriving at the outermost epithelial layers of the cornea, where nerves will set up free nerve endings and persist throughout life, developing nerves must first extend into and through corneal layers that contain an abundance of GAG molecules. To assess whether GAGs regulate the migratory behaviors we carried out a detailed analysis of corneal innervation patterns following exposure to the glutamine analog, 6-Diazo-5-oxo-L-norleucine (DON), an inhibitor of GAG biosynthesis. Our findings show that disrupting the network of sulfated GAGs in the cornea alters the growth and guidance of nerves prior to, and following, their entry to the cornea. These data strongly suggest that sulfated GAGs play an integral role in coordinating cornea innervation.

Poster Presentation P4

Revealing Misconceptions in Evolution to Better Teach Biology

Caroline Marchi and Edgar Lehr*

Department of Biology, Illinois Wesleyan University

Using diverse literature analysis and a compilation of field experience, this paper focuses on how common misconceptions of evolution can be revealed through scientific facts. The controversial history tied with teaching evolution in high schools will be unraveled in order to find the most common misunderstandings. These can include the “goals” of evolution, humans having evolved from chimps, individuals evolving within their lifetime, and evolution being only a theory. This paper will address these common misbeliefs that circulate at high schools among students and teachers, and will highlight the importance of a competent evolutionary education in the classroom. Evolutionary misconceptions can be used to design lesson plans that align with U.S.-accepted Next Generation Science Standards (NGSS) and focus on building biological literacy.

FACT OR FICTION

Poster Presentation P5

The Discovery of Joli Good Fellow

Anjali Patel, Anna Ta and Richard Alvey*
Department of Biology , Illinois Wesleyan University

Although bacteriophages, viruses that infect bacteria, are the most abundant biological entities in the biosphere, we have only scratched the surface in our understanding of them. Using the water sample from Sangamon River in Springfield, Illinois, a newly discovered phage, Joli, was isolated, purified, and characterized using a pink photosynthetic bacterium, *Rhodobacter capsulatus*. TEM analysis showed that Joli is a siphoviridae phage with a long flexible tail. PCR results suggested it is likely a member of the most common group of *R. capsulatus* phages, called RcD. Furthermore, genomic analyses showed that Joli's genome was 92% identical to a known RcD phage, McDreamy. Joli has 103 genes, and 17 of these genes have known functions. An evaluation of Joli's genes showed some of the functions include capsid and tail formation, proteins to lyse its host bacteria, and proteins that interact with DNA. Even though there is much uncertainty in how phages function, this project allowed us to better understand the mechanisms in which they interact with their hosts and environment. Our future work will focus on further understanding how phages adapt and take on new functions.

Poster Presentation P6

Cracking the Peripeteia Code: Discovering and Characterizing a Newfound Virus

Katy Smit, Erick Lopez, Kevin Kugler and Richard Alvey*
Department of Biology, Illinois Wesleyan University

Although bacteriophages—viruses that infect bacteria—are the most abundant biological entities on Earth, little is known about the impact they have on life, how they evolve, and the benefits they offer. Researching bacteriophages could provide new insights to the scientific community: it could help understand the role of bacteria in causing disease, the potential of using phages to treat diseases, and broaden the study of molecular biology. In the search of a virus to study, Peripeteia, a rare bacteriophage, was recently discovered from a water sample taken from a lake in White Oak Park in Bloomington, IL. The phage was grown using *Rhodobacter capsulatus* as its host bacteria. *R. capsulatus* bacteriophages, although common, are one of the least studied groups of bacteriophages. After having its genome sequenced, Peripeteia was found to be a member of the RcD cluster, a group of 10 other nearly genetically identical bacteriophages. Peripeteia is most related to Maeve, who are 99.61% identical. After annotating its genome we found that most of the identified genes have unknown functions. Studying Peripeteia and its genome allows for further insight into the evolution and gene function of bacteriophages.

Poster Presentation P7

The Journey of Discovering Kvothe

Sam Churchey, Aidan Garrett and Richard Alvey*
Department of Biology, Illinois Wesleyan University

Over the last 100 years, it was found that there are an estimated 10^{31} biological entities called bacteriophages or phages that are viruses that infect and kill bacteria. However, there are only a few thousand characterized bacteriophages. That is why it is important to discover new clusters of phages so we have a better knowledge of the abundant group of viruses that could combat bacteria-caused diseases. In this study, we searched for bacteriophages using the host *Rhodobacter capsulatus* YW1. We used different techniques like phage isolation and DNA extraction to uncover a phage and get it ready for testing. Then, we tested the phage to place it in a cluster by doing lysogen tests, PCR, TEM analysis and DNA sequencing. The phage we discovered, Kvothe was found in Sugar Creek in Bloomington, IL. By looking at its DNA sequence, we discovered that Kvothe belongs to the RcC cluster containing seven other phages with similar DNA. We were also able to see what genes in Kvothe have functions and which functions are still unknown. There is still so much left to learn about bacteriophages. In the future we will strive to discover how phages adapted to become so diverse.

Poster Presentation P8

One Year With Aesir: The Discovery and Analysis of a New Bacteriophage

Rebecca Rymarcsuk, Peter Matteson, Jillian Yonan and Richard Alvey*
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Despite the abundance of viruses on Earth, there is considerable lack of information about them. Certain types of viruses are categorized as bacteriophages, due to their ability to replicate by inserting their DNA into bacterial cells. Recent efforts have been made to better understand bacteriophages and how they can be identified and grouped. In this study, we contributed to these efforts through a process called “bacteriophage hunting,” in which a bacteriophage, named Aesir, was found in soil from Carlock, IL. The bacteriophage was then purified and examined under Transmission Electron Microscopy (TEM) and Polymerase Chain Reaction (PCR) analysis. Viruses fall into different categories of shared traits called clusters, which are used to determine information on size, behavior, and genetic makeup. With the presented data consisting of genetic comparisons, morphology, and evolutionary charts, we look at the similarities of the discovered bacteriophage Aesir and its bacteriophage relatives within the EF cluster. Cluster EF contains ten other bacteriophages, making it a relatively smaller cluster. With this cluster not being as common, comparing the other members of the EF cluster to Aesir allows for a greater understanding of bacteriophage evolution as well as its ability to travel geographically.

The Life of Fede: Discovery and Analysis of a Novel *Microbacterium foliorum* Bacteriophage

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Bacteriophages are the most abundant biological entities on Earth, yet they remain greatly understudied and mysterious to the scientific world. These viruses insert their own DNA into bacteria and use the host to reproduce. This parasitic behavior allows them to pass on toxin genes and express them in the host genome, which has been found to increase the virulence of diseases that can be harmful and deadly to humans. The aim of this research was to discover and characterize a bacteriophage that had never been studied before. A soil sample was collected from Melrose Park, IL and a single phage, named Fede, was isolated and studied using *Microbacterium foliorum* as the host. It is a podoviridae, the rarest morphology among *M. foliorum* hosts, meaning that it has a very short, non-contractile tail. Based on genomic analysis, Fede was placed into the EK cluster and EK2 subcluster. Only 8.1% of all *M. foliorum* bacteriophages belong to this group. Akoni, another phage in this subcluster from Tampa, FL, was found to have the most similar genome as Fede, with 89.0% similarity. This research has contributed to the understanding of bacteriophages and their role on Earth.



No Bones About It – Inhibition of Ocular Skeleton Formation by the Glutamine Analog DON

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The eyes of many vertebrates, including birds, contain a concentric ring of 14-16 intramembranous bones (ossicles) organized within the scleral tissues that surround the cornea. Ossicles form upon the reception by scleral cells of a bone inducing signal(s) that emanates from neighboring papillae, which arise temporarily in the overlying conjunctiva. To date, little is known concerning how papillae development and how they induce ossicle formation. To further understand these mechanisms, we exposed developing bird (chicken) embryos to the glutamine analog, 6-Diazo-5-oxo-L-norleucine (DON). In the 1950s, DON was shown to inhibit ossicle formation. Now, 70 years later we are setting out to explore the mechanistic basis of this result. Herein, we confirm that high concentrations of DON inhibits ossicle formation, likely due to the absence of papillae. Lower concentrations of DON lead to varied numbers of disorganized papillae and misshapen ossicles. Gene expression analysis is underway to determine which genes are lacking in DON eyes that may prove necessary for papillae formation. Moreover, papillae transplantation experiments are being carried out to determine whether scleral tissue remains capable of forming bone in DON-treated eyes. Collectively, our use of DON-treated chicks will increase our understanding of papillae and ossicles in the developing eye.

Poster Presentation P11

A New Age of Finding Phage: The Meachum Story

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Wreaking havoc as microscopic beings, bacteriophages are viruses that infect bacteria, capable of wiping out mass populations. This alarming behavior has made it a necessity to understand viruses, how they operate, and the global impact they hold. An important part of this phage research is identifying the various bacteria strains phages can successfully infect. *Rhodobacter capsulatus* (Rc) strain YW1 is a bacterium susceptible to infection by phage, currently having 6 identified clusters of phages that can infect it. Our research behind phages that can infect this strain led us to discover the Rc phage “Meachum”. Originally having extracted Meachum from Bloomington, IL, we performed isolation analyses and phage cultivation to create a sample of Meachum. Upon producing this, we were able to extract phage DNA from this phage and use it, along with a series of lysogen-hunt trials and TEM analyses, to properly group and characterize this phage into the RcC phage cluster. This information was also used to find the closest phage relative of Meachum, Oceanus, with 98.24% sequence similarity. Thus, our findings resulted in a newly identified Rc phage that accelerates a field of virology never explored before.

Poster Presentation P12

Exploration of Genes Responsible for Host-range Expansion

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Viruses are often thought to be very selective in the hosts they can infect – a virus that infects one species often cannot infect a different species. We know however, that sometimes they can make such evolutionary leaps and infect additional hosts. Occasionally this occurs with devastating impacts such as with the Ebola or Corona viruses. The process by which viruses make these jumps can be safely studied in the laboratory by using bacteriophages, viruses that infect bacteria. We have identified two bacteriophages that are nearly 96% identical in their DNA yet differ in their abilities to infect the host *Rhodobacter capsulatus* B10. To determine the region of DNA responsible for this expanded host range, we have examined varying regions in their genomes and copy these segments from the bacteriophage that can infect B10 to the one that cannot. Because previous work focusing on larger areas of variability between these two was not able to uncover the region involved in this process, recent efforts have focused on the less variable tail protein genes involved in directly interfacing with the host cell. Understanding this process may allow for the creation of therapeutic viruses that infect multiple harmful bacteria strains.

Poster Presentation P13

Unlocking the Evolutionary Secrets of Xuper's Host-Jumping Mechanisms

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With growing pandemics of viral-associated illnesses, such as coronavirus, there is an increasing concern with our lack of understanding of how viruses infect, interact with, and jump between hosts. Just as natural selection has shaped the evolution of all living things on Earth, viruses evolve as well. We observed this phenomenon with Xuper, a novel bacteriophage isolated and characterized using the host *Rhodobacter capsulatus*, a bacterium found in freshwater ecosystems. Our research has shown that Xuper infects not only *R. capsulatus* but also *Ruegeria pomeroyi*, a bacterium found in marine environments. To study how Xuper adjusts to this alternative host, we generated several *R. pomeroyi*-adapted Xuper isolates after three rounds of plating and then identified mutation sites possibly involved in host-range expansion through genomic analyses. Our findings highlighted two DNA regions, one associated with viral tail proteins and another involved in lysis control, that consistently change with cultivation on the marine host. Additionally, in order to determine other areas of genomic variation, we performed a longer-term selection of Xuper on *R. pomeroyi*. Next, we plan to isolate the imperative mutation sites and insert them into other phages to further study the mechanisms of host-range expansion.

Poster Presentation P14

**Introduction of Green Chemistry Concepts into Undergraduate Chemistry Lab:
A Greener Approach to Aspirin Synthesis**

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The synthesis of aspirin is a common undergraduate experiment conducted in general and organic chemistry labs. We hope to adapt this synthesis as part of our mini-research based experiment in second semester general chemistry lab. This synthesis requires a heating tool and uses a strong acid (sulfuric acid or phosphoric acid) as a catalyst. With the goal of introducing green chemistry concepts into the undergraduate chemistry laboratory curriculum, a MARS 6 microwave oven was introduced as a sustainable heating tool. A less hazardous synthesis is proposed converting salicylic acid into acetylsalicylic acid using the acids present in common beverages as catalysts instead of strong acid available in the chemical industry. Aspirin yields obtained were higher using the microwave compared to the ones obtained using the conventional heating method, making this method more user friendly for undergraduate labs. Aspirin products were isolated and analyzed for chemical and physical properties using Thin Layer Chromatography (TLC), melting point, Infrared Spectroscopy (IR), Nuclear Magnetic Resonance (NMR), and colorimetric analysis.

IFACT OR IFICTION

Poster Presentation P15

Ion chemistry in Space

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The work in Perera lab looks into ion molecular chemistry in space in two folds: experimental chemical dynamics and spectral identification. The custom designed instrument is built with the purpose of conducting reaction of ion-neutral in the gas phase (vacuum) that could be similar to chemical reactions that occur in the interstellar medium. This poster goes over the designing and building of the octopole ion guide that will be used to steer ions in the vacuum. Some of the potential work using this instrument is presented as well. The second part of the project is to understand and apply the potential outcome from our lab work to data that is available in space missions such as NASA missions. Use of pGopher software is used to simulate spectra using experimental data that is available in astrochemistry database to match experimental excited nitrogen molecule. Similar methods will be used with our data when the instrument is fully operating at a later stage.

Poster Presentation P16

On total positivity of Riordan arrays

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A Riordan array $R = (g(x), f(x))$ is defined as an infinite lower triangular matrix whose generating function of the k th column is $g(x)f(x)^k$, where g and f are formal power series with $g(0) = 1$, $f(0) = 0$, and $f'(0) \neq 0$. The set of all Riordan arrays forms a group called the Riordan group. The total positivity of R can be characterized by using the generating functions of its A- and Z- sequences. A finite sequence of nonnegative numbers is a Pólya frequency sequence (PF for short) if and only if its generating function only has real zeros. In particular, the set of all Bell-type Riordan arrays is an important subgroup of the Riordan group. Pascal triangle, for example, is one of the well-known Bell-type Riordan arrays. A Riordan array is total positive if the A-sequence is a PF sequence. We will study the total positivity of Bell-type Riordan arrays and construct Bell-type Riordan arrays with total positivity by using their A-sequences. We will also give the combinatorial interpretations of those Riordan arrays by using lattice paths. As one of the results, we find new sequences that are not included in OEIS.

Poster Presentation P17

An Index to Measure Walkability in Urban Environments

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From environmental, health, and economic standpoints, automobile centered infrastructure is problematic. For instance, automobiles emit the most CO₂ per person per mile for everyday travel. Due to the shortcomings of American's automobile dependence, the concept of "walkability", or how easy and friendly an area's environment is to walk in, has seen a surge of interest. In this study, indicators of walkability in Bloomington-Normal, IL were mapped using ArcMap GIS software. Indicators of walkability included the number of network junctions, population density, and presence of quality points. Quality points in this study are defined as locations that improve quality of life by providing common necessities. We used these to replace urban land use mix which was commonly used in previous studies. We believe that this change will better reflect the quality of life improvement inherent in a walkable urban environment. The walkability index was calculated for randomly selected points throughout Bloomington-Normal and estimated through spatial interpolation for all spaces in between. We found a hot spot of high walkability centered on uptown Normal and downtown Bloomington that extends south-east and north.

Poster Presentation P18

Effects of Acute Ethanol Exposure on Learning in Zebrafish

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Zebrafish have been shown to be capable of learning through classical and operant conditioning. Zebrafish are used as models in neuroscience when studying their learning abilities through conditioning stimuli. The objective of the proposed study is to examine the period of time required for post-learning extinction of learned behavior in zebrafish following exposure to different levels of ethanol. Following exposure to different levels of ethanol, zebrafish were randomly assigned to three different levels of ethanol prior to learning: no ethanol, low dose ethanol (6 mL), and high dose ethanol (12 mL). Individual fish were observed during four different time periods: 10 minutes of acclimation, 10 minutes of baseline, 10 minutes of training, and 60 minutes of testing. In the ten-minute training period, fish reliably learned to avoid shock by restricting their movement to a randomly assigned side of the tank. Following the testing period, we examined the persistence of the learned behavior. Our analysis suggested that fish exposed to greater concentrations of ethanol should show decreased associative learning.

Poster Presentation P19

Properties of the Fibonacci-Lucas Sequence Mod m

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The Lucas sequence is a variation of the Fibonacci sequence and connects to many similar properties. Using new methods of computation, a larger portion of the Lucas sequence is reduced by mod m and various patterns are compared to the known properties of the Fibonacci sequence. Analysis of the cyclic behavior and length of the Lucas sequence are studied using matrix notation. Specific properties pertaining to prime numbers are also noted for applications in cryptography.

Poster Presentation P20

Feedback-Processing during Speeded-Response Tasks: Expertise Effects on Performance

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With the objective of assessing neural activity during baseball performances, 14 novices who were considered non-baseball players and 14 experts with ongoing collegiate level experience were tested. Each participant completed a computerized task that had them determine between different types of pitches to assess whether the pitch was a ball or a strike. All pitches presented during this task were considered borderline pitches, making it hard to distinguish between them. After each pitch, the participant was given immediate feedback, displaying the accuracy of their answer. Throughout the given task, the participants were hooked up to an EEG in order to measure their neural activity. The relationship between collegiate-level players and their neural activity to feedback, pitches and performance, were found to be significant. However, this was not significant within the novice group. This suggests that the expert group more frequently was able to change their performance based on past feedback. It was shown that this group learned from both their incorrect and correct responses. Ultimately, determining that expertise has an effect on cognitive processing during baseball. Researching this level of psychological data could prove to be advantageous to teams who participate in performance modeling, player development plans, and evaluations.

Poster Presentation P21

Recursive Sequences and Girard-Waring Identities with Applications

Minghao Chen, Zihan Nie, and Tian-Xiao He*

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This poster is about generalized Girard-Waring identity constructed from recursive sequences. We also present the construction of Binet Girard-Waring identity and classical Girard-Waring identity by using the generalized Girard-Waring identity and divided differences. Also include the applications of the generalized Girard-Waring identity to the transformation of recursive sequences of numbers and polynomials is discussed.

Poster Presentation P22

The Effect of Chronic Stress on Stroke Rehabilitation

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Ischemic stroke is a prominent global health issue and is the 5th leading cause of death worldwide. There are many common risk factors for stroke, including chronic stress. Chronic stress causes a disruption in the physiological homeostasis of the individual, and specifically the homeostasis of the limbic system. In stroke rehabilitation, the limbic system is necessary in promoting a successful functional outcome, and a disruption of this integral system could possibly lead to a worsened functional outcome. While chronic stress has not been thoroughly investigated in the context of stroke rehabilitation and recovery, experimentation and analyses have investigated both the molecular sequelae and behavioral data that coincide with each condition individually. The current study aims to establish if chronic stress compounded with ischemic stroke has an effect on post-rehabilitative functional outcome using a novel behavioral study with the mouse as a model organism.

Poster Presentation P23

The Happy Campaign: Assessing the Effectiveness of a Community-Wide Intervention on the Well-Being of Elders in Public Housing

Amy Gourley and Mignon Montpetit Jolly*

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LaKeesha James-Smith, Elderly Services Coordinator, Bloomington Housing Authority

In the field of developmental psychology, the Stress-and-Coping model (Lazarus & Folkman, 1984) posits that individual differences in biological, psychological, and social risk and protective factors serve to increase or buffer the impact of stressful experiences on psychological well-being later in life. Importantly, research suggests that residents of public housing generally experience more risk factors than elders at large (Rabins et al., 1996). The present study examines the impact of a programmatic intervention, The Happy Campaign, on elderly individuals living in public housing in a small Midwestern city. Goals of the Happy Campaign were to improve residents' coping skills and increase perceived support. Results demonstrated significant improvement in key aspects of well-being post-intervention; these included increases in exercise, self-reported health, and hope, as well as decreases in negative affect. Although future research is needed to account for confounding variables that arose in conducting research in this community setting, these data provide preliminary evidence that a broad-based, environmental intervention may offset the myriad risks faced by particularly vulnerable elders, and even augment well-being.

Poster Presentation P24

Using a Reach Quality Analysis, How Does Intermittent Exercise and Rehabilitation Affect the Range of Motion in C57BL/6 Mice Post Ischemic Stroke?

Makena Harris and Abigail Kerr*

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Stroke affects more than 795,000 Americans each year, and it is estimated that one out of every eighteen deaths in the United States is caused by a stroke. A stroke is classified as a depletion of oxygen to the brain, which can last for 24 hours or longer causing brain cells to die and impacting the function of the brain. The most frequent type of stroke is an ischemic stroke, which is defined as an occlusion in the cerebral artery. The most frequent, chronic deficit reported by stroke survivors is upper limb impairment. One thing that contributes to chronic upper limb impairment is compensatory use of the unimpaired limb after injury. Although compensatory limb use permits return to independent daily living, it has been found to have detrimental effects on the ultimate functional outcome of the impaired limb in both humans and rodent models. Exercise has been proposed as an adjunctive therapy that may permit compensatory limb use without sacrificing the recovery potential of the impaired limb. Data from our lab indicate that 24-hour wheel access (i.e., voluntary exercise) ameliorates the negative effects of compensatory training in mice. However, this represents a tremendous amount of exercise. The current study was designed to assess the effects of intermittent wheel access during compensatory limb training on functional outcome of the impaired limb. We focus specifically on a skilled reaching task in mice that has demonstrated similarities to human reaching movements. This permits analysis not only of functional outcome but also reach quality in an effort to assess whether or not mice exhibit true recovery following exercise and compensatory limb use.

Poster Presentation P25

Experimental Implementation of Wavefront Sensorless Real-time Adaptive Optics Aberration Correction Based Upon a Deep Neural Network

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Department of Physics, Illinois Wesleyan University

Traditional adaptive optics (AO) aberration correction algorithms require multiple iterations, so are too slow for purposes such as free-space optics communications, which suffer from fast distortions due to atmospheric aberrations. Recently, deep neural network (DNN) based methods were proposed, in papers using simulations alone to demonstrate the high-speed aberration correction capabilities of such approaches. We describe experimental implementation of such techniques, using a multiplexable spatial light modulator (SLM), where atmospheric aberration is achieved in lab by using a heating element. Graphics processing unit (GPU) acceleration is used for both the neural network and phase profile generation to enable real-time aberration correction. We are capable of real-time aberration correction at 50 frames per second, which is limited by the camera acquisition speed.

Poster Presentation P26

Thresholds of Dimensionality in Physical Systems

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Electrical resistance of a wire is normally proportional to the wire length and inversely proportional to cross-sectional area, but as the diameter reaches the nanoscale such classical behaviors break down, and conductance can only come in integer multiples of a value set by fundamental constants alone, in a manner that can be used to argue both for the wave nature of electrons and that these wires have become, physically, one dimensional. Yet if the *length* of a nanowire is also reduced to the nanoscale, the electron should become localized (particle-like), and the system becomes zero dimensional. This work aims to tune the degree of isolation, *e.g.*, the degree of coupling to external leads, in systems of reduced dimensionality, with the goal of identifying thresholds to accessing higher physical dimensions.

Poster Presentation P27

False Beliefs in Dogs

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Dogs tend to perform exceptionally on social reasoning tasks such as locating a hidden object by following a human point. Dogs even outperform non-human primates on such social reasoning tasks. One complex form of social reasoning, understanding false beliefs (FB) -- that another individual may possess a belief contrary to both one's own belief and reality--remains a pinnacle in understanding social reasoning. Humans understand FB but whether nonhumans understand it remains controversial. We predicted that dogs would demonstrate an understanding of FB. We presented dogs with a stage with a duck in the middle. A researcher watched the duck move inside one of two boxes positioned on either end of the stage. An occluder then hid the researcher so they could not see events on stage. At this point, the duck moved to the opposite box. The occluder then dropped to reveal the researcher, who then reached either toward the box where they had last seen the duck (expected) or to the box where the duck actually was (unexpected). Preliminary results suggest that dogs look longer when the researcher looked in the unexpected box supporting the hypothesis that dogs may understand FB. Further controls can rule out alternative explanations.

Poster Presentation P28

Absorption Spectra of Silicate Cosmic Analog Dusts Obtained with a Custom-Made Spectrometer

Katie North and Thushara Perera

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Much of the cosmic dust that makes up our universe is expected to be in the form of submicron-sized, amorphous, metal containing silicates. We are able to synthesize analogs of this dust in our labs using the sol-gel processes. These dust grains are embedded in low density polyethylene pellets, for practical use in our equipment. By passing light from a calibrated blackbody source into a homemade Fourier Transform Spectrometer (FTS) and then through the dust pellets, we are able to obtain data. Our custom instrument measures absorption spectra in the range 150-2400GHz. The data collected on Fe- and Mg-silicate dusts has been found to follow a power law trend, with the frequency range being 150-1500GHz. This trend also varies with the temperature of the dust, which we are able to vary within the astronomically relevant temperatures of 5-50K.

Poster Presentation P29

Creative Writing: What's it Worth?

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In the study of creative writing, there is a lack of research on the lasting impact the class has on students, as well as research on the ways creative writing is implemented in the classroom. *Creative writing* is an umbrella term for the high school elective class that covers a variety of writing styles including, but not limited to, poetry, short stories, and dialogue. This literature review collected and analyzed twenty articles, investigating creative writing and the missing data in order to evaluate effective practices to teach creative writing and the practical benefits of the class. The significance of this research is to assess the value of the creative writing elective, and to evaluate if it should be cut from the school curriculum because it is outdated, or if it is still valuable for students.

Poster Presentation P30

Characterizing and Eliminating Magnetic Fields in an Electron Spectrometer

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Since moving charges experience a force when travelling through a magnetic field, the presence of such fields can adversely affect charged particle detectors. The goal of our work is to characterize and eliminate magnetic fields from an electron spectrometer. To accomplish this, we are setting up a magnetic field sensor to detect the possible magnetic fields that are interfering with the spectrometer, specifically Earth's magnetic field. The sensor and associated circuitry are being made compact, and we are automating the measurement process so that the sensor can be used in the confines of the spectrometer. After determining the influence of the magnetic field, we will make use of mu-metal to layer and shield the spectrometer's time-of-flight tube from unwanted magnetic fields, allowing the apparatus to provide accurate and unaltered results.

Poster Presentation P31

Getting Students Involved: Examining HS Teachers' Techniques for Encouraging Student Participation

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According to education scholars, student participation enhances intellectual development, motivation, and communication skills (Connolly, Flynn, Jemmott, & Oestreicher, 2017; Czekanski & Wolf, 2013; Eliason & Turalba, 2019; Fassinger, 1995; Prince, 2004; Rocca, 2010). However, it can be very difficult to get students to raise their hands and participate in class. In order to address this issue, this study examined various experienced teachers' techniques for encouraging student participation. For the purposes of this study, *participation* was defined as students responding to questions posed by the teacher. Data was collected by observing eight different high school teachers and taking anecdotal records of the events that occurred during their lessons. Records focused on the techniques that teachers employed to encourage student participation in their class and students' responses to those techniques. Some common techniques that were observed include (a) forming positive relationships with students, (b) devoting specific time during lessons for students to respond to questions, and (c) asking broad questions with more than one correct answer (i.e. "Who can tell me about one of the types of signaling?"). The observations from this study provide an opportunity for pre-service and first-year teachers to examine and learn from the practices of more experienced teachers.

Poster Presentation P32

Glutamate Inhibition within the Amygdala during Positive Memory Formation in Rats

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Many studies have established that the amygdala is extensively involved in the processing of fear-based and negative emotions. Although most studies agree that the amygdala is involved in processing positive emotional stimuli, less is known about the neurochemical underpinnings of this process. The present study utilized a radial arm maze and a magnitude for reward memory task in which rats were trained to correctly associate percentages of sugar with correlating rewards. After learning the task, rats then underwent surgery to insert bilateral guide cannulae into their amygdala for future infusions. Following recovery from surgery, rats received infusions of the glutamate antagonist (inhibitor), ifenprodil (high dose: 3µg/µl or low dose; 2µg/µl), and a saline control solution over three separate testing days. After each injection, rats were placed back in the radial arm maze and performances (i.e., correct choices) were recorded for each treatment type. Results following all three treatment types will be discussed. It is hypothesized that inhibition of the glutamate system within the amygdala will significantly impair performance on this reward value task.

FACT OR FICTION

Poster Presentation P33

Strategies and Benefits of Incorporating Student Interests

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Students come into every classroom with diverse lives and interests outside of the classroom. Often times these lives and interests are not directly correlated to the things that students learn inside of the classroom. This is the definition of student interests, things that may or may not be related to the subject matter in the classroom but can be incorporated into the structure of the curriculum for the benefit of the student. One of the major benefits of incorporating student interest is increased engagement (Evans & Boucher, 2015). Through analyzing research studies from across different educational disciplines this literature synthesis is trying to create a way for teachers to most easily incorporate the interests of their students into the classroom, and to show the benefits that incorporating these interests can have. The articles were selected in two different categories, ones that had strategies from teachers and also ones that were focused on why those strategies were useful. I hope that through this research different teachers can have strategies to incorporate student interests into their classrooms and to understand the importance of them doing so.

Poster Presentation P34

Admissions and Marketing at IWU: Findings from Focus-Group Discussions

Julia Chen, Sierra Eidsmoe, Amy Gourley, Calvin Holliday, Ria Patel, Skyler Reisig, Sydney Rowley, Grant Werner and Amanda Vicary*

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When faced with the decision of where to apply to and attend college, students must weigh a variety of factors. To better understand the driving factors that lead to students' decisions to attend Illinois Wesleyan University, as well as what factors drew them to apply to the university in the first place, eight focus groups were conducted. Participants consisted of 68 students that came from every grade level and from 22 different majors. Results revealed that the most frequent factors that influenced students' final decisions were the small class sizes offered, the reputation of the school, and the atmosphere felt on campus. Participants also made suggestions to help increase prospective students' interest in attending Illinois Wesleyan, including adding a virtual campus tour to the school website, increasing contact from admissions before the decision to deposit, and improving the website for easier accessibility to information.

Poster Presentation P35

What strategies can be incorporated in World Language curriculum to promote post-secondary empowerment for high school students?

Yesenia Martinez Calderon and Leah Nillas*

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The concept of *empowerment* is often defined as the process of an individual becoming stronger, confident and especially in controlling one's life and claiming one's rights (Lexico, 2020). In K-12 education, there is an emphasis on ensuring that students are college and career ready by the time they graduate. However, for students who continue into higher education their needs are not always met by their university. In recent years, there is a direct connection between college retention and graduation rates. These factors include academic, faculty to student ratios and classroom settings. However, these may also include factors such as students from underrepresented groups (Millea, Wills, Elder, & Molina, 2018). These issues have become more pertinent in ensuring that K-12 educators are not solely preparing students academically, but also preparing them for the emotional demands of higher education. In this study, there is an examination of strategies that can be incorporated in a World Language classroom in order to promote empowerment amongst students. In addition, there will be a brief examination of how colleges have attempted to combat these differences in retention rates at their institutions.

Poster Presentation P36

Examining the Implications of Acculturation on Body Image Ideals and Dissatisfaction: A Systematic Literature Review

Amy Gourley and Marie Nebel-Schwalm, Ph. D.

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Although Caucasian groups predominate the literature on body dissatisfaction and eating pathology, individuals of all ethnicities are impacted by these maladaptive features (Levinson & Brosos, 2016). Also, there is growing evidence that one's racial and ethnic identification differentially impacts one's body dissatisfaction (Rakhkovskaya & Warren, 2016; Yu & Perez, 2019), studies on disordered eating routinely omit measures of ethnic identification and acculturation. The current review examines the gaps in the literature regarding the impact of culture on eating pathology and body image. Findings suggest that, although researchers have identified key predictors of eating pathology, the degree to which these factors influence outcomes among non-Caucasians is less clear. Clinicians must avoid the temptation to assume that the existing conceptual framework equally applies to all populations. Further, within-group variation of ethnic identification is an important consideration when conducting cross-cultural comparisons (Guan, Lee, & Cole, 2012). Causal clarification is needed to better understand the influence of racial and ethnic factors on body image and eating pathology.

Poster Presentation P37

Integration of Storytelling within STEAM for Differentiated Learning

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In STEAM curriculum, there is a general disconnect from what students have to learn and what they want to know. This can be a frustration for many teachers within STEAM, by two accounts (1) every teacher wants their students to succeed in their class and (2) students on occasion don't find what the teacher is passionate about interesting. A differentiated approach to this is to present scientific findings and problem-solving skills through the act of storytelling, which is known in the academic community as *storylining*. The purpose for this research is to find a learning approach that is found to impact all students and be able to communicate scientific findings and methods for greater understanding. In this research, field notes were taken and participants were of a local public school, ranging from different backgrounds and cultures. The main goal for this research is to outline exactly how other teachers implementing STEAM curriculum can integrate storylining into their curriculum for increased productivity, engagement, and overall greater understanding for the students who need a differentiated learning approach.

Poster Presentation P38

Deconstructing Racial Battle Fatigue

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Racial battle fatigue has been defined as "the psychological, emotional, physiological, energy, and time related cost of fighting against racism," (p. 298; Smith, 2008); however, its implications have been difficult to measure. Originating from research on African-Americans in predominantly white institutions (Smith, 2004), it has since been expanded to all genders and other racial and ethnic minorities (Smith, 2008). The features and impact of this construct have been described in some other sources without the term "racial battle fatigue," such as "racial minority stress," the impact of "racial micro-aggressions," and "race-based social stress," (Levy et al., 2016), making it difficult to synthesize relevant information. The present review attempts to address what is currently known about racial battle fatigue and its related concepts, specifically with a focus on Black women.

Poster Presentation P39

Creative Community: How Creative Writing Contributes to Student Autonomy

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The focus of my research is creative writing in the classroom and how it can lead to higher student autonomy. Yi-Lien Yeh and Yu-Ju Lan (2017) they say there are 5 ways they interpret this autonomy: for situations in which they study entirely on their own; for a set of skills which can be learned and applied in self-directed learning; for an inborn capacity which is suppressed by institutional education; for the exercise of learners' responsibility for their own learning; and for the right of learners to determine the direction of their own learning. Creative Writing is a term that essentially speaks for itself, my definition is simply having students write while giving them the freedom to explore topics they're interested in. Dove (2018) discussed the challenge of creating writing prompts that produce good writings for an appropriate audience. In the English classroom, I was able to experiment a lot with writing prompts and collected data in the form of field notes, student journals, lesson plans, rubrics, and student work samples. Through this study, I found a significant growth in autonomy and learning through the use of creative writing.

Poster Presentation P40

The Salt of Our Tears: Journalism as a Form of Justice

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On November 1, 1988, photojournalist Ildefonso Sena stood on the shores of Tarifa, Spain and captured a photograph of a dead man lying on the sand. In this moment, Sena documented the first migrant who died crossing the Strait of Gibraltar, the 14 km body of water that separates Spain from Africa, which also serves as the clandestine route for many migrants. Thirty years later, this problem persists, as the Mediterranean Sea has borne witness to the increasing number of migrant deaths across the Strait.

This project analyzes the ways in which the Spanish media's representation of migration influences Spaniards' attitudes of migrants. In an era where the media has the ability to not only represent but also manipulate reality, it is important to consider the ways in which the Spanish media represents the reality of social phenomena such as immigration. This project analyzes how two national Spanish newspapers have evolved in their portrayal of African migrants from the 1990s to present day. The analysis is multimodal, and takes into consideration how migrants are represented both in written news articles as well as in photographs that accompany the articles.

FACT OR FICTION

Poster Presentation P41

Engaging Underrepresented Students in STEM; A Study in Casting a Wide Net

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There is a noticeable trend in students who show initial disinterest in science, technology, engineering, and math (STEM) classes in high school. Of the total college graduates in the U.S., only 3.5% of women graduates will pursue careers in STEM. This is marginal compared to the 1.5% of graduates of color and the 1% of graduates with documented learning disabilities (National Center for Education Statistics, 2014). This research was designed to investigate the potential positive and negative effects on the engagement of underrepresented groups in STEM by integrating student interests into high school science classes. Participants in this research include female students, students of color, and students with learning disabilities. *Student engagement* is defined as the degree of attention, interest, or passion that students show when they are learning, and can be correlated with grades. Data sources include field notes, anecdotal records, lesson plans, and grade details from consenting students. Data analysis supported by literature review reveals a strong connection between student interest and student engagement. The goal of this research is to provide strategies to create an inclusive classroom and to evaluate and deepen my knowledge of teaching for social justice.

Poster Presentation 42

**YouTube, Social Media, and Website Exposure on Body Dissatisfaction:
A correlational survey study**

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Mass media has become inseparable from daily life, especially among adolescents (Twenge et al., 2018). Unfortunately, media frequently convey unrealistic images of male and female bodies (Pope et al., 2001) which can lead to body dissatisfaction (Grabe et al., 2008; Hargreaves et al., 2009). Body dissatisfaction is also associated with low self-esteem, depressed mood, and disordered eating (Thompson et al., 1999). Thus, with increasing media exposure, people may be more susceptible to these negative outcomes (Derenne et al., 2018).

Research on the link between media and body dissatisfaction is either limited to single sites such as Facebook (Stronge et al., 2015) and Instagram (Brown et al., 2016), or general internet use that does not distinguish types of sites (Canan et al., 2014). General internet use is not typically predictive of body image concerns; thus, it is important to consider the extent to which media are appearance-focused.

The present study gathered data on media use among 214 undergraduate students. Data on specific websites, Youtube channels, and social media apps were categorized based on their appearance-focus. We hypothesized that exposure to appearance-focused media predicts body dissatisfaction (Mingoia et al., 2017; Rodgers et al., 2016). Results and implications for future research are discussed.

Poster Presentation P43

Adaptation for International Students in the United States: Factors and Implications

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In 2018 to 2019, the total number of international students in the United States has reached 1,095,299, counting for 5.5% of the entire student population in U.S. higher education institutions (Institute of International Education, 2019). Along with the growing number of populations, increasing number of studies aims to examine international students' adaptation processes. However, existing literature focus more on the predictors and factors of the students' adaptation, but less on the implementation and intervention programs. The purpose of this research synthesis is to examine the convergent findings in the current literature on the potential factors that affect international students' psychosocial adaptation, as well as evaluate programs and strategies provided by institutions in the United States. Research studies are selected based on topic relevance and date of publication. Results suggest that interpersonal communication, academic performance, social support, length of residency and language proficiency play significant roles in students' success of sociocultural adaptation. Meanwhile, students' self-esteem condition, satisfaction with life in the U.S. and perceived psychological distress affect their psychological adaptation pathway. Further implications and recommendations were also discussed based on the findings.

Poster Presentation P44

A computational approach to the study of Ultralow field reversal of two-body magnetization

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Field-induced magnetization reversal has been thoroughly used for information storage in hard-disks, magnetic memory, and logic devices. Here, we observe the magnetization reversal of two spherical nanoparticles, also called Stoner particles. We used a GPU-accelerated micromagnetic simulation software called *mumax3* to study the magnetic switching of these particles at a separation distance that is perpendicular to the anisotropy axes. The external field is applied antiparallel to the anisotropy axes. We have studied the magnetic switching for different values of separation distances, and we observe a general decrease in the external field required for switching as the distance decreases. However, at a critical distance of 23nm, we observed an ultralow magnetic switching field strength. Then the field increases sharply. Our simulations show a general trend that agrees to the data. Work is still in progress to study the magnetic switching of Stoner particles of varied geometry.

Poster Presentation P45

Let's Read into It: The Impact of Social Emotional Learning on Student Emotional Behavior

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My research was designed to develop and implement ways to incorporate Social Emotional Learning (SEL) into existing lessons, comprehension strategies, and means of motivation. In my study, I determined how the integration of Social Emotional Learning into a second-grade classroom affects students' engagement. The term *Social Emotional Learning* is defined by Fredricks (2002) as "Emotional engagement encompasses positive and negative reactions to teachers, classmates, academics, and school and is presumed to create ties to an institution and influence willingness to do the work." This also connects to teacher support associated with emotional and cognitive engagement; peer support, work norms, and task challenges. Emotional engagement refers to students' affective reactions in the classroom, including interest, boredom, happiness, sadness, and anxiety (Connell & Wellborn, 1991; Skinner & Belmont, 1993). I collected and analyzed data through field notes, class photographs, lesson plans, and student work samples. My objective throughout this self-study was to enhance my understanding of the structure of my students' families, to identify and establish open communication with the children, and to support the emotional well-being of my students through Social Emotional Learning awareness.

Poster Presentation P46

Effects of Edge Roughness on Magnetoresistance Signatures in an Artificial Spin Ice System

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Artificial spin ice (ASI) systems are certain lattices of individual nanowires that each act like small magnets. The system collectively is 'frustrated' in that it cannot reach a unique low energy state. Electrical properties of ASI systems have been explored in depth, and signatures of their magnetoresistance (MR) curves are well understood. The effects of disorder on the magnetization and domain mobility of thin magnetic films and of isolated magnetic nanowires have been studied in detail. In addition, effects of disorder have been well explored for atomically frustrated magnetic materials such as pyrochlores. However, there have been no attempts to understand the relationship between MR characteristics of ASI with disorder and edge roughness. This study attempts to fill that void. We present a simulation study of MR as a function of edge roughness, and report three important changes observed in the MR signatures. We also present a qualitative explanation to these effects based on simulated magnetization profiles of the simulated ASI systems.

Poster Presentation P47

Learning Styles in the Classroom

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The support for learning styles has fluctuated over time, but many still believe that they are effective when it comes to knowing and teaching students. The term *learning style* is defined by Keefe (1979) as the “composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment” (p. 61). My research looked at the impact of learning styles in the classroom and how integrating those styles into teaching benefits student learning. Over the course of a semester, data was collected through field notes and videos in a first grade classroom. Through data analysis and reflection, it was found that students gained an understanding of concepts when large group lessons were catered to the three important learning styles: auditory, visual, and kinesthetic. This is valuable information for educators who are striving to create classroom learning environments that are supportive for all types of learners. This is because, by integrating learning styles into teaching, educators are making their instruction differentiated, diverse, and accessible for all students.

Poster Presentation P48

Effects of Intermittent Exercise and Good Limb Training following Stroke in Mice

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Stroke is the leading cause of long-term disability in the United States with more than 795,000 occurring each year. The most common form, an ischemic stroke, results from the blockage of a cerebral blood vessel that deprives the brain of oxygen. A prevalent physical impairment seen in stroke victims is upper limb dysfunction. Stroke rehabilitation focuses largely on finding ways to accomplish activities of daily living that is usually achieved with compensatory mechanisms using the unimpaired limb. The current strategies that are focused on improving the impaired limb only obtain around 70% of its original ability. Aerobic exercise is known to have many benefits that may provide a recovery mechanism in stroke patients that reduces impairments and allows a better functional recovery. Previous rodent studies have demonstrated that exercise following stroke can ameliorate the maladaptive effects of compensation, producing outcomes that mimic pre-operative performance; however, the exact amount of exercise needed to produce these results is unknown. The current study examines the functional outcome of the bad limb following compensation and intermittent exercise using a mouse model of stroke. We hypothesize that allowing 12-hour access to exercise every other night will be sufficient in preventing deterioration from nonuse and also provide a means of rehabilitation for the impaired limb.

Arts Integration and Student Engagement

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One of the most crucial parts of education is making sure your students are engaged. Student engagement is characterized as having three facets: behavioral, emotional, and cognitive engagement. Additionally, student engagement is often linked with academic achievement; i.e. higher engagement often leads to higher academic achievement (Kearsley & Schneiderman, 1998). The purpose of this study was to investigate how cross-curricular arts integration impacted student engagement. Arts-integration is the practice of using art forms to teach concepts unrelated to the arts. This study took place in a classroom with 34 students, all in 4th grade. I taught a series of lessons in different content areas that all included arts-integration. After each lesson, I collected student feedback on how they enjoyed the lesson and kept a running record of my own observations of students and their engagement during the various forms of arts integration. I found that integrating the arts into the curriculum led to positive trends in student's engagement. These findings are consistent with other studies that have been conducted on similar topics.

Communal Healing Among the Ojibwe: Past and Present

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The Ojibwe were skilled healers on both the individual and communal levels long before European colonization. The Grand Medicine Society, a closed group of Ojibwe men and women, was at the heart of the community and provided education and social support, in addition to medical treatment. Following colonization, the secretive nature of this society ensured that the medical knowledge of the Ojibwe, including an understanding of herbal remedies, basic surgical procedures, and advanced natal care, was protected from European pressures. On contemporary Native American reservations individuals are returning to community based healing to treat modern social and medical issues related to the historical trauma of colonialism. Community based healing calls for revitalization of Ojibwe healing methods, creation of ceremonial healing spaces, expression of daily gratitude, use of physical and emotional detox, and the building of spiritual connections. Primarily, this relates to the treatment of alcohol and opioid dependency, both of which have been labeled epidemics on modern reservations and continue to feed into social issues such as domestic violence. Through the use of anthropological, historical, and medical sources, this project aims to highlight the modern applications of culturally significant medicinal practices of the Ojibwe both on and off native reservations.

FACT OR FICTION

Poster Presentation P51

Let's Read into It: The Effect of Children's Literature Integration on Student Engagement

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Children's literature can play a crucial role in the classroom environment, both as independent reading for students, as well as a tool for teaching content. In my study, I determined how the integration of children's literature into the Social Emotional Learning unit of a third-grade classroom affects students' cognitive, behavioral, and emotional engagement. Cognitive engagement can be defined as being invested in the learning process and going above-and-beyond in the classroom. A student who is behaviorally engaged follows the rules, is not disruptive, is an active participant in the learning process, and/or participates in extra-curricular activities. Emotional engagement includes any and all emotional reactions (Fredricks, Blumenfeld, & Paris, 2004). I collected and analyzed data through field notes, class photos, lesson plans, and student work samples. The results of this study showed how the use of children's literature allows students to become more engaged with the lessons being presented.

Poster Presentation P52

Transformation of light in anisotropic materials and devices

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The speed of light in a birefringent material varies by polarization, leading to the creation of a fast axis and a slow axis. This anisotropy may be utilized to impose a phase difference (or 'retardance') between components of the propagating electric field of light. A geometry which causes a phase difference of 90 degrees is called a quarter-wave plate and, in conjunction with a linear polarizer, can be used to produce circularly polarized light. In other words, the interplay between light and matter allows us the opportunity to tailor the information encoded into a laser beam.

We will first describe, mathematically, the properties of birefringent wave plates, such as the relationship between the input state of the light beam, plate orientation, and the output state. Utilizing polarization-selective beam splitters, photodiodes and a data acquisition system, these predictions can be checked by experiments.

Better Questions, Better Learning: Deeper than “Do you get it?”

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Within the classroom, a key component to a successful lesson is the ability to ask questions. Asking questions allows for students to have an opportunity to participate in class as well as giving the teacher a chance to gauge the level of understanding among the students. However, merely asking surface level questions such as “do you get this?” is not sufficient. This self-study examined the impact of deeper-level questions on student engagement to see if asking deeper-level questions would encourage students to become more invested in class. To define whether or not a question was deemed to be deeper-level, it was compared to Bloom’s Taxonomy, a model that categorizes questions and learning objectives based on their purpose and specific words used (Spence, 2019). There are multiple levels: remember, understand, apply, analyze, evaluate, and create. If the question reached the level that requires students to apply information, it was deemed deeper-level for this research. Lesson plans, field notes, and video recordings were collected from five different high school science classrooms over a semester. This practice of utilizing deeper-level questions is essential for pushing students in their engagement and understanding of the content.

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