

Loyola Marymount University



**Eighth Annual
Undergraduate
Research
Symposium**

Arts Showcase

Friday, March 18th
4:30–7:45pm
Burns Fine Arts Complex

Symposium

Saturday, March 19th
8:30am–4:30pm
University Hall

<http://academics.lmu.edu/symposium>

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☞ *A Welcome from the Associate Provost of Undergraduate Education* ☞

March 19, 2016

“Tell me and I’ll forget; show me and I may remember; involve me and I’ll understand.” Chinese proverb

Dear LMU Students, Faculty, Staff, and Guests,

Welcome to the Eighth Annual Undergraduate Research Symposium! This campuswide tradition celebrates the exceptional academic work of LMU undergraduate students and showcases student research and creative activity mentored by LMU’s distinguished faculty. The Undergraduate Research Symposium reflects Loyola Marymount’s unwavering commitment to academic excellence both inside and outside of the classroom.

We are pleased to feature the work of more than 350 students from all of the undergraduate colleges and the School of Film and TV. The diverse sessions will be intellectually stimulating for all. Among the presentations on Saturday are 140 posters in three sessions, 60 oral presentations, including graphic arts displays, and 4 panels. In the morning and afternoon sessions students wrestle with complex social issues in Los Angeles including driverless cars, K-12 education, foster youth concerns, the riches of the Ballona Wetlands and the desolation of Skid Row. Among the sessions are discussions of small things – green lynx spiders, hummingbirds, fish, and honeybees - and the big issues around global impact such as soccer migration, the British-Chinese-Indian trade triangle, and consideration of the economic landscape in Mexico.

Research, using new technologies, produced discoveries on drones and insights into STEM education with virtual worlds. One invention, using an app for smartphones that implements selective image processing, shows real promise in helping the visually impaired in the classroom. Health-related results include the 2015-16 IMPAACT study that considers the effects of aerobic and resistance training on the health of cancer survivors. Other students contemplated gang legislation and restorative justice and still others considered the hot button, and contemporary, issues of race and gender in the popular media. Study Abroad inspired several research projects including on-site research in Rome at the Basilica of Santa Maria Maggiore and the Lateran Basilica. Another student produced an adaptation for theatre of *The Troubles* in Northern Ireland. Yet another researched the Indo-American Refugee NGO through an internship in London.

On Friday, we devote an evening to the arts (music, dance, theatre, and the visual arts), taking place in the arts spaces of the Burns Fine Arts Center. The formal presentations, as well as the art-making in the studios, are grounded in opportunities for students to explore the human experience through work which is intellectual, creative, and critical.

The Undergraduate Research Symposium provides an excellent opportunity for all members of the LMU community to actively engage with students who have been immersed in thought-provoking questions and challenging global issues. In an increasingly complex world, it is important for students to take learning to a deeper and more integrated level. The work showcased this weekend is evidence of this learning process.

Congratulations to this year’s presenters and to all the students and faculty participating in the 2016 LMU Undergraduate Research Symposium!

Sincerely,



Rae Linda Brown, Ph.D.



Friday, March 18th | Arts Showcase

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Saturday, March 19th | Research Symposium

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Friday, March 18, 2016
☞ Undergraduate Research Symposium: Arts Showcase ☞

PROGRAM BY VENUE and TIME

☞ ONGOING EVENTS

- **BUFFET RECEPTION 4:30pm-7:00pm** (please note end time of Buffet)

- **ONGOING DISPLAYS OF STUDENT ARTWORK 4:30pm-7:30pm**
BURNS 121 – CERAMICS STUDIO BURNS 152 – PHOTOGRAPHY STUDIO
BURNS 200 – PRINTMAKING STUDIO BURNS 217 – DRAWING STUDIO

- **PROFESSIONAL ART EXHIBIT**
LABAND ART GALLERY – FROM CLAY TO THE CLOUD: *This exhibition explores the human impetus to preserve our knowledge, our memory, and our cultural heritage. Ancient clay cuneiforms will be on view as well as Nuala Creed's ceramic portraits of the Internet archivists that remind us of the crucial human involvement in this digital archive.*

☞ PRESENTATIONS BY VENUE and TIME

THOMAS P. KELLY STUDENT ART GALLERY: *Graphic Design and Dance Presentations*

Session One

- | | |
|------------------|--|
| 4:45-4:55 | <i>Starvation: Deserting Nutrition</i>
Nicole Green (Studio Arts-Graphic Design)
Garland Kirkpatrick & Terry Dobson (Studio Arts-Graphic Design), Mentors |
| 5:00-5:10 | <i>The Dirty Detox: Uncovering the Truth About the Ingredients in Your Toiletries</i>
Jennifer Masuda (Studio Arts-Graphic Design)
Garland Kirkpatrick & Terry Dobson (Studio Arts-Graphic Design), Mentors |
| 5:15-5:25 | <i>Trigger Warning: The Harmful Side Effects of Political Correctness on College Campuses</i>
Shelby Albrecht (Studio Arts-Graphic Design & Art History Minor)
Garland Kirkpatrick & Terry Dobson (Studio Arts-Graphic Design), Mentors |
| 5:30-5:40 | <i>I'mmigrant: My Undocumented Experience</i>
Aaron De La Torre (Studio Arts-Graphic Design)
Garland Kirkpatrick & Terry Dobson (Studio Arts-Graphic Design), Mentors |

ENTR'ACTE

- | | |
|------------------|---|
| 5:40-5:55 | View ongoing exhibits in the Thomas P. Kelly Student Art Gallery, the Laband Art Gallery, and open art studios. Visit the Buffet (Dunning Courtyard). |
|------------------|---|

Session Two

6:00-6:10

Under Bald Eagle Eyes

Evan Dickerson (Studio Arts-Graphic Design & English Minor)
Garland Kirkpatrick & Terry Dobson (Studio Arts-Graphic Design), Mentors

6:15-6:25

Injected: A Raw Look at the Meat We Consume

Lauren Eejima (Studio Arts-Graphic Design)
Garland Kirkpatrick & Terry Dobson (Studio Arts-Graphic Design), Mentors

6:30-6:50

Nebraska: 2016 ... a dance reflection

Kay Hampton (Psychology and Dance), Samantha Blaz (Dance & Political Science
Minor), and Gigi Todisco (Dance)—Choreography & Performance
Rosalynde Leblanc Loo & Kristen Smiarowski (Dance), Mentors

6:55-7:05

Unseen Ocean: What goes in the ocean, goes in you!

Cole Madden (Studio Arts-Graphic Design)
Garland Kirkpatrick & Terry Dobson (Studio Arts-Graphic Design), Mentors

7:10-7:20

Busted: Covered in Crude

Jacob Hassett (Studio Arts-Graphic Design)
Garland Kirkpatrick & Terry Dobson (Studio Arts-Graphic Design), Mentors

7:25-7:35

Left Out to Dry: The Abandonment of Our Homeless Neighbors

Brian Jared Pearson (Studio Arts-Graphic Design)
Garland Kirkpatrick & Terry Dobson (Studio Arts-Graphic Design), Mentors

🔗 Please go to next page for Music and Theatre Arts Presentations 🔗

MURPHY RECITAL HALL – Music Presentations

Session One

- 4:45-5:00** ***The Pathos in “Pathétique”: A Timeless Beethoven Sonata***
Anna Thompson (Music & Italian Minor)—Piano Performance
Wojciech Kocyan (Music), Mentor
- 5:00-5:15** ***“Così fan tutte”: Feminist and Vocal Challenges***
Evelyn Fajardo (Psychology & Music-Vocal Studies)—Vocal Performance
Paul Humphreys (Music), Mentor
- 5:15-5:30** ***“This is my Reply”: A study of the social influences and implications of piano music***
Matilda Rudolph (Music-Instrumental Studies & English) —Piano
Performance
Wojciech Kocyan (Music), Faculty Mentor
- 5:30-5:45** ***Romanticism in Regondi***
Brian Rodriguez (Music-Instrumental Studies and Composition)—Guitar
Performance
Martha Masters (Music), Mentor

ENTR’ACTE

- 5:40-5:55** View ongoing exhibits in the Thomas P. Kelly Student Art Gallery, the Laband Art
Gallery, and open art studios. Visit the Buffet (Dunning Courtyard).

BURNS 211 – ART HISTORY CLASSROOM: Theatre Arts Presentations

Session Two

- 6:00-6:15** ***Lighting and Projection Design of “The Colonel and the Birds”***
Tom Ash (Theatre Arts & Classical Civilizations Minor)—Technical Theatre
Rob Hillig (Theatre Arts), Mentor
- 6:15-6:30** ***scene from “The Colonel and the Birds”***
Annalisa Cochrane (Theatre Arts & Film and Television Studies Minor) and Ian
Salazar (Screenwriting & Theatre Arts Minor)—Acting
Neno Pervan (Theatre Arts), Mentor
- 6:30-6:45** ***Historical Costume Research: “Chavez Ravine” and “Sweeney Todd”***
Joshua La Cour (Entrepreneurship & Theatre Arts)—Costume Design
Maureen Weiss (Theatre Arts), Mentor
- 6:45-7:00** ***Designing Durang: A look inside the costume design for Christopher Durang’s
“Vanya and Sonia and Masha and Spike” from concept to completion***
Brianna Ellis-Mitchell (Marketing and Bus. Law & Theatre Arts) —Costume Design
Patricia McMahon (Theatre Arts), Mentor



Saturday, March 19, 2016



Schedule of Events

8:30am – 12:30pm	REGISTRATION University Hall – 1 st Floor
8:30am – 9:50am	ORAL SESSION I 1 st Floor
9:30am – 10:50am	ORAL SESSION II 1 st and 3 rd Floors
10:30am – 12:00pm	POSTER SESSION I 2 nd Floor Hallways
11:00am – 12:30pm	ORAL SESSION III 1 st Floor
11:00am – 12:30pm	LUNCH 1 st Floor on Atrium Patio
12:00pm – 1:30pm	ORAL SESSION IV 1 st Floor
1:30pm – 3:00pm	POSTER SESSION II Atrium and 1 st Floor Hallways
1:30pm – 3:00pm	ORAL SESSION V 1 st and 3 rd Floors
3:00pm – 4:30pm	POSTER SESSION III Atrium and 1 st Floor Hallways
3:00pm – 4:30pm	ORAL SESSION VI 3 rd Floor

ORAL SESSION I
8:30am-9:50am

<i>Time</i>	<i>Room</i>	<i>Student Presenter</i>	<i>Project Title</i>	<i>Faculty Mentor</i>
Health and the Human Body				
8:30-8:50	1402	Audrey Chien <i>Athletic Training</i> Isabel Jones <i>Athletic Training</i> Carrie Whitelam <i>Dance</i>	Effect of Ankle Taping on Power, Velocity, Balance and Agility	Stephanie Perez <i>Health and Human Sciences</i> Sarah Strand <i>Health and Human Sciences</i>

8:50-9:10		Rakiyah Johnson <i>Health and Human Sciences</i> Isabela Kuroyama <i>Psychology</i>	Changes in Metabolic Syndrome among Cancer Survivors in the 2015-2016 IMPAACT Study	Heather Tarleton <i>Health and Human Sciences</i>
9:10-9:30		Mark Barrett <i>Psychology, Economics</i> Alice Gavarette Olvera <i>Psychology</i>	The Effects of Energy Drinks on Cognition	David Hardy <i>Psychology</i>

Business and Finance: Financial Crises, Silicon Beach, and Sustainability

8:30-8:50	1222	Yusef Trad <i>Finance</i>	Financial Crises and Government Regulation	Susan Elkinway <i>Finance</i>
8:50-9:10		Timothy Nguyen <i>Finance</i>	The RE Rental Market near LMU, for Students and Investors	Susan Elkinway <i>Finance</i> Christopher Manning <i>Finance</i>
9:10-9:30		Cedric Char <i>Finance</i>	Sustainability and Business Performance	Joshua Spizman <i>Finance, Computer Information Systems</i>

All Living Things: Fish, Spiders, Pine Siskins, and Plants

8:30-8:50	1218	Ashley Arnell <i>Biology</i>	Understanding the Nodulation Pathway in <i>Burkholderia tuberum</i>	Michelle Lum <i>Biology</i>
8:50-9:10		Christopher Dorsey <i>Biology</i>	Genetic Variation and Biogeography of the Silver Garden Spider <i>Argiope argentata</i>	Martina Ramirez <i>Biology</i>
9:10-9:30		Melissa Morado <i>Biology</i>	Food Deprivation Affects Male Pine Siskins' Vocalization in Preparation for Migration	Heather Watts <i>Biology</i>
9:30-9:50		Allison Croul <i>Chemistry</i>	Seasonal Trends in BVOC Content of Local Native and Non-native Plants	Nicole Bouvier-Brown <i>Chemistry</i>

Political Narratives: 9/11, Battlestar Galactica, Captain America, The Troubles

8:30-8:50	1403	Matthew Connelly <i>English</i>	America's Own 9/11 Story: Processing a Tragedy Through a Collective Memoir in The 9/11 Commission Report	Dermot Ryan <i>English</i> Linda Bannister <i>English</i> Susan Scheibler <i>Film and TV Studies</i>
8:50-9:10		Brynn Bodair <i>Dance, Political Science</i>	Maintaining Humanity Amidst Crises	Susan Scheibler <i>Film and TV Studies</i>
9:10-9:30		Jaime Maier <i>English</i>	Star-Spangled Man with a Plan: Captain America as Resonant Historical and Political Literature	Gary Dauphin <i>English, Journalism</i>
9:30-9:50		Emmett Schlenz <i>English, History</i>	The Old Sorrow: Adapting the Troubles in Northern Ireland to Theater	Amy Woodson-Boulton <i>History</i>

ORAL SESSION II

9:30am-10:50am

<i>Time</i>	<i>Room</i>	<i>Student Presenter</i>	<i>Project Title</i>	<i>Faculty Mentor</i>
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Aesthetics: Philosophy, Image, and Virtual Worlds

9:30-9:50	1404	Raciel Cuevas <i>Philosophy</i>	A Pair of Horns and a Tail: Approaching an Aesthetics of Ugliness	Martin Nemoianu <i>Philosophy</i>
9:50-10:10		William Rehbock <i>History, English</i>	The Automobile as Art and its Role in Shaping the Infrastructural Growth of Los Angeles	Amy Woodson-Boulton <i>History</i>
10:10-10:30		Katarina Klask <i>Animation</i> Hunter Gibson <i>Animation</i> Taylor Roseberry <i>Recording Arts</i> Mattie Coccia <i>Computer Science</i>	Visualizing the Invisible: Exploring the Motif of Sight Through the Game Development Process of "Visions: Chaos in Naango"	Rob Burchfield <i>Animation</i> Tom Klein <i>Animation</i>

Narratives and Identity: Asian Americans, Native Hawaiians, and a Naturalist

9:30-9:50	1858	Hillary Aringo-Peregrina <i>Psychology</i>	East Meets West: Orientalism, Race, and Gender in the U.S. Visual Culture	Constance Chen <i>History</i>
9:50-10:10		John Livingston <i>History</i>	The Historical Exceptionalism of William Bartram: How an 18 th Century Naturalist Complicates the American Environmental Narrative	Nicolas Rosenthal <i>History</i>
10:10-10:30		Amy Higa <i>Communication Studies</i>	Whitewashing, Marginalization and Commodification: Hegemony in Aloha	James Bunker <i>Communication Studies</i>

Power and Propaganda in Film: Chinese, New German Cinema, and Horror

9:30-9:50	Ahmanson Auditorium	Claire Andreae <i>Film and Television Production</i>	The High Price of Economic Success in Fassbinder's "The Marriage of Maria Braun"	Gloria Shin <i>Film Studies</i>
9:50-10:10		Rachel Econ <i>Film and Television Production</i> Logan Fulton <i>Film and Television Production</i>	"Burn Out" – A Short Film Comparison of Japanese and American Horror Styles	Pete Soto <i>Film Production</i>
10:10-10:30		Cameron Villadiego <i>Marketing</i>	An Insight on Chinese Communist Propaganda	Yanjie Wang <i>Asian and Pacific Studies</i>

Marginalization and Oppression in America

9:30-9:50	3218	Spencer Head <i>Marketing, Psychology</i> Caitlin O'Hern <i>Psychology</i>	When does White Privilege Awareness lead to Dismantling Behavior? The Role of Correspondence Bias and Social Empathy	Adam Fingerhut <i>Psychology</i>
9:50-10:10		Rebecca Corona <i>Political Science</i>	Being Gay is Ultimately Okay: The Progression of LGB Rights Between Israel and the United States	Jodi Finkel <i>Political Science</i> Andrew Dilts <i>Political Science</i>
10:10-10:30		Alexia R. Barbaro <i>Political Science, Philosophy</i>	Race, Space, and Police in Los Angeles City: Narratives of Resistance and the Limits of Agency	Andrew Dilts <i>Political Science</i>
10:30-10:50		Nicole Powell <i>Communication Studies</i>	Straight Outta Misogyny: A Womanist Critique of the N.W.A. Film	James Bunker <i>Communication Studies</i>

Far Out: Physics, Philosophy, and Outer Space

9:30-9:50	3222	Kellie Ault <i>Physics</i>	Traversable Wormholes in Fourth-Order Conformal Weyl Gravity	Gabriele Varieschi <i>Physics</i>
9:50-10:10		Julian Alsarhn <i>History</i>	Aristotelian Non-Contradiction and Quantum Superposition	Erin Stackle <i>Philosophy</i>
10:10-10:30		Connor Orr <i>Physics</i>	The Effects of Geomagnetic Activity on Magnetic Field Line Resonance Frequencies in Earth's Magnetosphere	David Berube <i>Physics</i>
10:30-10:50		Michael Lerner <i>Physics, Entrepreneurship</i>	Observable Effects on Relativistic Orbits in Generalized Uncertainty Principle Space-time	Jonas Mureika <i>Physics</i>

POSTER SESSION I

10:30am-12:00pm

2nd Floor Hallways

ORAL SESSION III

11:00am-12:30pm

<i>Time</i>	<i>Room</i>	<i>Student Presenter</i>	<i>Project Title</i>	<i>Faculty Mentor</i>
Against the Grain: Views of Feminism in Philosophy, in Art, and in the Home				
11:00-11:20	1403	Mary Densmore <i>English: Writing</i>	Power and Gender: British Women's role in 19 th Century Imperial India	Amy Woodson-Boulton <i>History</i>
11:20-11:40		Adinah Bolden <i>Entrepreneurship, French</i>	Painted Smiles	Damon Willick <i>History</i>
Panel – Christianity and Art in Rome				
11:00-11:20	1404	Cedric Char <i>Finance</i>	Theological Reconciliations in Constantinian Art and Architecture	Kirstin Noreen <i>Art History</i> Fr. Marc Reeves, SJ <i>Theological Studies</i>
11:20-11:40		Shannon Hayes <i>Modern Languages and Literatures, Classics and Archaeology</i>	Santa Maria: Intercessor, Guide, and Mother	Kirstin Noreen <i>Art History</i> Fr. Marc Reeves, SJ <i>Theological Studies</i>
Tech Savvy				
11:00-11:20	3218	Ian Wiedenman <i>Applied Information Management Systems</i>	Identifying Methods for Extracting "Meaning" from Unstructured Text	Linda Leon <i>Information Management Systems</i> Kala Seal <i>Applied Information Management Systems</i>
11:20-11:40		Austin Hentrup <i>Electrical Engineering</i> Peter Roldan <i>Electrical Engineering</i> Deyi Lu <i>Electrical Engineering</i>	Wireless Authentication of Smart Doors using RFID	Hossein Asghari <i>Electrical Engineering</i>

11:40-12:00	Cameron Billingham <i>Film and Television Production, Computer Science</i>	MayaCam: Virtual Camera Capture on Mobile Devices	B.J. Johnson <i>Computer Science</i>
12:00-12:20	Austin Hentrup <i>Electrical Engineering</i> Joshua Solberg <i>Mechanical Engineering</i>	Inertial Electrostatic Confinement (IEC) Fusion	Anatol Hoemke <i>Physics</i>

ORAL SESSION IV
12:00pm-1:30pm

<i>Time</i>	<i>Room</i>	<i>Student Presenter</i>	<i>Project Title</i>	<i>Faculty Mentor</i>
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Panel – Greek Studies: From Antiquity to Modernity

12:00-12:20	1402	Yanira Melendez-Gonzalez <i>Classical Civilizations</i>	Greek Diaspora and Assimilation: From Antiquity to Modernity	Katerina Zacharia <i>Classics and Archaeology</i>
12:20-12:40		Sam Melendres <i>Screenwriting</i>	Greece Under Roman Rule	Katerina Zacharia <i>Classics and Archaeology</i>
12:40-1:00		Robert Wieland <i>Entrepreneurship</i>	Fallacy of Black Athena	Katerina Zacharia <i>Classics and Archaeology</i>

Panel – Voices of Justice: Service, Action and Engaged Learning Experiences

12:00-12:20	Ahmanson Auditorium	Christian Beltran <i>Political Science, Economics</i>	Second Chance: A Reflection of Engaged Learning	MaryAnne Huepper, CSJ <i>Center for Reconciliation and Justice</i> Sr. Judith Royer <i>Theatre Arts & Dance</i>
12:20-12:40		Tori DiGeronimo <i>Theatre Arts</i>	Be You! Hear Me! Join Forces and Create Change!	Sr. Judith Royer <i>Theatre Arts & Dance</i>
12:40-1:00		Ian Salazar <i>Screenwriting</i>	Welcome Home: Voices from the Francisco Homes.	Sr. Judith Royer <i>Theatre Arts & Dance</i>
1:00-1:20		Marina Marmolejo <i>Health and Human Sciences</i>	The Effects of Weight Bearing Activities on Hamstring Muscle Flexibility in Homeless Communities	Hawley Almstedt <i>Health and Human Sciences</i>

DNA and Proteins

12:00-12:20	1403	Tessa Morris <i>Biomathematics</i>	Mathematical Modeling Shows that Gln3 Affects the Dynamics of Gene Regulatory Network Controlling the Cold Shock Response in <i>Saccharomyces cerevisiae</i>	Kam Dahlquist <i>Biology</i> Ben Fitzpatrick <i>Mathematics</i>
12:20-12:40		Juan Carrillo Quinche <i>Computer Science, Applied Mathematics</i> Trixie Anne Roque <i>Computer Science</i>	Usability Improvements to GRNmap: Software for Gene Regulatory Network Modeling and Parameter Estimation	Kam Dahlquist <i>Biology</i> John David Dionisio <i>Computer Science</i>
12:40-1:00		Taylor Arhar <i>Biochemistry</i> Nathan Pihl <i>Biochemistry</i>	Aggregation Characterization of Wild-Type p53 and Six Common p53 Mutants	David Moffet <i>Chemistry and Biochemistry</i>

Through the Eyes of Children: Migration and Narrative

12:00-12:20	1222	David Martinez <i>Political Science</i>	Indo-American Children (film)	Jodi Finkel <i>Political Science</i>
12:20-12:40		Alyssa Venezia <i>English, Mathematics</i>	Characters Through Time	Stephen Shepherd <i>English</i>
12:40-1:00		Nazeli Ekimyan <i>English: Writing</i>	Not So Happily Ever After: How Fairy Tales Have Changed	Alexandra Neel <i>Humanities</i>

Water Issues in the 21st Century

12:00-12:20	3222	Chengyu Gao <i>Civil Engineering</i> Brianna Pagan <i>Civil Engineering</i>	Assessing Residential Water Supply Demand Changes for the City of Long Beach under Climate Change Scenarios	Jeremy Pal <i>Civil Engineering, Environmental Science</i>
12:20-12:40		Cassandra Nickles <i>Civil Engineering</i> Matthew Goodman <i>Mechanical Engineering</i>	Using Computational Fluid Dynamics to Model Tracer Transport at Treatment Plants	Emin Issakhanian <i>Mechanical Engineering</i>
12:40-1:00		Kelly Hunter <i>Biochemistry</i>	Energetic characterization of the water oxidation mechanism using earth abundant metal catalysts and development of a novel catalyst	Emily Jarvis <i>Chemistry</i>
1:00-1:20		Joshua Solberg <i>Mechanical Engineering</i> Victor Heinen <i>Mechanical Engineering</i> Matthew Goodman <i>Mechanical Engineering</i>	Analysis of Turbine Blade Film Cooling Using Computational Fluid Dynamics (CFD)	Emin Issakhanian <i>Mechanical Engineering</i>

POSTER SESSION II
1:30pm-3:00pm
Atrium and 1st Floor Hallway

ORAL SESSION V
1:30pm-3:00pm

<i>Time</i>	<i>Room</i>	<i>Student Presenter</i>	<i>Project Title</i>	<i>Faculty Mentor</i>
Innovative Therapies Across the Age Spectrum				
1:30-1:50	3218	Kira Jatoft <i>Sociology</i> Melissa Sandoval <i>Marketing</i>	Aging Under the Radar	Anna Muraco <i>Sociology</i>
1:50-2:10		Carla Ventura <i>Psychology</i>	The effects of music therapy in children diagnosed with an autism spectrum disorder	Sabine Huemer <i>Psychology</i>
2:10-2:30		Beth McGowan <i>Psychology, Dance</i>	Dance and Well-being in Older Adult Communities: Exploring Efficacy as a Mediator	Adam Fingerhut <i>Psychology</i> Kristen Smiarowski <i>Dance</i>
LMU – Diverse Voices				
1:30-1:50	3222	Cielo Garat <i>Psychology, Sociology</i>	The relationship between self-esteem, academic satisfaction and life satisfaction in first and fourth year students	Ricardo Machón <i>Psychology</i>
1:50-2:10		Angelica Diaz <i>Psychology</i> Nicole Muldoon <i>Psychology, English</i>	The Relationship Between First-Generation College Status and Co-Curricular Engagement on the University Satisfaction of Students	Ricardo Machón <i>Psychology</i>
2:10-2:30		Jonathan Ishii <i>Political Science</i>	Leadership Across Diversity as a First-Generation College Student at Loyola Marymount University	Paul Jimenez <i>Education</i>
On Teaching, Sacred and Intercultural Spaces: From Augustine to the Now				
1:30-1:50	3226	Mariajose Gomez <i>Liberal Studies</i>	Augustine on Teachers and Teaching: Reflections for the Intercultural Classroom	Matthew Pereira <i>Theological Studies</i>
1:50-2:10		Cynthia Garcia <i>English</i>	The Intersection of Faith and Cultura: LMU Latino Students' Faith Formation	Maruth Figueroa <i>Ethnic and Intercultural Services – Higher Education</i>
2:10-2:30		Claire Andreae <i>Film and Television Production</i>	An Original Protest?: Influences on Martin Luther's Theology in "The Freedom of a Christian" and "The Ninety-five Theses on the Power and Efficacy of Indulgences"	Charlotte Radler <i>History</i>

Trade(s) and Trade-Offs: The Impact of Globalization

1:30-1:50	3230	Dominic Budetti <i>History, Political Science</i>	From Silver to Opium: A Study of the Evolution and Impact of the British-Chinese Trade System from 1780-1842	Elizabeth Drummond <i>History</i>
1:50-2:10		Alvaro Gonzalez <i>Economics, Chicana/o Studies</i>	Globalizing Bodies: The Impact Globalization had on Cultural Hegemony in Ciudad Juarez	Yvette Saavedra <i>Chicana/o Studies</i>
2:10-2:30		Jeremy Selland <i>Political Science, Economics</i>	Efficacy of Targeted Killings in Pakistan: Drones, Blowback, and Effects on the State	Kerstin Fisk <i>Political Science</i>
2:30-2:50		Matthew Brancolini <i>Psychology, Sociology</i>	Global Ball: The Effects of Soccer Migration on South America and Africa	Stephanie Limoncelli <i>Sociology</i>

War: What is it Good For?

1:30-1:50	Ahmanson Auditorium	Jospeh Berg <i>History</i>	Simplicius Simplicissimus and Violence Against Civilians in the Thirty Years War	Lawrence Tritle <i>History</i>
1:50-2:10		Elliott Sauerwald <i>History</i>	Manhood according to the American Infantrymen of World War II	Cara Anzilotti <i>History</i>
2:10-2:30		Arriona Randazzo <i>History</i>	“No cause for worry!” War, Masculinity, and Disease in the case of Corporal Alton Miller	Carla Bittel <i>History</i>
2:30-2:50		Elliott Sauerwald <i>History</i>	War, Trauma, and Nazi Germany	Lawrence Tritle <i>History</i>

POSTER SESSION III

3:00pm-4:30pm

Atrium and 1st Floor Hallway

ORAL SESSION VI

3:00pm-4:30pm

Time Room Student Presenter Project Title Faculty Mentor

The Crusades Through a Cross-Cultural Lens

3:00-4:30	3222	Theresa La <i>History, Biology</i>	The Crusader Hospital of Jerusalem – Examining Christian and Muslims Physicians through the Statues of Father Roger de Moulins 1181	Anthony Perron, <i>History</i>
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Dean Messinger <i>History</i>	The Chronicle of William of Puylaurens and the Historiography of the Albigensian Crusade	Anthony Perron, <i>History</i>
Catherine Perl <i>History</i>	“A Castilian, a Christian, and a Loyalist”: The Construction of Distinctly Spanish Feudal Systems in “The Poem of the Cid”	Anthony Perron, <i>History</i>
Patrick Scheuring <i>History</i>	Frank or Faux? – Art in the Early Crusader Kingdoms	Anthony Perron, <i>History</i>
Emmett Schlenz <i>English, History</i>	Amongst Coarse and Bad men: Medieval Theodicy and Alberic of Trois-Fontaines’ Account of the Children’s Crusade	Anthony Perron, <i>History</i>

POSTER SESSION I
10:30am – 12:00pm
2nd Floor Hallways

• **Globalization** • **Graphic Design** • **Political Science – Urban Studies** • **Psychology** • **Sociology – Social Issues – Economics** •

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
<u>Globalization</u>			
1	Michael Busse <i>Entrepreneurship</i>	Political Roadblocks to Economic Integration: Comparative Case Studies	David French <i>International Business</i>
2	Eric Robinson <i>Entrepreneurship</i>	Tsehai Publishers: The Pursuit of Profitability and Freedom from the Grant System	Elias Wondimu <i>Tsehai Publishers</i>
3	David Tassone <i>Finance</i>	Benefits of a Global Market Index	Joshua Spizman <i>Finance</i>
<u>Graphic Design</u>			
4	Shelby Albrecht <i>Studio Arts:</i> <i>Graphic Design</i>	Trigger Warning: The Harmful Side Effects of Political Correctness on College Campuses	Garland Kirkpatrick <i>Graphic Design</i> Terry Dobson <i>Graphic Design</i>
5	Aaron De La Torre <i>Studio Arts:</i> <i>Graphic Design</i>	I'mmigrant: My Undocumented Experience	Garland Kirkpatrick <i>Graphic Design</i> Terry Dobson <i>Graphic Design</i>
6	Evan Dickerson <i>Studio Arts:</i> <i>Graphic Design</i>	Under Bald Eagle Eyes	Garland Kirkpatrick <i>Graphic Design</i> Terry Dobson <i>Graphic Design</i>
7	Lauren Eejima <i>Studio Arts:</i> <i>Graphic Design</i>	Injected: A Raw Look at the Meat We Consume	Garland Kirkpatrick <i>Graphic Design</i> Terry Dobson <i>Graphic Design</i>
8	Nicole Green <i>Studio Arts:</i> <i>Graphic Design</i>	Starvation: Deserting Nutrition	Garland Kirkpatrick <i>Graphic Design</i> Terry Dobson <i>Graphic Design</i>
9	Jacob Hassett <i>Studio Arts:</i> <i>Graphic Design</i>	Busted: Covered in Crude	Garland Kirkpatrick <i>Graphic Design</i> Terry Dobson <i>Graphic Design</i>

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
10	Cole Madden <i>Studio Arts:</i> <i>Graphic Design</i>	Unseen Ocean: What goes in the ocean, goes in you!	Garland Kirkpatrick <i>Graphic Design</i> Terry Dobson <i>Graphic Design</i>
11	Jennifer Masuda <i>Studio Arts:</i> <i>Graphic Design</i>	The Dirty Detox: Uncovering the Truth About the Ingredients in Your Toiletries	Garland Kirkpatrick <i>Graphic Design</i> Terry Dobson <i>Graphic Design</i>
12	Erin Murphy <i>Studio Arts:</i> <i>Graphic Design</i>	Glutenophobia: The Irrational Fear of Gluten	Garland Kirkpatrick <i>Graphic Design</i> Terry Dobson <i>Graphic Design</i>
13	Jared Pearson <i>Studio Arts:</i> <i>Graphic Design</i>	Left Out to Dry: The abandonment of Our Homeless Neighbors	Garland Kirkpatrick <i>Graphic Design</i> Terry Dobson <i>Graphic Design</i>
14	Kristen Vasquez <i>Studio Arts:</i> <i>Graphic Design</i>	Handheld Prison	Garland Kirkpatrick <i>Graphic Design</i> Terry Dobson <i>Graphic Design</i>

Political Science – Urban Studies

15	Christian Beltran <i>Political Science</i>	Requirements for Utilization of the Wireless Emergency Alert System to Help Increase Low Voter Turnout in State and Local Elections	Brianne Gilbert <i>Political Science</i> Fernando Guerra <i>Political Science</i>
16	Matthew Campos <i>Political Science</i>	Shifting Tides and the Subway to the Sea	Brianne Gilbert <i>Political Science</i>
17	Damian Gatto <i>Political Science</i>	Spatial Mismatch in South L.A.	Peter Hoffman <i>Urban Studies</i> Brianne Gilbert <i>Political Science</i>
18	Hannah Gioia <i>Political Science</i> Priscilla Torres <i>Political Science</i>	Weapons of Mass Hunger: The Latent Threat to Human Security	Jennifer Ramos <i>Political Science</i>
19	Zachary Hayes <i>Political Science</i> Fassa Sar <i>Political Science</i>	Finding the Best Way To Sustain College Political Organizations	Brianne Gilbert <i>Center for Study of Los Angeles</i>

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
20	Josalyn Karr <i>Political Science</i> Rishaun Narayan <i>Political Science</i>	The Effects of the Local Control Funding Formula in Los Angeles County	Brianne Gilbert <i>Political Science</i>
21	Brianna Medina <i>Political Science</i>	Driverless Cars in Los Angeles	Brianne Gilbert <i>Political Science</i> Fernando Guerra <i>Political Science</i>
22	Ugonma Nwankwo <i>Political Science</i>	Playing it Safe: The Role of Safetivism in Political Participation	Richard Fox <i>Political Science</i>
23	Priscilla Torres <i>Political Science</i>	The Concentration of Female Elected Officials Throughout Los Angeles County	Brianne Gilbert <i>Urban Studies/Political Science</i>
24	David Wike <i>Political Science</i>	The Effect of Antiterrorism Spending on Subsequent Targeting	Kerstin Fisk <i>Political Science</i> Andrew Dilts <i>Political Science</i>
25	Savannah Woolston <i>Political Science</i>	Homelessness and Responsibility on Los Angeles' Skid Row	Andrew Dilts <i>Political Science</i>

Psychology

26	Amore Alvarenga <i>Psychology</i>	Skid Row--The Community, The Struggle: A Community-Based Analysis of the Quality of Life on Skid Row	Cheryl Grills <i>Psychology</i>
27	Alice Gavarrete Olvera <i>Psychology</i>	The Role of Working Memory in Problem Solving and Mental Workload	David Hardy <i>Psychology</i>
28	Catherine Houston <i>Chemistry</i>	Alcohol and Marijuana Use Among Low-Income Youth of Color in Los Angeles, CA	Cheryl Grills <i>Psychology</i>
29	Elizabeth Key-Comis <i>Psychology</i>	Perceptions of Criminality based on Facial Photographs	Nora Murphy <i>Psychology</i>
30	Kimberly Smith <i>Psychology</i>	The Effect of Support Groups for Disabled Individuals	Ricardo Machon <i>Psychology</i>
31	Allison Swenson <i>Psychology</i>	Perceptions of Appearance Toward the Self and Others	Ricardo Machon <i>Psychology</i>
32	Aisha Walker <i>Psychology</i>	What's Yours is Mine: The Collective Threat of Afrocentric Hair in the Black Community	Adam Fingerhut <i>Psychology</i>
33	Cheyenne Weinstein <i>Psychology</i>	Do Prejudicial Attitudes Moderate the Relationship Between Age and the Willingness to Seek Psychological Help?	Nora Murphy <i>Psychology</i>

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
<u>Sociology – Social Issues – Economics</u>			
34	Snejana Apley <i>Sociology</i>	"Community is Our Politics": Immigrant Women of Color, Citizenship, and the Fight for Environmental Justice	Nadia Kim <i>Sociology</i>
35	Cassandra Bosley <i>Communication Studies</i>	Juvenilia Books Collective	Judy Battaglia <i>Communication Studies</i>
36	Kendra Dawson <i>Philosophy</i>	Still Deciding	Brad Stone <i>Philosophy; African American Studies Chair</i>
37	McKenzie Dodge <i>Economics</i>	Economic Factors that Contribute to Women's Homelessness	Jennifer Pate <i>Economics</i>
38	Anna Engstrom <i>Sociology</i> Claire Kennedy <i>History</i>	The Adverse Effects of Gang Legislation & the Alternative of Restorative Justice	Jonathan Rothchild <i>Theological Studies</i>
39	Beza Fekade <i>Communication Studies</i>	The Sensationalism of the Media: Africa and Compassion Fatigue	Judy Battaglia <i>Communication Studies</i>
40	Lucia Gonzalez <i>Chicana/o Studies</i>	Using Qualitative Data to Develop Supportive Experiences for Seniors	Steven Neal <i>Academic Community of Excellence</i> Kim Misa <i>Academic Community of Excellence</i>
41	Amanda Hayes <i>Psychology</i>	Guardian Scholars Program: Social Supports for Foster Youth College Students in Los Angeles	Jessica Langlois <i>English</i>
42	Marianna Hernandez <i>Psychology</i>	Mentor/Mentee Class Differences in a Middle School Mentoring Program	Stephanie Limoncelli <i>Sociology</i> La'Tonya Rease-Miles <i>Academic Resource Center</i>
43	Aaliyah Jordan <i>Sociology</i>	Out from the shadows: Black midlife and older gay and lesbian adults' experiences of resilience and marginalization	Anna Muraco <i>Sociology</i>
44	Victoria Owens <i>Communication Studies</i>	Grandma Got Run Over By The Fashion Industry: An Analysis of the Negative Effects of Western Hegemonic Beauty Ideals on Women 60+	Gary Dauphin <i>English</i>
45	Alyson Ress <i>English</i>	Factors Influencing Childhood Obesity: A Multiple Regression Model	Joseph Earley <i>Economics</i>

POSTER SESSION II
1:30pm – 3:00pm
Atrium and 1st Floor Hallways

- **Engineering – Computer Science • Environmental Sustainability – Environmental Justice •**
• Health and Human Sciences • Mathematics – Biomathematics – Physics •

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
<u>Engineering – Computer Science</u>			
46	Ariana Albiar <i>Civil Engineering</i> Christopher Delgado <i>Mechanical Engineering</i> Christopher Green <i>Mechanical Engineering</i> Luis Guevara <i>Mechanical Engineering</i> Edgar Marcial <i>Mechanical Engineering</i> Carlos Martin del Campo <i>Civil Engineering</i> Michael Mudy <i>Mechanical Engineering</i> Matthew Navarro <i>Mechanical Engineering</i> Alfredo Telona <i>Civil Engineering</i>	Heat Treatment Optimization of 4330 Steel for Fasteners Applications	Omar Es-Said <i>Mechanical Engineering</i>
47	Elias Ashe <i>Mechanical Engineering</i> Cassandra Jacobsen <i>Mechanical Engineering</i>	The Recreation and Evaluation of a Human Hand Using Low-Cost Reverse Engineering and 3D Printing Systems	Rafiqul Noorani <i>Mechanical Engineering</i>
48	Elias Ashe <i>Mechanical Engineering</i> Racel Mendoza <i>Mechanical Engineering</i>	The Effect of Hydrogen Charging on Fracture Toughness of 4340 Steel	Omar Es-Said <i>Mechanical Engineering</i>
49	Elias Ashe <i>Mechanical Engineering</i> Xiaodong Sun <i>Electrical Engineering</i>	Optimization of Heat Treatments and Mechanical Properties of 15-5 PH Stainless Steel for Fastener Applications	Omar Es-Said <i>Mechanical Engineering</i>

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
50	Zach Bates <i>Mechanical Engineering</i> Jacob Buckhalter <i>Mechanical Engineering</i> Caitlin Dorff <i>Mechanical Engineering</i> Jad Ghawi <i>Mechanical Engineering</i> Will Hohorst <i>Mechanical Engineering</i> Michael Schwarz <i>Mechanical Engineering</i>	The Effect of Component Orientation on the Fatigue Crack Growth on Ti 4V 6Al	Omar Es-Said <i>Mechanical Engineering</i>
51	Zachary Bates <i>Mechanical Engineering</i> Jacob Buckhalter <i>Mechanical Engineering</i> Caitlin Dorff <i>Mechanical Engineering</i> Jad Ghawi <i>Mechanical Engineering</i> William Hohorst <i>Mechanical Engineering</i> Michael Schwarz <i>Mechanical Engineering</i>	The Effect of Component Orientation on the Fracture Toughness of Ti-6Al-4V	Omar Es-Said <i>Mechanical Engineering</i>
52	Nicolas Breceda <i>Mechanical Engineering</i> Christopher Delgado <i>Mechanical Engineering</i> Christopher Green <i>Mechanical Engineering</i> Alex Hendricks <i>Mechanical Engineering</i> Ying-fen Huang <i>Systems Engineering</i> Brandon Kim <i>Mechanical Engineering</i> Chris LeMieux <i>Mechanical Engineering</i> Jacob Orlita <i>Mechanical Engineering</i> Cristina Zebeljan <i>Mechanical Engineering</i>	Effect of Grain Size on the Fatigue Properties of 2016 Aluminum-Silver Alloy	Omar Es-Said <i>Mechanical Engineering</i>

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
53	Marisol Castellanos <i>Electrical and Computer Engineering</i>	Disruption of Bacterial Biofilm Formation Using Laser-Generated Shockwaves in Combination with Low Concentrations of Gentamicin	Edward Mosteig <i>Mathematics</i>
54	Nadya Charista <i>Civil Engineering</i>	The Importance of Water Current Speed on the Sampling Rates of Polycyclic Aromatic Hydrocarbons in Polyethylene Passive Samplers	Rachel Adams <i>Civil Engineering & Environmental Science</i>
55	Ray Colquhoun <i>Mechanical Engineering</i> Adrian Elias Rodriguez <i>Mechanical Engineering & Applied Mathematics</i>	Vibration Energy Harvester-Powered Wireless Sensor Network for Infrastructure Monitoring	Curtiss Takada-Rooks <i>Asian Pacific American Studies</i> Pezhman Hassanpour <i>Mechanical Engineering</i>
56	Sean Cunniff <i>Electrical & Computer Engineering</i> Patrick Foster <i>Electrical Engineering</i>	Programmable, Inexpensive, Visual Aid System in the Classroom using Augmented Reality	Hossein Asghari <i>Electrical Engineering</i>
57	Alina Garcia Taormina <i>Chemistry</i> Kenneth Ravelo <i>Mechanical Engineering</i> Adrian Rodriguez <i>Mechanical Engineering,</i> Johann Kim <i>Mechanical Engineering</i>	Microstructure Analysis of an Aluminum Alloy	Omar Es-Said <i>Mechanical Engineering</i>
58	Carlos Melendez <i>Mechanical Engineer</i>	Abrasiveness of sputtered boron carbide and diamond-like carbon coatings	Mathew Siniawski <i>Mechanical Engineering</i>
59	Margaret O'Neil <i>Biology</i>	Predator and Prey Availability: A study of the Impact of Prey Accessibility and Watershed Conditions on the Growth Rates of Juvenile Chinook Salmon in the Salish Sea	John Dionisio <i>Computer Science</i>
60	Lucia Ramirez <i>Electrical Engineering</i>	THz Medical Imaging Optical System to Measure Corneal Hydration	Warren Grundfest <i>UCLA Bioengineering</i> Zachary Taylor <i>UCLA Bioengineering</i>
61	Rachel Rivera <i>Computer Science</i>	Human Movement Initiation Music Generation	B.J. Johnson <i>Computer Science</i>
62	Sylvana Santos <i>Electrical Engineering</i>	Fostering STEM Education with Virtual Worlds	Stephanie August <i>Computer Science</i>

Poster # Student Presenter(s) Title of Presentation Faculty Mentor(s)

Environmental Sustainability – Environmental Justice

63	Clara Brackbill <i>Political Science</i>	Our Climate of Inequality	Nicole Bouvier-Brown <i>Chemistry</i>
64	Nicole Enciso <i>Environmental Science</i>	Measuring Runoff Pollutant Removal Efficiency in the Ballona Creek Rain Garden, Culver City, California	John Dorsey <i>Environmental Science</i>
65	Catalina Ibarra <i>Biology</i>	Extent of Awareness on Environmental Sustainability in Los Angeles Families	Susan McDaniel <i>Communications</i>
66	Angela Rabe <i>Environmental Science</i>	The Effects of CEC: 17 β -Estradiol on a Atherinops Affinis Vitellogenin (VTG) Development	John Dorsey <i>Environmental Science</i>
67	Jacob Stuienvolt Allen <i>Environmental Science</i>	Measuring Runoff Fecal Indicator Bacteria Removal Efficiency in the Ballona Creeek Rain Garden, Culver City, California	John Dorsey <i>Environmental Science, Engineering</i>

Health and Human Sciences

68	Eilene Anderson <i>Health & Human Sciences</i> Jeanette Ricci <i>Health & Human Sciences</i>	Heart Rate Variability in Post-treatment Cancer Survivors Following a 26-week Exercise Intervention	Silvie Grote <i>Health & Human Sciences</i>
69	Nia Archer <i>Health & Human Sciences</i> Alex Fuentes <i>Health & Human Sciences</i> Caroline Gallagher Poehls <i>Health & Human Sciences</i> Katelyn Parker <i>Health & Human Sciences</i>	The Effects of Exercise Training on Muscular Variables in Cancer Survivors	Todd Shoepe <i>Health & Human Sciences</i>
70	Alex Franco <i>Health & Human Sciences</i> Nicole Gobreial <i>Health & Human Sciences</i>	Tri-weekly Exercise Positively Improves Balance in Cancer Survivors	Silvie Grote <i>Health & Human Sciences</i>
71	Alex Fuentes <i>Health & Human Sciences</i> Caroline Hallagher Poehls <i>Health & Human Sciences</i> Katelyn Parker <i>Health & Human Sciences</i>	The Effects of Exercise Training on Self-Reported Fatigue and Muscular Variables in Cancer Survivors	Todd Shoepe <i>Health & Human Sciences</i>

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
72	Alex Fuentes <i>Health & Human Sciences</i> Connor Smith <i>Athletic Training</i>	Loading Patterns of Rubber-Based Resistance Bands Across Distributors	Todd Shoepe <i>Health & Human Sciences</i>
73	Heather Lowell <i>Health & Human Sciences</i> Harper Woker <i>Health & Human Sciences</i>	Tri-weekly aerobic and resistance exercise improves cardiovascular markers in cancer survivors	Silvie Grote <i>Health & Human Sciences</i>
74	Sydney Maltz <i>Health & Human Sciences</i>	Bone Mineral Density Trends in a Cohort of Cancer Survivors	Hawley Almstedt <i>Health & Human Sciences</i> Heather Tarleton <i>Health & Human Sciences</i>
75	Emmett Schlenz <i>English & History</i> Lacey Smith <i>Health & Human Sciences</i>	Fact and Fiction: Science and the Mid-to-late 19th Century American Gothic	Paul Harris <i>English</i>
76	Lacey Smith <i>Health & Human Sciences</i>	Physiology of Addiction in Performance: Opioid Pharmacology in Character Development for the Theater	Nenad Pervan <i>Theater Arts</i>

Mathematics – Biomathematics - Physics

77	Nicolas Breceda <i>Mechanical Engineering</i>	Distribution of Ultra-Low Frequency Wave Power in the Magnetosphere during Geomagnetic Storms	David Berube <i>Physics</i> Jeff Sanny <i>Physics</i>
78	Juan Carrillo <i>Computer Science & Applied Mathematics</i>	A New Combinatorial Interpretation for Fibonomial Coefficients	Curtis Bennet <i>Mathematics</i>
79	Kyle Casto <i>Mathematics</i>	Teaching Simultaneous Systems of Equations with Gaussian Elimination	Christina Eubanks-Turner <i>Mathematics</i>
80	Carlos Cruz <i>Mathematics</i>	Modeling the Interaction Dynamics between Honeybees and Food Availability	Baojun Song <i>Mathematics</i>
81	Samvel Gyurdzhyzan <i>Pre-Med</i> Daniel Pascoe <i>Physics</i> Colin Wikholm <i>Biology</i>	Does sleep impact examination performance	Vincent Coletta <i>Physics</i>

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
82	Kristen Horstmann <i>Biomathematics</i> Brandon Klein <i>Biology</i> Tessa Morris <i>Biomathematics</i>	Mathematical Modeling Reveals Zap1's Role in the Gene Regulatory Network that Controls the Response to Cold Shock in "Saccharomyces cerevisiae"	Kam Dahlquist <i>Biology</i> Ben Fitzpatrick <i>Mathematics</i>
83	Jonathan Iozaki <i>Mathematics</i>	Building Block Basics	Christina Eubanks-Turner <i>Mathematics</i>
84	Brandon Klein <i>Biology</i>	Characterization of Retinal Thickness Measurements and their Relationship to Visual Acuity in Progressing Cases of Nonneovascular Macular Degeneration	Lily Khadjavi <i>Mathematics</i>
85	Luciano Manfredi <i>Physics & Pure Mathematics</i>	Photon Geodesics of a Generalized Uncertainty Principle (GUP) Inspired Metric	Jonas Mureika <i>Physics</i>

POSTER SESSION III
3:00pm – 4:30pm
Atrium and 1st Floor Hallways

• **Biology** • **Chemistry - Biochemistry** •

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
<u>Biology</u>			
86	Andrew Abesamis <i>Biology</i> Shaunt Gharbegan <i>Biology</i> Kingsley Hill <i>Biology</i>	Ecological Applications of Unmanned Aerial Vehicles	Victor Carmona <i>Ecology</i>
87	Claudia Aliman <i>Biology</i>	Comparison of allelopathic potential and biogenic volatile organic compound content of <i>Carpobrotus</i> hybrids in two coastal microclimates in Southern California	Victor Carmona <i>Biology</i> Nicole Bouvier-Brown <i>Chemistry</i>
88	Claudia Aliman <i>Biology</i> Megan Ho <i>Biology</i>	Relationships of Location and Quantity of EFN Glands with Recruitment of Ants	Victor Carmona <i>Biology</i>

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
89	Rulla Al-khayat <i>Biology</i> Erich Eberts <i>Biology</i> Lauren Pangburn <i>Biology</i>	Photosynthetic Characterization of Invasive Plant Species in Los Angeles County, CA	Victor Carmona <i>Ecology</i>
90	Matthew Allegretti <i>Biology</i> Ethan Flake <i>Biology</i>	Camera Trap Analysis of Apex and Mesopredator Occurrence and Movement Patterns Within and Around the Ballona Wetlands, Los Angeles, CA	Peter Auger <i>Biology</i>
91	Brendan Angelo <i>Biology</i> Lauren Ellis <i>Biology</i>	Analysis of <i>Ricinus communis</i> explosive dehiscence for ecological and managerial implications	Victor Carmona <i>Biology</i>
92	Mitchell Braun <i>Biology</i>	Comparisons of desiccated and hydrated leaf structure and histochemical staining patterns of Xerophyta elegans in relation to the restoration of xylem activity after desiccation	Philippa Drennan <i>Biology</i>
93	Ashley Brown <i>Biology</i>	Characterization of Seed Predation in Castor Bean (<i>Ricinus communis</i> L.) Plants in Southern California	Victor Carmona <i>Biology</i>
94	Zachary Calilung <i>Biology</i> Alex Napior <i>Biology</i>	Analyzing the role of <i>Rhizobium pilA1</i> and <i>pilA2</i> genes during root infection and nodulation	Nancy Fujishige <i>Biology</i>
95	Kevin Ray Calvelo <i>Biochemistry</i>	The Role of <i>flhC</i> genes in motility and exopolysaccharide production in <i>Burkholderia unamae</i>	Michelle Lum <i>Microbiology</i>
96	Marisol Castellanos <i>Electrical and Computer Engineering</i> Johanna Lugo <i>Biology</i>	Biogenic Volatile Organic Compounds as Communication Signals between Foraging <i>Linepithema humile</i> Ants	Victor Carmona <i>Biology</i>
97	Anjali Chakravarti <i>Biology</i> Nadine Del Rosario <i>Biology</i> Alejandra Garcia <i>Environmental Science</i> Anahi Leiva Partnoy <i>Biology</i> Lauren Sarni <i>Biology</i>	Assessing Multiple-Paternity in Broods of the Green Lynx Spider <i>Peucetia viridans</i> (Araneae, Oxyopidae)	Martina Ramirez <i>Biology</i>

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
98	Sarah Choe <i>Biology</i> Nydia De La Cruz <i>Biology</i>	Western Scrub Jay <i>Aphelocoma californica</i> Caching Behavior and Vertebrate and Plant Species Composition at Kennedy Meadows Field Station	Peter Auger <i>Biology</i>
99	Sarah Choe <i>Biology</i> Nydia De La Cruz <i>Biology</i> Catalina Ibarra <i>Biology</i>	Disparate Response By American Crows <i>Corvus brachyrhynchos</i> and Western Scrub Jays <i>Aphelocoma californica</i> to Avian Versus Terrestrial Predators	Peter Auger <i>Biology</i>
100	Jeremiah Dallmer <i>Biology</i> Helena Drolshagen <i>Biology</i> Chase Dugay <i>Biology</i> Emma Strand <i>Biology</i>	Lipid Peroxidation Recovery after an Acute Thermal Challenge in a Marine Intertidal Mussel (<i>Mytilus californianus</i>)	Wes Dowd <i>Biology</i> Lani Gleason <i>Biology</i>
101	Spencer Deale <i>Biology</i>	Antifungal properties of a rhizobacterial isolate against plant pathogens	Michelle Lum <i>Biology</i>
102	Mia DeLeon <i>Biology</i> Jacob Stuienvolt Allen <i>Environmental Science</i>	<i>Amblysius degenerans</i> and <i>Frankliniella occidentalis</i> on Castor Bean (<i>Ricinus communis</i>); Testing Predictions of the Janzen—Connell Hypothesis in Response to Mutualisms	Victor Carmona <i>Biology</i>
103	Tanya Diaz <i>Biology</i> Camila Garcia Paz <i>Biology</i> Nicholas Islas <i>Biology</i>	Genetic Variability and Fitness in the Green Lynx Spider <i>Peucetia viridans</i> (Araneae, Oxyopidae)	Martina Ramirez <i>Biology</i>
104	Hailey Dodson <i>Biology</i>	Identification of Quorum Sensing Mechanisms in <i>Burkholderia tuberum</i> mutants	Michelle Lum <i>Microbiology</i>
105	Randall Dominguez <i>Electrical Engineering</i> Terrance Melemai <i>Electrical Engineering</i>	Describing, Characterizing and Mitigating Strategies for Potentially Harmful Hummingbird/Micro-Drone Interactions	Peter Auger <i>Biology</i> Hossein Asghari <i>Electrical Engineering</i>
106	Erich Eberts <i>Biology</i>	Physiological levels of CO ₂ and O ₂ Used As A Physiological Energy Burn Rate Indicator For Neotropical Hummingbirds At The El Gullan Field Station Located in La Paz, Ecuador	Peter Auger <i>Biology</i>
107	Ann Eme <i>African American Studies</i>	Community Gardens and Environmental Justice in the Los Angeles Area: A Comparative Analysis	Michele Romolini <i>Biology</i>

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
108	Michael Erike <i>Finance</i> Johanna Lugo <i>Biology</i>	Quantification of Anthocyanins with UV Spectroscopy	Victor Carmona <i>Biology</i>
109	Sofia Esteves <i>Biochemistry</i> Nicholas Pilaud <i>Environmental Science</i>	DNA Sequencing shows consistently high numbers of mislabeled fish	Demian Willette <i>Biology</i>
110	Samantha Garcia <i>Biochemistry</i>	Novel Inhibitor of Pig Liver Esterase Activity	David Moffet <i>Biochemistry</i>
111	Alina Garcia Taormina <i>Chemistry</i>	Exploration of Metal-oxide Surface Structure and Stoichiometry in Oxygen Depleted Nanoparticles	Emily Jarvis <i>Chemistry</i>
112	Steven Gigli <i>Biochemistry</i> Sam Lardy <i>Chemistry</i> Nathan Pihl <i>Biochemistry</i> Oliver Valle <i>Biochemistry</i>	Synthesis and screening of novel polyphenol compounds targeted to inhibit IAPP amyloid aggregation	Jeremy McCallum <i>Chemistry</i> David Moffet <i>Chemistry</i>
113	Michael Gloudeman <i>Biology</i>	Design, Construction, and Experimentation Using Varying Phenotypic Decoys of Anna's and Allen's Hummingbirds Presented to Free-Ranging Conspecifics in the Presence of Mechanical Drones	Peter Auger <i>Biology</i>
114	Stephen Gloudeman <i>Biology</i>	Design, Construction, and Experimentation with Variable Phenotypes Using Scrub Jay (<i>Aphelocoma californica</i>) Decoys	Peter Auger <i>Biology</i>
115	Monica Hong <i>Biology</i> Kevin Wyllie <i>Biochemistry</i>	The Transcription Factors Swi4 and Hap4 Contribute to the Regulation of the Transcriptional Response to Cold Shock in <i>Saccharomyces cerevisiae</i>	Kam Dahlquist <i>Biology</i>
116	Alexandra Horvath <i>Biochemistry</i>	Oxidation of Water Catalyzed via Natural and Synthetic Organic Species	Jeremy McCallum <i>Chemistry</i>
117	Gabriel Huacuja <i>Biology</i> Kewku Larbie <i>Biology</i>	Quantitation of Anthocyanins in an Exotic Myrmecophyte via UV/VIS Spectroscopy	Victor Carmona <i>Biology</i>
118	Alex Isaev <i>Biology</i> Armaan Zare <i>Biology</i>	Modifications and Upgrades to a Novel Predator Aversion System Intended to Protect Nesting Endangered Least Terns 'Sternula antillarum' at Venice Beach, CA	Peter Auger <i>Biology</i>

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
119	Christopher Jaime <i>Biology</i> Timothy Yates <i>Biology</i>	Downregulation of CCoAOMT in Arabidopsis via the CRISPR/CAS Sequence Specific Endonuclease	Nancy Fujishige <i>Biology</i>
120	Katherine Grace Johnson <i>Biochemistry</i> Margaret O'Neil <i>Biology</i>	Evaluating Hap4's Role in the Gene Regulatory Network that Controls the Response to Cold Shock in Saccharomyces cerevisiae using GRNmap	Kam Dahlquist <i>Biology</i> Ben Fitzpatrick <i>Mathematics</i>
121	Brandy Kwak <i>Biology</i>	Investigating the Role of an LPS Transport Gene, lptE, in Nodulation by Burkholderia tuberum	Michelle Lum <i>Biology</i>
122	Karina Lawrence <i>Biology</i> Angela Rabe <i>Environmental Science</i>	Using Drones To Optimize Invasive Species Management Strategies	Victor Carmona <i>Biology</i>
123	Isai Lopez <i>Biology</i> Colin Wikholm <i>Biology</i>	Cerithideopsis californica in Ballona Wetlands exhibit a bimodal size distribution and size-associated differences in dispersion patterns	Victor Carmona <i>Biology</i>
124	Cole Madden <i>Graphic Design</i>	Unseen Ocean: What goes in the ocean, goes in you!	Garland Kirkpatrick <i>Graphic Arts</i> Terry Dobson <i>Graphic Design</i>
125	Melissa Morado <i>Biology</i>	American Crow Corvus brachyrhynchos Capture and Color Banding Techniques Used at an Endangered Least Tern Sternula antillarum Nesting Site at Venice Beach, CA	Peter Auger <i>Biology</i>
126	Amanda Muñoz <i>Biology</i> Joshua Ramsey <i>Biology</i>	Morphological Asymmetry as an Indicator of Stress in Rodents, a Comparative Study of Rodent Species in Southern California	Wendy Binder <i>Biology</i>
127	Kevin Nguyen <i>Biology</i>	Aim32p is a Novel Member of the Erv1 Translocation Pathway within the Mitochondrial Intermembrane Space of Saccharomyces cerevisiae	Deepa Dabir <i>Biology</i>
128	Kathryn Orban <i>Biology</i>	Investigation of a Mycobacteriophage Transcription Repressor	Carl Urbinati <i>Biology</i>
129	Veronica Pacheco <i>Biology</i>	The Effect of Temperature on Testes Function in House Finches (Haemorhous mexicanus)	Heather Watts <i>Biology</i>
130	Veronica Pacheco <i>Biology</i>	Individual Identification of Anna's Calypte anna and Allen's Selasphorus sasin Hummingbirds based on Phenotypic Variation Using Video Analysis at Feeding Stations	Peter Auger <i>Biology</i>

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
131	Mihir Samdarshi <i>Biology</i> Anindita Varshneya <i>Biology</i>	Test-driven development improves GRNsight: a web application for visualizing models of gene regulatory networks	Kam Dahlquist <i>Biology</i> John D. N. Dionisio <i>Computer Science</i>
132	Emily Simso <i>Biology</i>	Societal and Biological Interactions of the Culver City Rain Garden	Michele Romolini <i>Biology</i>
133	Kiran Singh <i>Biology</i>	A Study of Seasonal Changes in the Reproductive Output of the Green Lynx Spider <i>Peucetia viridans</i> (Araneae, Oxyopidae)	Martina Ramirez <i>Biology</i>
134	Colin Wikholm <i>Biology</i>	Survey of heavy metal concentrations in insects and western fence lizards of the Ballona Wetlands of Los Angeles, California	Victor Carmona <i>Biology</i>

Chemistry - Biochemistry

135	Alexander Arroyo <i>Biochemistry</i> Daniel Moghtader <i>Chemistry</i>	Porter Ranch Gas Leak Effect on Ozone and Hydrocarbon Concentrations in Los Angeles County	Lambert Doezeza <i>Chemistry & Biochemistry</i>
136	Nicole Baghdasaryan <i>Biochemistry</i> Christopher Coyle <i>Biology</i> Mali McGuire <i>Biochemistry</i> Vincent Ovalle <i>Chemistry</i>	Synthesis and evaluation of novel G-quadruplex-stabilizing molecules	Jeremy McCallum <i>Chemistry</i>
137	Megan Burke <i>Biology</i> Charles Hoying <i>Biology</i> Shannon Pilcher <i>Biology</i> Dillon Rinauro <i>Biochemistry</i>	Cu(II), Ni(II), and Sn(II) May Inhibit Islet Amyloid Polypeptide (IAPP) Aggregation	David Moffet <i>Biochemistry</i>
138	Samantha Garcia <i>Biochemistry</i>	Novel Inhibitor of Pig Liver Esterase Activity	David Moffet <i>Biochemistry</i>
139	Alina Garcia Taormina <i>Chemistry</i>	Exploration of Metal-oxide Surface Structure and Stoichiometry in Oxygen Depleted Nanoparticles	Emily Jarvis <i>Chemistry</i>

<i>Poster #</i>	<i>Student Presenter(s)</i>	<i>Title of Presentation</i>	<i>Faculty Mentor(s)</i>
140	Steven Gigli <i>Biochemistry</i> Sam Lardy <i>Chemistry</i> Nathan Pihl <i>Biochemistry</i> Oliver Valle <i>Biochemistry</i>	Synthesis and screening of novel polyphenol compounds targeted to inhibit IAPP amyloid aggregation	Jeremy McCallum <i>Chemistry</i> David Moffet <i>Chemistry</i>
141	Alexandra Horvath <i>Biochemistry</i>	Oxidation of Water Catalyzed via Natural and Synthetic Organic Species	Jeremy McCallum <i>Chemistry</i>
142	Lauren Thurlow <i>Biochemistry</i>	Synthesis of Guanine Quadruplex Macrocycles	Jeremy McCallum <i>Chemistry & Biochemistry</i>

A

The Adverse Effects of Gang Legislation & the Alternative of Restorative Justice

Anna Engstrom, Claire Kennedy

Recent legislation (e.g. the STEP Act) has introduced gang injunctions and gang enhancements to promote public safety and correct “at risk youth”. We challenge such legislation on several grounds. We argue that racial and class tensions have significantly contributed to the implantation of these gang laws. In addition, we find there are no clear proven benefits of injunctions and enhancements on crime reduction and recidivism, rather, these laws promote hostility and distrust between poor, urban, non-white communities and white elites as well as law enforcement. To reach these conclusions we collected data from legislative archives and engaged experts in several fields (e.g. *The New Jim Crow* by Michelle Alexander, *Redeeming a Prison Society* by Amy Levad, *Police, Power, and the Production of Racial Boundaries* by Anna Muniz. We also consulted the personal memoirs of those impacted by the STEP Act. In critiquing the STEP Act, we argue that a restorative justice approach is more beneficial to individuals and communities. Instead of immediately trying to assign blame, a restorative justice approach promotes repairing racial and class tensions by identifying who has been harmed, what needs are created, and who is accountable for addressing the needs of restoring relationships. Such an approach works to eliminate fear and skepticism of non-white urban communities by white elites and police. Most importantly, this approach would lessen the feeling of isolation and frustration of these communities, reducing the number of street gangs and empowering individuals and communities.

Aggregation Characterization of Wild-Type p53 and Six Common p53 Mutants

Taylor Arhar, Nathan Pihl

p53 is a tumor suppressor protein, which functions in maintaining the cell cycle. When p53 loses its function, cells may multiply at an uncontrolled rate and form tumors. This loss of function is linked to over fifty percent of human cancers. This investigation aims to explore the possible link between p53 aggregation and tumorigenesis. There is a possibility that p53, especially in mutant form, will aggregate beyond its normal tetrameric conformation and lose its function, leading to tumor formation. Wild-type p53 and six mutants, R175H, R175C, R248Q, R248W, R273C, and R273H (six of the most common mutations found in human cancers), were purified from *E. coli* using Ni-NTA agarose resin. Aggregation rates were monitored for the wild-type and each mutant by Thioflavin-T binding assays. Atomic force microscopy was used to visualize each of the p53 mutants pre-incubation and at time points that Thioflavin-T binding suggested the presence of aggregates. Utilizing this data, each mutant was characterized for its relative speed of aggregation; this suggests which mutants are more aggregation-prone. Combined with cell viability results, our data indicates that p53 aggregation of mutated variants is a contributing

factor to tumorigenesis. Those mutants with the greatest propensity to aggregate also appear to be those with the greatest ability to become immortal.

Aging Under the Radar

Kira Jatoft, Melissa Sandoval

This study examines social support experiences amongst midlife and older LGBT adults, a population that has been historically marginalized, but is receiving greater attention in scholarly research. The research questions guiding this study are: 1) Who provides midlife and older LGBT adults in this sample with social support? 2) How do the participants experience the social support, or lack thereof, that they receive? In this context, social support refers to emotional and instrumental (i.e., lending money, providing transportation) forms of support typically provided by close relationships and community members. The researchers examined data transcripts from (N= 59) face-to-face interviews that were collected as part of the Caring and Aging with Pride and Aging Under the Radar Studies conducted in the Greater Los Angeles area by their faculty mentor between 2011-2013. The researchers collaboratively and systematically coded the interview data by searching for themes that emerged from the data transcripts. Preliminary findings show that participants have limited social support and identified four specific areas of focus: isolation, life altering experiences, health both mental and physical, and long-term relationships. With respect to mental and physical health, many of the interviewees indicated that they have been diagnosed with depression, which affects their ability to interact with other people. Many have had life altering experiences that changed their perspective about social support. Additionally, the participants have varied degrees of isolation and heterogeneous family structures, which affects the social support they receive and give.

Aim32p is a Novel Member of the Erv1 Translocation Pathway within the Mitochondrial Intermembrane Space of *Saccharomyces cerevisiae*

Kevin Nguyen

The mitochondrion is a vital facilitator in eukaryotic metabolic homeostasis. Within yeast, most mitochondrial proteins are synthesized in the cytoplasm then imported into the organelle via protein translocation pathways. The Erv1 oxidative folding pathway, a disulfide relay system composed of Erv1 and Mia 40, is a versatile translocation pathway in the mitochondrial intermembrane space (IMS) that is involved in the reoxidation of Mia40 upon release of the client protein, the maturation of cytosolic iron-sulfur cluster-containing proteins and in the biogenesis of the TIM22 translocation pathway. We hypothesized that additional Erv1 partner proteins exist that function as electron acceptors and/or substrates. In this study, we characterize the biological functions of Aim32p, newly identified Erv1-binding protein and IMS resident, which coexists with Erv1 and Osm1 under native conditions. Osm1 is a fumarate reductase, postulated to function as an anaerobic electron acceptor of Erv1. Our structure predictions, based on sequence analysis and homology modeling, suggest that Aim32p is a putative thioredoxin-like

ferredoxin protein, indicating highly probable roles in redox sensing and electron transfer. Interestingly, deletion of the gene encoding Aim32p in yeast confers severe sensitivity to DNA damaging agents, methyl methanesulfonate and hydroxyurea. Thus, Aim32p may have a dual role in the mitochondrial IMS, participating in electron transfer reactions with Erv1 singularly or as a redox couple with Osm1, while functioning in DNA damage stress response. Importantly, this study connects the redox-regulated Erv1 translocation pathway to DNA damage stress response, and, consequently, its importance and versatility in several fundamental processes of the mitochondria.

Amblyseius degenerans AND Frankliniella occidentalis ON CASTOR BEAN (*Ricinus communis*); TESTING PREDICTIONS OF THE JANZEN—CONNELL HYPOTHESIS IN RESPONSE TO MUTUALISMS

Jacob Stuienvolt Allen, Mia DeLeon

The Janzen-Connell hypothesis maintains that the distance seedlings are dispersed from their host plant is crucial to fitness and maintenance of species recruitment in a tropical rain forest, giving insight to a possibility for high species diversity. This hypothesis predicts that seedling survival should increase directly with distance from the parent due to the inability of pathogens or parasites to concentrate their antagonistic energy in a spatially dense population. This hypothesis for ecosystem diversity is contingent upon the spatial effects of an antagonist, but does not account for spatial dependence in facultative mutualistic relationships. Plants may exert energy towards the attraction of natural predators of herbivory or parasitic organisms, facilitating an indirect defense and facultative mutualism. *Ricinus communis* (castor bean) is specifically a host plant for a mutualistic relationship with *Amblyseius degenerans*, a predatory mite that feeds on phloem feeding thrips, (*Frankliniella occidentalis*) which damage leaf tissue. The combination of accessible pollen and extra floral nectar glands from castor bean has shown to provide favorable conditions for the population of phytoseiid mites, which in turn serve as a facultative mutualist to castor bean from their predation on an antagonistic species. In light of the plant-predator mutualism between Castor bean and the studied species of phytoseiid mite, distance might account for variation in mite and thrip relationships within populations of castor bean. The relationship between *A. degenerans* and *F. occidentalis* has been established to be important in well established castor bean individuals, benefitting recruits who are close enough share in a common mutualist but far enough to diminish the effect of an antagonist. In response, amendments to the Janzen-Connell hypothesis have been proposed that include the spatial relevance of mutualistic species.

Amongst Coarse and Bad Men: Medieval Theodicy and Alberic of Trois-Fontaines' Account of the Children's Crusade

Emmett Schlenz

Alberic of Trois-Fontaines' 13th century account of the Children's Crusade of 1212— the swell of religious enthusiasm that saw one group of French youths visit the king, and another group of German children march toward Jerusalem — has often been derided as more romanticized legend than factual history, and ignored accordingly. My research question, then, was to what extent could such a problematic source be valuable to historians? In answering this I leaned into Gary Dickson's analysis of Alberic as a mythistorian, which examines not only the facts of his account of 1212 (limited as they may be) but also his fabrications and mythologizing. How Alberic wrote his account of the Children's Crusade, in other words, can reveal just as much — if not more, given his inaccuracies — than what he wrote. I also read Alberic in light of the broader Crusading context — specifically the series of disasters leading up to 1212 — which revealed that his value resides in how he participates in this broader context, namely with regards to theodicy, the historiographic effort to explain why various crusades failed even though “God willed them.” Alberic's romanticized, mythologized account, therefore, represents a theodicial counterargument to the challenges posed by the Children's Crusade to the standing theodicy surrounding that series of disasters. Alberic's history manages to maintain the rhetorical viability of that theodicy while simultaneously asserting the symbolic potency of child crusaders marching off to die for Christ, giving him a more clearly delineated role in the historiography of the Crusades.

Analysis of *Ricinus communis* explosive dehiscence for ecological and managerial implications

Brendan Angelo, Lauren Ellis

Plant physiology and adaptation changes drastically from species to species. Specifically, *Ricinus communis* has adapted the ability to disperse seeds through biophysical forces, relying on explosive dehiscent seed dispersal to propel them to areas that growth could occur or ants could retrieve. In this study, we aim to measure the effectiveness of this method of dispersal, primarily by studying the heights of *R. communis*, to see if there is a critical height. This height would describe the point at which the seeds are dispersing optimally, and if grew above ceases to be effective in dispersion by dehiscent means. It was found that such a height does exist in local Los Angeles County population, at about 3 meters tall. Using previous population data of other local populations, it can be seen that 1.6-3.8% of the plants are dispersing optimally. This finding has a direct connection with the Janzen-Connell hypothesis, in that seeds that are being dispersed optimally are showing the highest probability of survivorship, which leads to the rapid spread of these species in habitable areas. These results can also be used to help aid landscaping institutions manage these plants as well as managerial positions in the removal of these plants, as the plants that should be focused on for removal are those which are optimally dispersing and

producing the most amount of seeds. With these findings, it can be said that growth is an important factor, especially for plant species like *R. communis*, but knowing that there is a limit to their effectiveness, as well as where they are most successful, places inherent advantages to those looking to prevent the spread and invasion of this non-native species of plant.

Analysis of Turbine Blade Film Cooling Using Computational Fluid Dynamics (CFD)

Matthew Goodman, Victor Heinen, Joshua Solberg

Understanding flow conditions inside high temperature turbines is vital in order to design them to last longer and operate at higher efficiencies. One promising design approach to this end is the introduction of film cooling holes in turbine blades, which allow for cool air to act as a barrier between the hot fluid and the blade. This project uses computational analysis to revisit and build upon previous research done on film cooling holes conducted using experimental methods, as current experimental measuring methods are still limited in terms of resolution and the variables able to be determined. SolidWorks, a 3D modeling software, used in conjunction with ANSYS Fluent, a Computational Fluid Dynamics (CFD) software, were used to simulate the flow conditions in an oval-shaped film cooling hole. Once the flow conditions from this specific case modeled computationally matched up with the experimental results, other variables, such as temperature distribution and heat transfer coefficient, were estimated from the computational model. With the computational method verified, further work can be conducted to analyze and compare film cooling holes of varying shape and size to find the optimum dimensions for a given flow condition.

Analyzing the role of *Rhizobium pilA1* and *pilA2* genes during root infection and nodulation

Zachary Calilung, Alex Napior

Nitrogen is a vital nutrient for plant growth. Although it is abundant in the atmosphere, nitrogen gas cannot be used directly by plants as a nutrient. Biologically usable forms of nitrogen, such as ammonia and nitrate are easily leached from the soil, making it difficult for some plants to obtain the nitrogen they need. Legumes like white sweet clover, (*Melilotus alba*) through their unique symbiotic relationship with rhizobacteria (*Sinorhizobium meliloti*) can more easily obtain nitrogen and even enrich surrounding soil due to the bacteria's ability to fix nitrogen (convert nitrogen gas to ammonia). The symbiosis between these two species involves the rhizobacteria attaching to root hairs, root hairs changing shape to trap the bacteria, formation of an infection thread that allows the bacteria to enter into the root, and formation of a nodule where the rhizobacteria can fix nitrogen into a form usable for the legume. Two genes of *S. meliloti*, *pilA1* and *pilA2*, that code for the important structural component of Type IV pili, pilin, appear to be part of the pathway for nodule formation. The project seeks to understand the developmental relationship of *pilA1* and *pilA2* genes in attachment to the host plant roots, infection thread

formation, and nodule formation. This study shows that mutation of pilA1 and pilA2 genes leads to reduced rhizobial attachment and delayed nodule development. To assess when these genes are active, *S. meliloti* carrying pilA1 or pilA2-transcriptional fusions to reporter genes were followed over the course of the infection process.

Antifungal properties of a rhizobacterial isolate against plant pathogens

Spencer Deale

We have a bacterial isolate from plant roots initially identified to be *Bacillus thuringiensis*. *Bacillus thuringiensis* is a known plant growth promoting rhizobacterium (PGPR) that is commonly studied for its production of insecticidal crystal proteins. It also produces chitinase, which is an enzyme that catabolizes the chitin skeleton of fungi. We hypothesize that our isolate will aid in plant defense against fungal pathogens by secreting chitinase. This study evaluates the ability of our isolate to inhibit fungal pathogens of radish seedlings. The identity of the isolate is being confirmed by 16S ribosomal DNA sequencing, and a combination of fungal inhibition tests, chitinase production assays, and plant inoculation experiments are being used to study its antifungal properties. Preliminary analysis shows that our isolate inhibits the growth of both *Rhizopus stolonifer* and *Fusarium oxysporum*. The research being conducted provides a model by which to target specific plant fungal pathogens using a known PGPR.

Aristotelian Non-Contradiction and Quantum Superposition

Julian Alsarhn

As the founding experiment of quantum mechanics, the double-slit experiment is the exhibition of wave-particle duality, or the simultaneous superposition of wave-qualities and particle-qualities as light passes through a space. It reveals seemingly contradictory data, as light exhibits characteristics of a wave and a particle at the same moment. Moreover, if an observer is introduced to the experiment, the results are altered simply because someone is watching; just by observing, the individual collapses the superposition, and the contradiction ceases to exist. This study will explore the philosophical ramifications of a seemingly contradictory data set on Aristotle's Principle of Non-Contradiction.

Aristotle's *Metaphysics* describes the Principle of Non-Contradiction (PNC) as the firmest first principle of reality and logic. The PNC is as follows: "It is impossible for the same thing to belong and not to belong at the same time to the same thing and in the same respect". He argues that if the principle is rejected, reality could not be knowable, nor could it physically exist. Does the experiment undermine Aristotle's first principle of reality and logic?

The study reconciles the conflict by stressing the dichotomy between the observed-reality, and the non-observed reality. When an observer is introduced, the contradiction disappears. Through close textual analysis of Aristotle's *Metaphysics*, his argument for the PNC remains sound in the

observed-reality. However, the experiment reveals an unobserved reality where the principle breaks down. This reality incurs the implications of the rejection of the PNC: it is not knowable, nor does it physically exist.

Assessing Multiple-Paternity in Broods of the Green Lynx Spider *Peucetia viridans* (Araneae, Oxyopidae)

Anjali Chakravarti, Nadine Del Rosario, Alejandra Garcia, Anahi Leiva Partnoy, Lauren Sarni

In prior studies, Ramirez et al. (2009, 2010) showed that mating copulatory plugs are not consistently produced after mating, which leads in some cases to multiple paternity in *P. viridans* broods. To better estimate the potential for multiple paternity in *P. viridans*, we are now genetically assessing whether the progeny data best fit with a single male as the father or not, based on the analysis of 18 females and their brood spiderlings and using genotypes at two variable allozyme loci [lactate dehydrogenase (LDH), phosphoglucose isomerase (PGI)]. We have examined 12 broods thus far and 3 have either shown three paternal alleles or a significant deviation from a Mendelian genotype ratio for either LDH and/or PGI, given the adult female involved and her presumed male partner under a hypothesis of single mating. The low frequency of multiple paternity (2 of 12 broods) reported for this species by Ramirez et al. (2009), and by our current results (3 of 12 broods), may be due to limited opportunities to encounter multiple male partners. Specifically, Arango et al. (2000) found that the female/male sex ratio shifted from 1:1.5 in April to 1:0.1 in September at a site in Mexico. Hence, females reaching adulthood later in the year may have had access to fewer males at her Mexican study site. If a similar seasonal sex ratio shift occurs in southern California, this may be partly responsible for the low frequency of multiple mating found by Ramirez et al. (2009) and in our current study.

Assessing Residential Water Supply Demand Changes for the City of Long Beach under Climate Change Scenarios

Chengyu Gao, Brianna Pagan

Due to California's periodic droughts, a detailed analysis of current and future water demand while incorporating potential climate change impacts is needed to properly address water supply security. This study provides such an analysis focusing on current and projected residential irrigation water demand in the city of Long Beach as part of the City's Climate Resiliency Study, commissioned by the Mayor of Long Beach Robert Garcia and organized by the Aquarium of the Pacific. High-resolution output from a 10-member ensemble climate change simulations is analyzed to assess local hydrological impacts, specifically evaporation and precipitation. Greenhouse gas concentrations are prescribed according to the Intergovernmental Panel on Climate Change's (IPCC's) Representative Concentration Pathway 8.5 (RCP8.5) using the present-day period of 1966-2005 and future period of 2011-2050. The Blaney Criddle method is used to calculate evapotranspiration (ET) while historical ET data from the Department of Water Resources California Irrigation Management Information System (CIMIS) is used to calibrate

the model outputs. Residential irrigation demand is broken down into three customer classes: singlefamily, multi-family and duplexes. Utilizing the Geographic Information System (GIS) and historical CIMIS information, an average landscape size and water demand is determined for each residential class assuming all landscape is turf grass. With rising temperatures, total irrigation demands are expected to increase. However, as residents participate in turf removal programs, demand is curtailed. Rooftop areas are calculated for each customer class to quantify potential storm water capture which is another possibility for offsetting rising demand in Long Beach.

Augustine on Teachers and Teaching: Reflections for the Intercultural Classroom

Mariajose Gomez

Throughout his writings, the renowned Latin theologian Augustine of Hippo (354-430), frequently returned to complex issues related to the practice of teaching and the role of the teacher. This research project has interrelated objectives. I analyze Augustine's philosophy of teaching and his critiques of the teacher within select writings (i.e., *The Confessions*, *The Teacher*, *Instructing Beginners in Faith*, *On Christian Teaching* and *The Trinity*) in order to provide an interpretation that connects Augustine's writings on teaching and teachers to the intercultural classroom by suggesting points of contact, thereby employing a comparative and integrative approach. In particular, this reassessment argues that Augustine's emphasis on the intrinsic nature of learning, the importance of the teacher as model, and the centrality of teaching and seeking truth centered around God as the Teacher, continue as valuable pedagogical objectives to be implemented within the contemporary classroom. I will demonstrate that Augustine informs our modern approach to teaching, specifically within the Jesuit tradition, by connecting his writings with practical and theoretical issues in the field of contemporary education. In closing, I will argue that Augustine's philosophy of teaching and the role of the teacher may be reappropriated within modern pedagogical frameworks towards developing a curriculum that encourages and values interactive learning in the multicultural classroom.

B

Biogenic Volatile Organic Compounds as Communication Signals between Foraging *Linepithema humile* Ants

Marisol Castellanos, Johanna Lugo

Foraging *Linepithema humile* ants are known to have a mutually beneficial relationship with honeydew-producing homopterans. *L. humile* ants collect honeydew secreted by homopterans and use it as a carbohydrate food source, in return, the ants provide protection from natural predators and cease growth of fungal pathogens. It has been studied that communication occurs between *L. humile* ants as they head up and down the trees or stems to collect and deliver honeydew. Although there are few studies focusing on chemical communication between ants,

Pogonomyrmex have shown to use a biogenic volatile organic compound (BVOC), 4-Methyl-3-heptanone, as an alarm pheromone. The objective of this study is to evaluate differences in BVOC and sugar composition between *L. humile* ants heading up and down the Sycamore trees in Southern California. It was hypothesized that *L. humile* ants heading down the trees will obtain a different BVOC and sugar composition than the ants heading up the trees. There were a total of 32 retentive sugar species found; 17 sugars that were unique to the ants heading down the trees and 15 sugars that were unique to the ants heading up the trees. Sugar evenness of *L. humile* ants heading up and down the trees varied significantly ($p < 0.05$). There were a total of 14 BVOCs secreted by the ants heading down the trees and 6 BVOCs secreted by ants heading up the trees. 8 BVOCs were unique to the ants heading down the trees. There was a positive correlation between retentive sugar species evenness and BVOC richness ($r = 0.73$, $p < 0.05$), and a negative correlation between retentive sugar species evenness and BVOC diversity ($r = -0.73$, $p < 0.05$) and retentive sugar species evenness and BVOC evenness ($r = -0.73$, $p < 0.05$). This study demonstrates that there is a relationship between the foraging behavior and BVOCs secreted by the *L. humile* ants.

Bone Mineral Density Trends in a Cohort of Cancer Survivors

Sydney Maltz

Cancer treatment can have systemic effects that negatively influence bone mineral density (BMD). Our analysis seeks to determine which factors are the best predictors of poor bone health among cancer survivors. The World Health Organization (WHO) defines osteoporosis as bone density that is 2.5 standard deviations below the mean bone density for normal young women and osteopenia as 1.0-2.5 standard deviations below the norm. The factors being examined are treatment type, race, years since treatment, and body mass index (BMI, kg/m²). Questionnaires of demographic data were administered to collect data on race, treatment type, and years since treatment. Height and weight were measured and used to calculate BMI. Dual-energy x-ray absorptiometry was used to measure BMD and assess bone health according to WHO definitions. Analysis of treatment types show that those who had radiation and surgery had a greater prevalence of osteopenia at the spine, femoral neck, total hip, and whole body than those who only received chemotherapy, radiation, or surgery, or those who received a combination of those treatments. The prevalence of low BMD among those who had radiation and surgery was 57.1-85.7% at various bone sites. Using BMI categories, 21 of 49 participants were obese. Prevalence of osteopenia ranged from 19.0-52.4% at different bone sites. This suggests that BMI may be less of a protective factor in cancer survivors and that the treatment type may negatively impact BMD. Aerobic and resistance training could address obesity and low BMD in this population.

C

"A Castilian, a Christian, and a Loyalist": The Construction of Distinctly Spanish Feudal Systems in "The Poem of the Cid"

Catherine Perl

In this paper I examine "The Poem of the Cid," an early-thirteenth-century epic. The "Poem" tells the story of Rodrigo Diaz, to whom the narrator refers as "my Cid," meaning "my lord." Rodrigo was a Castilian noble in the second half of the eleventh century whom the king exiled and then restored. During his exile, Rodrigo remained unfailingly loyal to the king and Rodrigo's vassals remained loyal to Rodrigo. I argue that the systems of relationships among individuals and groups in the "Poem" illustrate intersections in early-thirteenth-century Spanish political and cultural dynamics concerning feudal structures and political rivalries and conflicts. The Cid's personal qualities and the poem's narrative content construct a paradigm of Spanish Christian feudalism in which the relationships of lords to kings and vassals to lords synthesized Frankish and Andalusian feudal patterns and initially mirrored the tributary relationships of Muslim kingdoms to Christian kings. The invasion of the Almoravids, an Islamic North African military force, changed this system and invited a new Spanish Christian feudal system that was concerned more with reconquest than with the maintenance of tributary relationships. This paper is not limited in primary sources to "The Poem of the Cid." I refer also to the "Historia Roderici," a Latin account of Rodrigo's deeds written by a contemporary of Rodrigo, which was likely a source for the thirteenth-century poem, as well as to "La Chanson de Roland," a story of Frankish conflict with invading Muslims.

***Cerithideopsis californica* in Ballona Wetlands exhibit a bimodal size distribution and size-associated differences in dispersion patterns**

Isai Lopez, Colin Wikholm

The California Horn Snail (*Cerithideopsis californica*) is an important primary intermediate host in the life cycle of a variety of parasitic species that have extensive effects on ecological food webs. Parasite load in the California Horn Snail can serve as an important tool to assess the effectiveness of restoration projects. The goal of the study was to investigate the population dynamics of the California Horn Snail in Ballona Wetlands, California, an ecological reserve that is scheduled for restoration within the next few years. The experiments focused on the spatial dispersion, size distribution, and density of *C. californica* collected from the Ballona Wetlands Ecological Preserve. The results showed that the population of *C. californica* in the preserve exhibited a bimodal distribution of size, with the large and small cohorts exhibiting significantly different dispersion patterns. The study suggests that both bimodal size distribution and size-associated behavior of *C. californica* may be important for understanding this ecologically influential snail.

Changes in Metabolic Syndrome Among Cancer Survivors in the 2015-2016 IMPAACT Study

Rakiyah Johnson, Isabela Kuroyama

Metabolic syndrome is related to the onset of type 2 diabetes mellitus and cardiovascular disease. Cancer survivors are at higher risk of developing metabolic syndrome due to the side effects of cancer treatments. Our goal was to assess the effects of combined aerobic and resistance training (CART) on improving the cardio-metabolic health of cancer survivors, in comparison to an art therapy intervention. Fifty-four cancer survivors enrolled in the study. The average age of participants is 65 years (SD 7.14) with gynecologic cancers as the most prevalent cancer type. Sixty-three percent (n=34) of enrolled participants reported 2 or more comorbidities at baseline. Anemia (31%) and osteoporosis/osteopenia (37%) were reported most frequently. Of the 54 enrolled participants, 32 completed 15 weeks of CART prescribed for 1 hour a day, 3 days a week. Four of the 54 participants attended art therapy sessions once a month for the same 15-week period. Cardio-metabolic risk factors were assessed from volunteered blood samples and anthropometric measurement to determine change in waist circumference, triglycerides, high-density lipoproteins, fasting blood glucose, and blood pressure. Metabolic syndrome was prevalent in 38% of all participants at baseline. Metabolic syndrome prevalence decreased to 28% at midpoint for the exercising group (n=32), and remained unchanged (50%) for the art therapy group (n=4). We observed that 15 weeks of CART was related to a decreased prevalence of metabolic syndrome among cancer survivors. Physicians should explore the feasibility of prescribing CART as a non-pharmaceutical approach of promoting metabolic health and wellness after cancer treatment.

Characterization of Retinal Thickness Measurements and their Relationship to Visual Acuity in Progressing Cases of Nonneovascular Macular Degeneration

Brandon Klein

Nonneovascular macular degeneration has been linked to thinning of the retinal tissue layers bound between the internal limiting membrane and retinal pigment epithelium (ILM-RPE). Development of optical coherence tomography (OCT) technologies has introduced a rapid, non-invasive method of measuring the ILM-RPE thickness in a clinical environment. The purpose of this study was to analyze new clinical data including OCT measurements and standard exam data to investigate the relationship between retinal characteristics and visual acuity in 46 dry macular degeneration patients, ranging in age from 47 to 94 years. Strong positive correlations were noted between visual acuity and quantitative, qualitative, and longitudinal OCT measurements. In particular, a multiple linear regression model using only OCT outputs as explanatory variables could predict the patients' visual acuity. This model is applicable to the future management of patients with nonneovascular macular degeneration.

Characterization of Seed Predation in Castor Bean (*Ricinus communis* L.) Plants in Southern California

Ashley Brown

The U.S. spends an average of 34 billion dollars a year on damage and efforts to control invasive species. *Ricinus communis* is an invasive species to Southern California and uses both autochory and myrmecochory in the dispersal of its seed. *Ricinus communis* seeds possess an elaiosome, a lipid rich incentive to ants to disperse seeds. However, recent field observations have suggested that a mutualism antagonist may be thieving the elaiosome before secondary dispersal, thereby disrupting the ant plant mutualism. An unknown Microlepidoptera species was observed inside the *R. communis* seedpods, and was successfully raised to the adult form on elaiosome. After successful larval rearing, the unknown Lepidoptera was partially identified to be in the Gelechiidae family, which includes species that are agricultural pests as well as potent bio control agents. If the unknown Microlepidopteran is an agricultural pest, *R. communis* may be acting as a refuge. However, if the unknown species is capable of acting as a bio control, it may help control the populations of *R. communis*, which are an aggressive invasive species.

The Chronicle of William of Puylaurens and the Historiography of the Albigensian Crusade

Dean Messinger

In this paper, I explore the historiographical debates surrounding the Albigensian Crusade of the 13th century, when French and Papal forces invaded Languedoc to stamp out the Cathar Heresy. Specifically, I analyze the questions of what constitutes a crusade and of pre-modern nationhood. I argue that there was in fact a distinct sense of community and culture found in the Languedoc that are the groundworks for a distinct nation, and the invasion was a politically motivated international dynastic war and not a crusade. The Chronicle of William Puylaurens, a chronicle of the crusade written by a native of the Languedoc, serves as my central primary source, along with various other sources and documents from the time. The works of historians like Elizabeth Hallam and Lawrence Marvin provided historical context and offered thorough analyses to draw from. Using these sources, I concluded that the medieval Languedoc had many characteristics of a nation, like a vernacular and widely used language, Occitan, relatively high literacy compared to the rest of Europe, and distinct social and economic structures. Furthermore, the highly politicized nature of the invasion and the revocation of Papal indulgences in 1212 demystifies the Albigensian Crusade to yet another medieval dynastic war.

Community Gardens and Environmental Justice in the Los Angeles Area: A Comparative Analysis

Ann Eme

In the realm of environmental studies, researchers in urban ecology have been able to find that urban vegetation and green space produce beneficial outcomes. Community gardens specifically have also been known to promote healthy relationships within local communities, promote mental wellness, and promote youth empowerment through civic action. By engaging members in their environment in both a holistic and remediating way, community gardening can be a form of environmental justice in urban communities, and particularly in communities of color, which have been known to receive unequal environmental benefits and protection. This research thus intends to comparatively analyze community gardens in cities within the Los Angeles County, of differing socioeconomic demographics, in an attempt to determine how they operate and incorporate environmental justice frameworks to their organizations. Methods will include identifying appropriate gardens for comparison, site visitations and general observations, background historical data on the cities where the gardens are located, and qualitative comparative case study research. Community garden organizational leaders will be interviewed and observed on how they incorporate equity, access, and preventative measures within their programs. Through this study, we intend to better understand whether these community garden organizations correspond with the environmental justice research framework. This presentation will provide in more detail the environmental justice framework, the proposed methods, and preliminary background on the selected sites.

Comparisons of desiccated and hydrated leaf structure and histochemical staining patterns of *Xerophyta elegans* in relation to the restoration of xylem activity after desiccation

Mitchell Braun

Desiccation tolerance is the ability to survive through periods of extreme cellular water loss. Most seeds commonly exhibit a degree of desiccation tolerance while vegetative bodies of plants rarely show this characteristic. Desiccation tolerant vascular plants, in particular, are a rarity. While the science behind the process of desiccating has been widely researched, the process of recovering from this state of stress, especially in restoring xylem activity after cavitation, or air bubble formation within the water conducting xylem cells, is still relatively unknown. Water can enter a plant mainly through the roots and leaves. Even though root pressure can be significant, it may not provide enough water to completely restore xylem activity. To explore the influence of leaf water absorption on xylem restoration, the desiccation tolerant plant *Xerophyta elegans* was put through a desiccation cycle, and desiccated leaf hydrophobicity, surface structure, and morphology were compared to those of hydrated leaves. The change in the length and width of selected leaves were measured throughout the desiccation process to determine the impact that this change may have had on leaf venation and the absorption of water through the leaf surface; electron microscopy allowed for the examination of stomatal density and the presence of

additional structures and morphology relating to water absorption; and cross sections and histochemical dyes were examined to characterize internal biochemical and anatomical changes. Differences were noted between both states along multiple parameters, indicating the leaf's water absorption functionality.

The Concentration of Female Elected Officials Throughout Los Angeles County

Priscilla Torres

Existing literature states that women in cities with ideologically liberal political makeups will be most likely to have female elected officials. The existence of cohesive women's political organizations will also increase the likelihood of a female mayor or female members of a city council being elected. This study builds upon previous research regarding gender disparities in Los Angeles City Council. Are there census tracts within LA where women are more likely to hold elected office? With more than 50 elected officials with different jurisdictions representing LA, the city is a viable locale for a geographic comparison of the number of female elected office holders. Using geographic information systems (GIS), data were mapped throughout LA for the number of current sitting female elected officials by geographic jurisdiction. The levels of analysis included municipal, state, and national government for the positions of city council, county board of supervisors, school board, state assembly, state senate, and Congress. Relevant literature was compared with the map showing overlap where multiple women are elected. Socioeconomic and demographic data of residents for the Census Bureau's American Community Survey were also used in this analysis. Exploring the demographics of census tracts where multiple women hold elected office will contribute to scholarship and provide a historical record for future female candidates in Los Angeles.

Così fan tutte: Feminist and Vocal Challenges

Evelyn Fajardo

The aria of focus in this study is Despina's "In uomini, in soldati" from Wolfgang Amadeus Mozart's opera *Così fan tutte* (1790), commonly translated as "Women are like that." The process of mastering an operatic aria is both exciting and deeply challenging. A singer must learn about the historical context and character of the piece as well as overcome a multitude of technical vocal hurdles before being able to deliver a well-informed, successful performance. Though Austrian-born Mozart wrote for an 18th century Viennese audience, Italian opera buffa was highly popular throughout Europe at the time, inspiring Mozart to compose this work on a libretto by Lorenzo Da Ponte. Modern audiences are often bothered by the apparent misogyny of Da Ponte's plot, which exploits the idea that all women are fickle by nature. I explore this supposed misogyny through an examination of the opera's historical context and a character study of Despina. I also detail the challenges that all singers face when studying a piece in a foreign language: learning the word by word meaning of the text as well as finding ways to

communicate the meaning and clearly articulate the language, all while delivering a consistent operatic sound. This presentation takes into account the relevant historical aspects of Mozart's *Così fan tutte* while presenting an in-depth look at the specific technical challenges posed by the Act I aria "In uomini, in soldati."

D

Dance and Well-being in Older Adult Communities: Exploring Efficacy as a Mediator

Beth McGowan

As the population of older adults expands, it becomes increasingly important to develop effective interventions to ensure high levels of well-being. Previous research in a variety of populations has shown that dance produces broad benefits including improving physical mobility, social relationships, autonomy, and self-image. Given this, I was interested in examining whether dance has similar benefits for older adults. Furthermore, my research attempted to clarify the mechanisms through which dance might lead to these improvements. Specifically, my research examined the roles that social connectedness and self-efficacy, or beliefs that one can accomplish certain tasks, have in explaining the psychological benefits of dance. I hypothesize that when dance is a social activity it instills a sense of connectedness which in turn benefits well-being. I also hypothesize that because dance improves a sense of control, it positively affects self-efficacy which in turn improves well-being. In order to test these hypotheses, I collaborated with nearby centers for older adults and utilized a pretest-posttest design to examine changes in well-being following a one-hour dance class. Participants completed existing measures of general efficacy, physical efficacy, loneliness and well-being. A week later, they participated in an hour-long, seated dance class based in a curriculum titled "Dance for Veterans" and then completed the same measures as at pretest. I am in the midst of teaching dance and collecting data, and results are forthcoming. Should the results support my hypothesis, modified dance programs could be incorporated in senior-living centers to build individuals' connectedness, efficacy, and well-being.

Describing, Characterizing and Mitigating Strategies for Potentially Harmful Hummingbird/Micro-Drone Interactions

Randall Dominguez, Terrance Melemai

Anecdotal observations of hummingbirds and micro-drones indicate potentially harmful interactions. The audio-visual characteristics of micro-drones are analyzed in this study and compared to sounds vocalized or generated during aggressive hummingbird interactions. MATLAB was used to generate spectrograms that identified acoustic frequency ranges corresponding to aggression between hummingbirds. These analyses indicate that micro-drones generate sound almost entirely within the hummingbird's natural frequency band of aggression. Presented mitigation recommendations intend to reduce potentially harmful hummingbird/micro-

drone interactions. Study findings are likely to have even greater significance in areas where hummingbirds are more diverse or abundant, as in Central and South America.

Disparate Response By American Crows *Corvus brachyrhynchos* and Western Scrub Jays *Aphelocoma californica* to Avian Versus Terrestrial Predators

Sarah Choe, Nydia De La Cruz, Catalina Ibarra

Mobbing behavior is displayed by numerous species within the avian family Corvidae. American crows *Corvus brachyrhynchos* and Western Scrub-Jays *Aphelocoma californica* may display distinct mobbing characteristics that vary in frequency and intensity based on the associated predatory risk. This study investigates differences in mobbing behavior displayed by these two corvid species located in Los Angeles, California. We presented an avian predator, the Red-Tailed Hawk *Buteo jamaicensis*, in two forms, in flight and on the ground. Elicited corvid vocalizations and reactions were recorded using video/audio recordings that were then analyzed and compared based on predator context. Data indicating potential differences in alarm call information content are also discussed.

Disruption of Bacterial Biofilm Formation Using Laser-Generated Shockwaves in Combination with Low Concentrations of Gentamicin

Marisol Castellanos

Chronically infected wounds contain strains of colonizing bacteria that can lead to biofilm formation. Bacterial biofilm forms a polysaccharide barrier that protects infectious bacteria against antibiotic treatment and the body's natural immune response, preventing infected wounds from properly healing. To combat against persistent bacterial biofilm colonization, current treatment consists of increasing the concentration of topical antibiotics, such as Gentamicin, which can be toxic and harmful to the patient, or performing painful mechanical debridement procedures. As an alternative and long term therapeutic solution, this study used laser-generated shockwaves in combination with low concentrations of Gentamicin to disrupt bacterial biofilm formation in vitro. To attain bacterial biofilm formation, *Staphylococcus epidermidis* was cultured in vitro using standard clinical techniques. Three different treatment groups were studied to understand their efficacy in disrupting bacterial biofilm. The bacterial biofilm was subjected to the treatment of: Gentamicin, laser-generated shockwaves, and laser-generated shockwaves in combination with low concentrations of Gentamicin. I used the Miles and Misra method and Spectroscopy to quantify bacterial colonies and bacterial biofilm formation before and after the treatments. Results demonstrated that the distribution of observed bacterial biofilm concentration differed significantly from the expected control concentrations ($p < 0.05$). Furthermore, the differences in means among the detection rate with serial dilutions of bacterial colonies differed significantly with treatment ($p < 0.05$). This study demonstrates the ability to reduce bacterial biofilm formation in vitro, which serves as an

important step towards an alternative long term therapeutic solution for treating bacterial biofilm formation within chronically infected wounds.

Distribution of Ultra-Low Frequency Wave Power in the Magnetosphere during Geomagnetic Storms

Nicolas Breceda

Since their discovery in the mid-nineteenth century, ultralow frequency (ULF) waves have been the subject of numerous investigations whose results have provided a significant contribution to our understanding of space weather. In particular, ULF waves have been found to be associated with geomagnetic storms, as the level of ULF activity during the recovery phase of a geomagnetic storm appears to determine whether the storm is accompanied by an occurrence of relativistic electron flux during that period. In this study, we investigated ULF wave activity in the dayside magnetosphere during geomagnetic storms based on magnetic field data from the THEMIS mission (satellites THEMIS-A, THEMIS-D, and THEMIS-E). During the period under consideration, 2010-2015, we identified 15 geomagnetic storms for which the satellites were located in the dayside magnetosphere. Using magnetic field data from each satellite, we calculated the average ULF wave power before, during, and after each storm. We then determined the change in wave power for each storm both as a function of local time and as a function of distance from the Earth. We found that the increase in wave power is generally greater in the afternoon sector. In addition, we observed that the effects of geomagnetic storms on ultra-low frequency wave power penetrated more deeply into the magnetosphere in the afternoon sector than in the morning sector. These results have implications for modeling the acceleration of energetic electrons to relativistic speeds during the recovery phase of geomagnetic storms.

DNA Sequencing shows consistently high numbers of mislabeled fish

Sofia Esteves, Nicolas Pilaud

Seafood mislabeling is a common problem in both the domestic and international fish market trade. Action by government and trade regulatory agencies is aimed at curbing fraud; however, data on how seafood mislabeling rates change year-to-year are lacking. Previous studies have revealed mislabeling rates of fish from commercial markets and restaurants from 16% to 55%, yet these data are limited to a single sampling year, making it difficult to assess trends.

This study explores the prevalence of fish mislabeling in Los Angeles sushi restaurants over a four-year period. Here DNA sequencing is used to identify sampled fish to species level, which has been shown to be far more reliable than subjective morphological analysis. Results show consistently high percentages (~30%) of mislabeling in multiple sushi restaurants from 2011 to 2014 in Los Angeles. Mislabeling was not, however, homogenous across species. Menu-listed halibut and red snapper had a consistently high incidence rate of fraud across sampling years,

whereas other fish such as salmon were far less likely to be mislabeled. Interestingly, mislabeling frequency did not appear to correspond with sushi menu price. This study not only identifies high levels of seafood mislabeling in Los Angeles' sushi restaurants, but also shows that these rates have remain relatively constant year-to-year despite increased regulatory and media attention to the problem.

Do Prejudicial Attitudes Moderate the Relationship Between Age and the Willingness to Seek Psychological Help?

Cheyenne Weinstein

Studies indicate that older adults underutilize, have less positive attitudes toward, and are less willing to seek psychological help (e.g., Pino, 2013). One factor that may relate to usage of mental health services is prejudice against individuals with mental disorders (PAIMD; Jorm & Oh, 2009). The current research investigates how age and PAIMD may relate to the willingness to seek professional psychological help (WPH). The project extends a 2015 Summer Undergraduate Research Program project, which showed significant results between PAIMD and WPH ($r = -.33, p < .01$), and will investigate additional variables. Namely, explicit prejudice (prejudice at conscious awareness) and implicit prejudice (unconscious prejudice) will be assessed with new measures. Approximately 500 participants recruited through Mechanical Turk (mTurk; www.mturk.com), an online recruitment tool, will complete PAIMD and WPH measures in addition to a mental-health prejudice IAT, which assesses nonconscious prejudice against mental disorders (Cash et al., 1978; Greenwald et al., 1998; Fischer & Farina, 1995; Link et al., 1987; Link et al., 1989). It is predicted that 1) higher PAIMD is associated with less WPH, 2) as age increases, the association between PAIMD and WPH becomes stronger, 3) higher implicit attitudes of PAIMD are associated with higher explicit attitudes of PAIMD, and 4) higher implicit attitudes of PAIMD will be strongly associated with less WPH. This project satisfies an Honors in Psychology requirement and is being funded through the McNair Scholars Program.

Downregulation of CCoAOMT in Arabidopsis via the CRISPR/CAS Sequence Specific Endonuclease

Christopher Jaime, Timothy Yates

Lignins are polymeric phenylpropanoids which provide rigidity to plant cell walls. These compounds are particularly abundant in wood and bark. In various manufacturing industries, lignin is removed from plant material by chemical processing, which carries a high economic and environmental cost. Whether the intent is to make the pulping process for paper production more amenable, reduce chemical use during biofuel creation, or make forages more digestible, the manipulation of lignin type and content for industry is environmentally and economically relevant. The intent of this study is to downregulate an enzyme in the lignin biosynthesis pathway called CCoAOMT (caffeoyl-CoA O-methyltransferase) in *Arabidopsis thaliana* and

Populus trichocarpa using CRISPR genome editing tools. This enzyme has been downregulated before in other crops, using RNAi methodologies, resulting in reduced lignin content. Several studies have also shown an increase in the ratio of syringyl to guaiacyl units (S/G), which is a predictor of greater glucose release. In our pilot study, CRISPR tools are used to downregulate CCoAOMT in the model plant Arabidopsis thaliana. Transgene constructs were introduced to the plant by floral dip transformation. Genome editing will be verified by sequencing CCoAOMT, and expression of CCoAOMT will be quantified via RT-qPCR. We expect to see a reduction of CCoAOMT gene expression, and a phenotype more amenable to industrial processing. If the pilot study is successful, this method will be used to downregulate CCoAOMT in poplar (Populus trichocarpa), a tree used widely as a source for paper production.

Driverless Cars in Los Angeles

Brianna Medina

“Driver error is the most common cause of traffic accidents, and with cell phones, in-car entertainment systems, more traffic and more complicated road systems, it is not likely to go away” (Deaton and Hall-Geisler). It is predicted, however, that driverless cars can be a disruptive technology that will impact the entire world by 2025. My research analyzes the opinions of Los Angeles residents as to whether or not they believe that driverless cars will make an impact on transportation in Los Angeles. Using the Center for the Study of Los Angeles’ 2016 Public Opinion Survey of 2,400 LA County residents, I use descriptive statistical analysis as well as geo-spatial analysis to identify patterns in opinion and identify a target audience for driverless car companies. I also identify the group of Angelenos that will benefit most from this transformative technology based on equitable access to necessary transportation income, geography, commute patterns, and other demographic data. My findings will serve as a recommendation for companies trying to establish driverless cars in Los Angeles.

E

East Meets West: Orientalism, Race, and Gender in the U.S Visual Culture

Hillary Aringo-Peregrina

The media is abundant with representations of minority groups that are distorted and stereotypical. This is problematic considering the power of visual media to affect how members of minority groups are presented to and received by the population at large. Through analysis of a cross-sample of visual media from selected decades throughout the twentieth and twenty first century, this project seeks to compare gendered and racialized representations of Asian Americans, and to situate them within the context of the history of U.S.-Asia relations. Utilizing the contested philosophy of Edward Said’s Orientalism, this work seeks to examine how race, gender, and sexuality function as modes of misrepresentation in visual media to negotiate

anxieties over the Asian other. Films are examined for contradictory stereotypes of Asian American women as the Lotus Blossom, Madame Butterfly, and China Doll, as well as the Dragon Lady at the other extreme. Stereotypes of Asian American men depict them as the threatening “Yellow Peril”, while paradoxically depicting them as asexual, effeminate, and emasculated. These portrayals of Asian Americans can be found in twentieth-century visual media as a result of imperialism and the militarization of Asia. Such distortions are still prevalent in our twenty-first century postcolonial world, with threatening implications for Asian American individuals, and the broader representation of the Asian American community at large. In the end, such depictions of Asian Americans have had political, socioeconomic, and cultural ramifications for race relations, transnational exchanges, gender expectations, and the formation of individual and national identities in the US.

The Effect of Antiterrorism Spending on Subsequent Targeting

David Wike

Since the 9/11 terrorist attacks on the American homeland, the study of transnational terrorism has risen exponentially. However, surprisingly few studies produced during the “Global War on Terrorism” have evaluated the real effect of the world’s response. This paper works to address this gap by focusing on the effectiveness of antiterrorism spending. Using the IMF Public Order and Defense Spending and Stockholm International Peace Research Institute (SIPRI) data to measure national antiterrorism spending, and the Global Terrorism Database (GTD) and RAND Database of Worldwide Terrorism Incidents (RDWTI) to log the frequency and lethality of terrorist incidents, I test the relationship between national antiterrorism spending and subsequent targeting. I supplement statistical analysis with a most-similar case study. In line with my expectations, I do not find increased deterrent antiterrorism expenditures to be an effective means of reducing the frequency or lethality of civilian-targeted terrorist incidents. In fact, I find that hardening military and government targets actually increases the risk to the more vulnerable civilian population, rendering antiterrorism spending an ineffective response to global terrorism.

The Effect of Component Orientation on the Fracture Toughness of Ti-6Al-4V

Zachary Bates, Jacob Buckhalter, Caitlin Dorff, Jad Ghawi, William Hohorst, Michael Schwarz,

A common assumption made in damage resistant design in aerospace applications is that the orientation of a component has no effect on its fracture toughness when in loading. This assumption is questioned by many engineers, which is why large factors of safety are often used when designing components that will be loaded. The objective of this research is to gather statistical data regarding how different orientations of the same plate material can result in different fracture toughness values. Plates of Ti-6Al-4V—a very commonly used titanium alloy used in aerospace and other industries—will be obtained and cut into compact tension samples by Electro Discharge Machining (EDM). The crack notch orientations will vary by sample:

parallel to the length of the plate, perpendicular to the length of the plate, and parallel to the surface of the plate. The names for these different orientations will be L-T, T-L, and S-T, respectively. Fracture toughness values will be measured for all three orientations both in as-received state and after heat treating to normalized and high strength conditions. Scanning Electron Microscopy (SEM) will be used to examine the fracture surfaces, and a model will be derived.

Effect of Grain Size on the Fatigue Properties of 2016 Aluminum-Silver Alloy

Nicolas Breceda, Christopher Delgado, Christopher Green, Alex Hendricks, Ying-fen Huang, Brandon Kim, Chris LeMieux, Jacob Orlita, Cristina Zebeljan

A novel alloy called aluminum 2016 utilizes the properties of added silver to retain its strength at high temperatures. It exhibits qualities that are useful for automotive and aerospace applications currently dominated by aluminum 6061. However, aside from noted corrosion resistance of large-grain compared to small-grain samples, much is undocumented about the new metal. It has been assumed by industry professionals that the large-grain version of aluminum 2016 would exhibit relatively poor fatigue properties. For this reason, the small-grain version, which is more expensive to manufacture, has overshadowed its counterpart. An experiment using samples of each grain size and a rotating beam fatigue-testing machine will allow for discernment between their fatigue properties. A quantitative correlation between grain sizes will be made to allow industry professionals to make an educated purchasing decision. If the difference between fatigue properties were negligible, the beneficial properties of large-grain aluminum 2016 would result in high uptake of this new alloy in the automotive and aerospace industry.

The Effect of Hydrogen Charging on Fracture Toughness of 4340 Steel

Elias Ashe, Racel Mendoza

4340 Steel is a low alloy steel which contains nickel, chromium, and molybdenum. This alloy is known for its high strength in heat treated conditions while maintaining good fatigue strength. The common applications of this alloy are in landing gears, fasteners, pinions, crankshafts, and piston rods in the aerospace industry. In order to prevent 4340 steel from corroding, it is typically electroplated with cadmium or chromium. However, the hydrogen content of the alloy may increase significantly through the electroplating process causing hydrogen embrittlement. The current methods used to test hydrogen charging are very slow and time consuming. The researchers at LMU discovered that hydrogen charging can be detected quantitatively through Charpy Impact testing. This testing method is much faster and simpler than the current methods used to detect hydrogen charging.

Another important testing method is the fracture toughness testing of an alloy, which indicates the amount of stress required to propagate a preexisting flaw in a material. The fracture toughness value is a very important material property because it is impossible to avoid the

occurrence of flaws in manufacturing and fabricating materials. However, this testing method can be very difficult and time consuming. The objective of this research is to derive a mathematical model which relates fracture toughness testing data with the Charpy Impact data obtained through research at LMU. If a strong correlation is discovered through the data, then the simple method of Charpy Impact testing will be used to predict the fracture toughness of steels.

Steel plates were Electro Discharge Machined (EDM) into twenty-four compact tension fracture toughness bars at LMU. These samples were divided into four groups: as-received, tempered, cadmium coated, and cadmium coated and tempered. The cadmium coating will be 0.012 mm in thickness. The tempering temperatures were 354°C, 468°C, and 621°C, for two hours. Also, Charpy Impact samples were treated in the same way. The cadmium coating will be performed by ALCOA Co. in Torrance, CA. Each sample will then be fracture toughness tested on the MTS fracture mechanics system and the data will be correlated with the Charpy Impact data generated.

The Effect of Support Groups for Disabled Individuals

Kimberly Smith

There is increasing research which supports a link between social support and well-being for individuals living with disability including acceptance and sense of belonging post-diagnosis (Kostava, Caiata-Zuffret, & Shulz, 2014 & Mejias, Gill & Shpigelman, 2014). However, there is little research which investigates specific ways in which social support can support those living with disabilities. The present study was designed to examine how social support, specifically in the form of a support group, influences the quality of life, coping abilities and acceptance of disability for individuals living with a physical or mental disability. The Health Related Quality of Life (HRQL) Scale, Acceptance of Disability (AOD-revised) Scale, Social Support Survey Instrument and Coping Self-Efficacy (CSE) Scale are used to assess participants. Participants of all ages and disability category are recruited from disability centers and health care offices to take the survey online. It is predicted that individuals who have participated in physical or online support groups will have an increased score in their health related quality of life, acceptance of their disability, and coping self-efficacy. Data collection for this study is ongoing and results are forthcoming. Should the data support the hypothesis, social support groups can be further implemented and improve care for those living with mental or physical disabilities.

The Effect of Temperature on Testes Function in House Finches (*Haemorhous mexicanus*)

Veronica Pacheco

The transition from reproduction to molt is a key transition in the lives of birds and temperature may be important in influencing the timing of this transition. We previously found that warmer temperatures induced house finches to initiate molt earlier than those exposed to colder temperatures, and there was a trend for males in warmer temperatures to have smaller testis sizes. To further investigate the relationship between temperature and testis function in house

finches, we examined spermatogenesis in these testes. Males had been held in captivity under either cooler (mean max=23.5C) or warmer (mean max=30.6C) temperatures from May to July of 2012 when testes were collected. Testes were sectioned and stained using a hematoxylin and eosin stain in order to determine spermatogenic condition under the microscope. Across all birds, we found a significant correlation between the spermatogenic state and testes size, confirming that testis size is a reasonable indicator of spermatogenic condition. We found that the presence or absence of spermatozoa was not significantly influenced by temperature treatment. Although there was a trend for birds in the colder condition to show most advanced spermatogenesis scores compared with those in the warmer condition, we found no significant effect of temperature on spermatogenic condition. Given that most males (15 out of 20) did not have spermatozoa at the time of sampling, it is possible that there may have been an effect of temperature prior to our sampling window. Overall, our results are ambiguous as to the effect of temperature on testis function.

The Effects of CEC: 17 β -Estradiol on *Atherinops Affinis* Vitellogenin (VTG) Development

Angela Rabe

Several organisms are impacted by natural and synthetic chemicals that enter ground and surface waters through runoff, industrial and municipal waste discharges, and/or atmospheric deposition. Effluent discharged from municipal wastewater treatment facilities are a major source of contaminants of emerging concern (CECs) to receiving waters. CECs comprise a vast number of chemicals that are generally unregulated in the U.S. or have limited regulation in environmental media around the world. These CECs have detrimental effects toward our environment as well as waste treatment facilities that are not designed to manage them. 17 β -estradiol, or E2, is a CEC commonly found in sewage treatment plant effluent. E2 is a human female sex hormone and steroid, essential for the regulation of the estrous and menstrual female reproductive cycles and necessary for the development of female reproductive tissues. This CEC has been shown to have feminizing effects in other fish species, e.g. in male fish such as, the development of ovarian tissue within testes and the production of vitellogenin (VTG), an egg yolk-producing protein, found in the blood and tissue. Ongoing study at Hyperion Water Reclamation Plant exposing specimen to different concentrations of E2, aims to determine what is the lowest concentration at which E2 does not cause *Atherinops affinis* to express the VTG gene, the lowest concentration at which an effect is noticeable and finally the concentration that elicits an effect in 50% of the test organisms. This will be done through RNA extractions, which will then be used to synthesize cDNA and finally qPCR analysis will occur in order to determine the expression of VTG. Determining the concentration(s) at which estradiol elicits detrimental effects, will provide insight and attentiveness to this CEC throughout public waters.

The Effects of Energy Drinks on Cognition

Mark Barrett, Alice Gavarette Olvera

In this study, we investigated what effects a popular energy drink would have on various cognitive processes. The initial hypothesis was that the energy drink would decrease mental demand and improve performance on problem solving tasks using the Tower of Hanoi. There were 281 subjects across three conditions (control, caffeinated energy and non-caffeinated energy drink) each run through a battery of neuropsychological tests. Our initial hypothesis was not supported, as caffeine appeared to increase workload in different parts of the measure. Additionally, performance was not significantly improved in the caffeine condition. This has implications for the different uses of caffeine in daily life. Research is currently ongoing to increase sample size in the conditions and including another condition such as a caffeinated energy drink without glucose which we see as a potentially biasing variable.

The Effects of Exercise Training on Muscular Variables in Cancer Survivors

Nia Archer, Caroline Gallagher Poehls, Katelyn Parker

The IMPAACT Study (Improving Physical Activity After Cancer Treatment) is a collaborative study examining the effects of physical activity on cancer survivors and their risk factors for cancer recurrence and chronic disease. This sub-study aimed to examine the effects of exercise on the anabolic state and muscular performance of participants from the 2014-2015 cohort. Cancer survivors ($n=18$; 63.6 ± 12.9 years of age; height 1.65 ± 0.07 m; weight 79.6 ± 19.7 kg; 5.5 ± 7.7 years since last treatment) were evaluated before and after 26 weeks of combined aerobic and resistance training (CART). Participants were separated into groups (<1 year, ≥ 1 year) based on time since last cancer treatment (TST) and assessed for changes in insulin-like growth factor-1 (IGF1), insulin-like growth factor binding protein-3 (IGFbp3), and functional capacity. TST was significantly related to increases in peak isometric force of the quadriceps ($10.8\pm 8.5\%$ vs. $2.8\pm 5.9\%$) for those within one year and greater than one-year post cancer treatment, respectively. Significant increases in IGF1 (371%) and decrease in IGFbp3 (76%) were correlated with number of exercise sessions attended. This data suggest a dose-response effect of CART on muscular strength. Desired alterations in anabolic hormones coupled with a non-significant change in cortisol could play a role in mediating favorable muscular improvements. Additionally, there appears to be a critical window of opportunity for strength improvement as demonstrated by larger improvements in strength in the group that had more recently completed cancer treatment. CART immediately following treatment cessation appears to favorably improve muscular performance in older adults.

The Effects of Exercise Training on Self-Reported Fatigue and Muscular Variables in Cancer Survivors

Alex Fuentes, Katelyn Parker

The IMPAACT Study (Improving Physical Activity After Cancer Treatment) is a collaborative study examining the effects of physical activity on cancer survivors and their risk factors for cancer recurrence and chronic disease. This sub-study aimed to examine the effects of exercise on self-reported fatigue (SRF) and muscular performance in participants from the 2015-2016 cohort. Female cancer survivors ($n=51$; 65.1 ± 7.1 years of age; height 1.63 ± 0.06 m; weight 79.6 ± 19.9 kg; 6.4 ± 7.6 years since last treatment) were evaluated using the NIH PROMIS Fatigue Scale along with muscular performance testing before and after 13 weeks of combined aerobic and resistance training (CART). Age ($r=-0.386$) and time-since-treatment ($r=-0.359$) were negatively ($p<0.05$) correlated with SRF at baseline and after 13 weeks. Participants were separated into three equal groups (low= $0-17$, mid= $18-28$, and high= ≥ 28) based on number of exercise sessions attended. Change in standardized sit and reach scores for flexibility significantly increased (low= -0.5 ± 3.4 ; mid= 2.0 ± 3.8 ; 3.5 ± 3.1 cm) and trends were observed for increase in percent change in handgrip strength and peak isometric torque of the quadriceps muscle. The finding that age is associated with lower levels of SRF is perhaps counterintuitive and warrants further investigation. In support of recent findings from a previous cohort of IMPAACT, exercise during the first year post-treatment facilitates significant increases in muscular health. This data suggest a dose-response effect of CART on muscular strength and flexibility. This data suggests that CART performed following cancer treatment can promote desired alterations in muscular performance that could positively impact quality of life in older female cancer survivors.

The Effects of Geomagnetic Activity on Magnetic Field Line Resonance Frequencies in Earth's Magnetosphere

Connor Orr

The focus of this research is to determine how geomagnetic storms affect field line resonance frequencies in Earth's magnetosphere. We rely heavily on space-based technology which enables us to have GPS, satellite TV, cell phone service, and the Internet. Geomagnetic storms are capable of causing disruptions with these devices and power grids on the ground. This can cause problems for us here on Earth, which is why it is important to understand how geomagnetic storms affect the near Earth space environment. The resonant frequency of a vibrating magnetic field line depends on the length of the field line, the strength of the magnetic field, and the mass density of the plasma along the magnetic field line. Both the magnetic field strength and length of magnetic field lines in the inner magnetosphere are well known and easily modeled making it fairly easy to find the field line resonance. In this study, we applied the cross-phase technique for measuring FLRs using data from pairs of stations in the McMac chain of ground magnetometers. We identified approximately 30 geomagnetic storms between 2007 and 2010, and monitored

changes in FLR frequencies before, during, and after each storm. We found that in general, FLR frequencies rise during a geomagnetic storm, and slowly return to pre-storm levels several days after the storm. These results indicate a depletion of inner-magnetospheric plasma followed by a slow refilling process. This allows us to know the strength of the field lines and how they will affect our satellites and devices.

The Effects of the Local Control Funding Formula in Los Angeles County

Josalyn Karr, Rishaun Narayan

The Local Control Funding Formula (LCFF), a new system for apportioning funds for K-12 Education in the State of California, allocates more funds to schools based on the proportion of unduplicated pupils, defined as the number of students that are classified as one of the following: English language learners, foster youth, or students who are eligible for free or reduced meals.

This study will examine how superintendents in the Los Angeles region view LCFF's impact on meeting the needs of students. Data will be derived from the Center for the Study of Los Angeles' Leaders Survey of superintendents in Los Angeles County, which consists of a quantitative multiple-choice survey and a qualitative open-ended interview component. We will also use the State of California's data on LCFF to classify districts as high need or low need and use district neediness as our main variable. The multiple-choice questions will be analyzed to establish relationships between district neediness, superintendents' outlook on LCFF and their outlook on student success in their districts five years into the future. The interviews will be used to gain greater understanding of superintendents' perspective on the efficacy of LCFF for Los Angeles County in general. Although the formula is in the early stages of implementation, this analysis will examine its impact in meeting the needs of California's changing student demographics thus far and offer policy recommendations to enhance its implementation.

Efficacy of Targeted Killings in Pakistan: Drones, Blowback, and Effects on the State

Jeremy Selland

Do targeted killings via drone strikes shift non-state actors' targeting and attack methodologies and, if so, how?, Do geographic and terrain features place any additional constraints on target selection? This study applies a long-standing theory in International Relations—deterrence by punishment—to examine the new age of targeted killings in Pakistan. So far, the main body of research on the efficacy of targeted killing has applied the theory of blowback after punishment techniques in order to analyze drone strikes' effects on civilian populations. This research differs, however, by applying blowback post punishment to the relationship between non-state actors and the state. Building upon the work of Lyall (2015), Byman (2006), and Price (2012), this study looks at targeted killings' effects on the state itself, arguing that targeted killings erode non-state actors' abilities to strike at hard (government and military) targets due to the loss of top-level planners and foot soldiers. The analysis incorporates data from the University of

Maryland's Global Terrorism Database, the World Wide Incidents Tracking System (WITS), and New America's Drone Wars database to carry out disaggregated, agency-level statistical analyses of the relationship between drone strikes and attacks on military and government installations and personnel in Pakistan. The findings are then discussed in the wider context of deterrence and punishment as applied to non-state actors, and further within the realm of U.S. drone policy in Pakistan.

Energetic characterization of the water oxidation mechanism using earth abundant metal catalysts and development of a novel catalyst

Kelly Hunter

The water oxidation mechanism, catalyzed by mononuclear ruthenium complexes, produces protons that can be used as a source of clean and renewable carbon-free fuel. This mechanism includes proton-coupled electron transfer (PCET) steps and an O-O bond forming step, similar to the oxygen evolving complex in plants. Ruthenium is too rare and costly of a metal for wide application. Iron is similar to ruthenium and much more abundant and inexpensive. Accordingly, we employ density functional theory (DFT) calculations of eleven mononuclear ruthenium catalysts and compare these to analogous mononuclear iron catalysts to investigate energetics for the steps along the water oxidation mechanism. Individual bond lengths and atomic charges were also analyzed to locate significant differences among the sets of metal catalysts that differ in their organic ligands as well as between the two metal centers. The relevant thermodynamic and kinetic values for the steps along the mechanism vary from one catalyst to the next with different steps serving as the most significant hurdle depending on the ligands' donating or withdrawing character. Typically, less than 10 kcal/mol is required to release O₂ in the final step to complete the cycle from the ruthenium and iron catalysts we investigated. Our results suggest that different ligands subtly influence the intermolecular features of the catalyst but can lead to dramatic impact on the energetics. The insights gained from the analysis of our calculations help inform design of a functioning iron catalyst and target ligand modification to address the most challenging mechanistic steps.

Evaluating Hap4's Role in the Gene Regulatory Network that Controls the Response to Cold Shock in *Saccharomyces cerevisiae* using GRNmap

Katherine Grace Johnson, Margaret O'Neil

Gene expression is regulated by proteins called transcription factors which either repress or activate a gene's transcriptional output. A gene regulatory network (GRN) is a set of transcription factors that regulate the level of expression of genes encoding other transcription factors. The dynamics of a GRN show how gene expression in the network changes over time. A MATLAB software package called GRNmap uses ordinary differential equations to model the dynamics of medium-scale GRNs from budding yeast, *Saccharomyces cerevisiae*. The program estimates production rates, expression thresholds, and regulatory weights for each transcription

factor in the network based on DNA microarray data. Data were obtained from a yeast strain deleted for the Hap4 transcription factor subjected to cold shock at 13°C for 15, 30, and 60 minutes. A modified ANOVA showed that 1794 genes had a log₂ fold change significantly different than zero at any of the timepoints. These genes were submitted to the YEASTRACT database to determine their transcription factors regulators. From this we generated 32 candidate GRNs that ranged in size from 35 genes, 102 edges to 15 genes, 28 edges. We then estimated and compared the parameter values for production rates, expression thresholds, and regulatory weights for each GRN. A comparison of the actual least squares error to the minimum theoretical least squares error allowed us to evaluate which size network best explains gene expression. From this analysis we have gained insight into Hap4's role in the gene regulatory network that controls the cold shock response in yeast.

Exploration of Metal-oxide Surface Structure and Stoichiometry in Oxygen Depleted Nanoparticles

Alina Garcia Taormina

Metal-oxides present an important class of materials that have applications ranging from catalysis to electronics. Although the practical value of these materials has motivated extensive experimental characterization, nanoparticles may present distinct behavior and interesting challenges for most characterization techniques relative to crystalline samples. Previous research has shown that alumina nanoparticles can become depleted of oxygen and exhibit surfaces of metallic aluminum even though the transition to a metallic surface is not predicted thermodynamically for crystals under ambient oxygen (Vykhodets, Jarvis, et al. Surf. Sci. 630 (2014) 182-186). We couple surface characterization using density functional calculations with experimental evidence from nuclear reaction analysis predicting surface oxygen depletion of cubic zirconia, c-ZrO₂, nanoparticles similar to that of alumina. Our results show that for oxygen depletion localized to a single surface termination layer, the electronic structure of surface zirconium in zirconia nanoparticles display characteristics similar to metallic zirconium surfaces. Additionally, we extend our studies to titanium dioxide, TiO₂. Titania is an ideal metal-oxide for photocatalysis due to its high stability and low cost. The two allotropes of titania that we are considering are anatase and rutile, both which have promising applications for nanostructured photo-electrodes. We have optimized the crystalline bulk cells for both anatase and rutile and are investigating the atomic and electronic structure of relevant surfaces of these titania nanoparticles – both stoichiometric and those depleted of oxygen. The structure and reactivity of oxygen depleted surface states in the metal oxide nanoparticle systems studied hold important implications for materials design and applications.

F

Fact and Fiction: Science and the Mid-to-late 19th Century American Gothic

Emmett Schlenz, Lacey Smith

The mid-to-late 19th century witnessed a juxtaposition of rationality and superstition, being both the period of Darwin and Pasteur as well as the séances, mesmerism, and other occult practices evidenced by the Gothic literature of the period. The purpose of this project was to explore the relationship between scientific advancement and American Gothic short stories of this era. Following a survey of relevant authors, seven primary writers were selected for further investigation. Stories were particularly assessed in light of, and in relation to, the additional research being performed on both the medical, hygienic, and technical development of the era. In accordance with our initial postulations, it was determined that science-related Gothic fiction reflected deep epistemological anxieties, as scientific developments cast doubt on many previously unchallenged areas of knowledge and belief. Furthermore, the abandonment of traditional practices in favor of scientific rationalism – favoring vaccines and sanitation over purging and bleeding, for example – saw scientists treated with a degree of moral suspicion in Gothic fiction of the period. Future research should cover not only the American Gothic but should also incorporate the work of European authors. Additionally, expanding genre focus to Gothic novels, plays, and poetry would lead the research towards more comprehensive findings.

Financial Crises and Government Regulation

Yusef Trad

In the midst of turmoil, regulation is “a rule or directive made and maintained by an authority” to maintain order. More often than not, the authoritative figure that imposes and upholds regulatory standards, following its introduction to the specific industry or firm, is the government of the respective country or region. However, politicians, like the rest of us, are unable to predict when a crisis will occur and what appropriate regulation should be imposed to prevent that crisis. Thus, an inevitable concern with regulation is the fact that it is unable to thwart an unforeseeable future crisis but is instead a preventative measure in response to a previous event. As is the case with crises before and after the Financial Crisis of 2008, the imposition of new laws like Dodd-Frank and others were enacted following the destructive effects of each crisis. Unfortunately, financial crises are seemingly inevitable, as people are ultimately self-interested and continue to find loopholes in the laws of the financial system to create incredible profits by unlawful means. Currently the Foreign Exchange Market is facing this very issue in its own crisis as people within the industry are consistently taking advantage of a lack of regulatory infrastructure to make money. What regulations will be imposed remains to / be seen. In this paper I will compare the factors that caused each respective crisis and determine what can be learned from the financial crisis and its resulting regulations that applies to the Foreign Exchange Market crisis.

Finding the Best Way To Sustain College Political Organizations

Zachary Hayes, Fassa Sar

At Loyola Marymount University, student organizations have faced extreme difficulty in maintaining their existence. Institutional records have shown that its political organizations have short life cycles: they rise before presidential elections and fade afterward. To expand this life cycle, the question of how political organizations on campus can sustain themselves after principal members graduate must be answered. Although there is little research that shows why LMU's political organizations cannot institutionalize on campus, a review of literature surrounding political engagement, social identity theory, and collaboration will provide the theoretical framework for assessing why political groups succeed or fail. In a joint research endeavor, the leaders of both the LMU College Democrats and College Republicans will study pathways to the long-term sustainability of campus political organizations by surveying members of their respective organizations about retention, fundraising, and events to inspect current practices, and by interviewing presidents of the College Democrats and College Republicans at other campuses to discuss their efforts to achieve institutional sustainability. Results from the internal survey will be used to gauge how to better motivate club members to remain involved while the off-campus club leader interviews will inform where improvements are possible. Collected data will be analyzed to find which methods are likely to be effective. Recommendations based on these findings will provide future group leaders with the tools they need to maintain their respective political organizations well after current leaders graduate.

Food Deprivation Affects Male Pine Siskins' Vocalization in Preparation for Migration

Melissa Morado

Vocal behavior during migration has been studied in species such as waders, but has not been focused on with species that do not have regular migration patterns, facultative migrants. This study observes the vocalization behavior of male Pine Siskins, known facultative migrants, under a decrease of food availability. While monitoring the activity under food deprivation, we hypothesized that the Pine Siskins that experienced the reduced food treatment would vocalize more in preparation to migrate. I collected data on the frequency of vocalizations during a two-week food deprivation period on forty-four male Pine Siskins housed in the Life Sciences Building at Loyola Marymount University. Control and food-limited birds were observed individually for ten minutes after a five minute acclimation period. I organized the vocalizations into categories labeled "soft calls", "zhree", "song", and "other" based on previous research on Pine Siskin vocal calls. The data collected was analyzed and compared after the experiment time and supported that the food-limited birds called out more during the experiment. Further analysis showed that the food-limited birds significantly let out more "soft calls" than any other

categorized call. Our initial hypothesis that the food-limited birds would vocalize more was supported and the vocal behavior behind “soft calls” is considered a focus in future studies.

Fostering STEM Education with Virtual Worlds

Sylvana Santos

In recent years, many private and government funded organizations have been established to address the issues that have long affected STEM education. Although actions have been taken to diversify and support early exposure in these fields, finances and a lack of resources continue to hinder progress. By implementing Second Life, a virtual gaming platform that is both free and browser-based, to create a learning academy, we have a potential solution to some of these difficulties. As a part of the continual development of this Virtual Engineering Sciences Learning Lab (VESLL), this study successfully designed, coded, and tested an electrical engineering station for this online world. The goal of these new activities is to help students: understand the concepts of Ohm’s and Kirchhoff’s Laws, build upon Kirchhoff’s Law using Ohm’s Law, and establish a foundation for analyzing the components of any circuit. Students begin with an introductory tutorial of this station. Students are then directed to Kirchhoff’s activity where they experiment with a see saw to recognize the conservative characteristics of a circuit. This task prepares them for Ohm’s activity. In this area, students interact with a river to discover the properties of a resistor. Informal trials of these learning centers suggest that students successfully retain the information, stay well-engaged, and feel confident in their ability to apply the knowledge. Our hope is that after subsequent rounds of surveying and modification, our online academy will be featured at one of LMU’s partnering, secondary schools where it can help educate underrepresented students.

Frank or Faux? – Art in the Early Crusader Kingdoms

Patrick Scheuring

After Western crusaders conquered Jerusalem in 1099, European “Franks” set up an official ruling government in what would become known as The Crusader States. Recent historians have given significant attention to these principalities as they attempt to understand how the West and East interacted in this moment of initial encounter and conflict. Not surprisingly, art made in the Crusader States is a rich source of cultural information that many historians have used to contribute to their analyses. Using the simultaneous presence of both Eastern and Western styles in crusader art as evidence, modern scholars like Jaroslav Folda argue that East and West meshed together in this period of perceived tribulation and actually were more tolerant and integrated than one would think. However, by analyzing an ideologically neutral piece of a crusader art, The Melisende Psalter, and paying particular attention to the amount of influence the Eastern versus the Western artistic styles had, we see that crusader art was fundamentally more Western than Eastern. Using a methodology of formal analysis combined with scholarship on Twelfth

Century art conventions and primary source accounts of life in the Crusader States, we see that crusader art adheres to western conventions of narrative and compositional form, severely overshadowing the few Eastern motifs. While this paper only proves the above, the true nature of crusader art and its influences can ultimately speak to the culture and level of integration in Crusader State society.

From Silver to Opium: A Study of the Evolution and Impact of the British-Chinese Trade System from 1780 to 1842

Dominic Budetti

This research examines the shift from silver to opium as a medium of trade in the British-Chinese-Indian trade triangle, as well as the social and economic impacts of this change on both empires. Beginning with the boom of the tea trade in 1771, I analyze the effects of this trade shift and the introduction of opium into China up until the end of the First Opium War in 1842. I utilize both primary sources, ranging from nineteenth-century trade records to firsthand accounts of European missionaries, as well as secondary sources. I argue that as a result of the introduction of opium, Britain gained vast wealth and trade power that economically justified their imperialist efforts. For China, however, opium created an unfavorable trade balance for the first time in history. As silver flowed out of the country, China's economic and monetary systems began to crumble. To make matters worse, opium was a powerful drug that plagued the vast majority of China and aided in the social degradation of the once powerful nation. China's growing resistance to the trade only created further problems, leading to a disastrous war, which resulted in an even more disastrous treaty. In the end, the introduction of opium shattered China's economic and social structures and left the country vulnerable to the European imperialistic powers that it had resisted for centuries prior. These changes had implications for subsequent political and economic developments in twentieth-century China and beyond.

G

Genetic Variability and Fitness in the Green Lynx Spider *Peucetia viridans* (Araneae, Oxyopidae)

Tanya Diaz, Camila Garcia Paz, Nicholas Islas

The relationship between fitness and the genetic variability was investigated in the green lynx spider *Peucetia viridans*. In 2010 and 2011, we collected female *P. viridans* and their egg sacs from Kenneth Hahn State Recreation Area, Los Angeles, CA (2010, n=60; 2011, n=150). In lab, three measures of female body condition and 11 measures of reproductive performance were determined for each spider. With samples from both years, we determined the phosphoglucose isomerase (PGI) genotypes for each female using allozyme electrophoresis. With 2010 spiders, PGIBC females made more egg sac silk relative to egg sac mass and offspring number than PGICC females, while PGICC females invested more in clutch and egg sac mass relative to their

own mass than PGIBC females. In 2011, PGIBC and PGICC females did not significantly differ for any reproductive indices. The fact that significant differences among PGI genotypes were detected in 2010 but not in 2011 could be due to many factors. One factor which differed greatly between years was rainfall, since in 2010-2011, Los Angeles had nearly 4" more rain than in 2009-2010. Thus, prey items for *P. viridans* may have been easier to find in 2011 than in 2010, resulting in generally heavier females and consequently more minimal differences in reproductive performance among genotypes in 2011.

Global Ball: The Effects of Soccer Migration on South America and Africa

Matthew Brancolini

Soccer's widespread popular appeal has resulted in the formation of an immense global professional soccer industry but the effects for countries of the global South, such as those in South America and Africa, is the subject of debate. Proponents of globalized soccer believe it can combat economic inequality by integrating players from countries in the developing global South into the capitalist financial network centered in the global North. Critics of globalization contend that globalized soccer simply continues Northern economic and cultural imperial practices that plunder the global South's natural resources -- in this case players -- for the financial benefit of owners and investors in the global North. The purpose of this study is to examine global migration patterns of players from the global South, particularly from Africa and South America, to the wealthiest and highest level European professional soccer leagues, in order to gauge the effects for players as well as the regions involved. I examined both scholarly literature and soccer industry data to determine whether the globalization of soccer has decreased global economic inequality in South American and Africa. Ultimately, I concluded that, while the global South does reap some economic benefits from these lucrative player transactions, European leagues ultimately benefit far more, meaning that the global soccer network does little to curb hemispheric economic inequality. Future areas of research could further examine the potential economic gain for countries in the global South that host high profile sporting events, such as the World Cup, as well as exploring ways the current system could be altered to equalize the rewards for both parties.

Globalizing Bodies: The Impact Globalization had on Cultural Hegemony in Ciudad Juarez

Alvaro Gonzalez

Changing a country's economic landscape also changes the country's socio-cultural landscape. By using census data, journal articles, and media accounts, the role globalization had in Mexico is explored. Specifically, this work analyzes the destabilizing conditions Mexico underwent pre and post-NAFTA and the impact this destabilization had on women in Ciudad Juarez. The work examines Mexico's debt crises of the 1980's, Mexico's liberalization of its economy by cutting

back on producer support, and the North American Free Trade Agreement. Through the analysis it is revealed that the country's globalization practices of the 80s and 90s carried serious implications for the everyday life of Mexican citizens. Destabilizing globalization policies in Mexico caused a surge of people to migrate to the Northern states in search of labor. One of the most attractive states for these migrants was Chihuahua. Many people moved to the Northern state of Chihuahua, and specifically to Ciudad Juarez. Ciudad Juarez saw a rise in crime against women correlate with the migration of people. The shifting economic landscape of the city led to a shifting cultural hegemony that devalued women's lives. The shift in women's socio-cultural place within their communities in Ciudad Juarez is noted through a qualitative analysis of the cases and police reports surrounding the disappearance of women in Juarez. The work then concludes with policy recommendations that could help lessen the negative impact neo-liberal policies can have on individual lives.

Guardian Scholars Program: Social Supports for Foster Youth College Students in Los Angeles

Amanda Hayes

According to the Department of Education there are approximately 1.5 million homeless and foster youth enrolled in U.S. public schools. Additionally, a recent survey of California foster youth showed that approximately 75% of them stated intentions to enroll in a college or university; however, less than 5% ever attain an undergraduate degree. Many foster youth students have to overcome major socioeconomic barriers in order to receive a higher education and successfully complete an undergraduate degree. In response to the rising need for foster youth students to complete college, campuses have begun to create networks of specialized programs called Guardian Scholars Programs that provide the necessary resources to foster youth such as food pantries and year-round housing so they can be successful while in college. As a current LMU Guardian Scholar, my interest lies in covering news and feature stories that highlight these Guardian Scholars Programs on other college campuses in the greater Los Angeles area and what various social support services they are providing to their students to help them combat the hurdles of economic hardship and the lack of family support. I intend to create a final portfolio of related news stories including a reaction story, an in-depth profile, and trend story that showcases a comprehensive exploration of Guardian Scholars Programs, its staff, and the effects that these programs are having on foster student members. While these articles offer a glimpse at diversity on college campuses, ultimately they will illustrate a universal human experience of perseverance and determination.

H

Heart Rate Variability in Post-treatment Cancer Survivors Following a 26-week Exercise Intervention

Eilene Anderson, Jeanette Ricci

Introduction: Studies have shown that cancer patients have decreased cardiorespiratory capacity as a result of cardiotoxicity exposure during treatment, including adjustments in heart rate variability (HRV). Cardiotoxicity can negatively alter autonomic regulation by decreasing parasympathetic vagal tone and increasing sympathetic activation. Purpose: Improving Physical Activity after Cancer Treatment Study (IMPAACT) aimed to investigate the effects of a 26-week exercise intervention on cardiac autonomic functioning in post-treatment cancer survivors. Methods: Participants completed a tri-weekly, one-hour combined aerobic and resistance circuit training program for 26 weeks (female, n = 29; male, n = 4). HRV was assessed at baseline (pre), at 13 weeks (mid), and following 26 weeks (post). HRV was recorded using PolarRS800CX heart rate monitors while participants laid supine in a diminished sensory environment. Results: Linear regression established statistically significant correlations between participant attendance and HRV AR Spectrum Low Frequency (LF) and High Frequency (HF) Power ($r = 0.764$, $n = 10$; $r = 0.821$, $n = 11$, respectively). Repeated measures ANOVA yielded a significant change in LF/HF following 26 weeks of intervention ($F(2,18) = 3.90$, $p = 0.039$). There was no significant change in participant's LF and HF Power following 26 weeks of intervention ($F(2,16) = 1.37$, $p = 0.282$; $F(2,16) = 0.19$, $p = 0.831$, respectively). Discussion: The moderately high correlations between attendance and LF and HF Power indicate that cancer survivors who exercise more often have a higher likelihood of increasing parasympathetic control and decreasing their sympathetic control, resulting in HRV and cardiac autonomic control improvements.

Heat Treatment Optimization of 4330 Steel for Fasteners Applications

Ariana Albiar, Christopher Delgado, Christopher Green, Luis Guevara, Edgar Marcial, Carlos Martin del Campo, Michael Mudy, Matthew Navarro, Alfredo Telona

The purpose of this study was to evaluate the mechanical and microstructural properties of solution treated 4330 steel alloy for high strength fasteners applications. This was primarily done through various heat treatment methods including; aging at temperatures from 1025oF to 1325oF in 25o increments, re-aging at two different temperatures, varying heating rate to aging temperature, and stress relieve heat treating. All samples were cooled in stagnant room temperature air. Study consisted of 84 tensile samples (ASTM E-8) from each of two manufacturers. After heat treatment, samples were tensile tested, then subject to hardness testing and microstructural examinations. The collected data is then used to plot the ideal property range for this alloy. These results will allow for significant conclusions to be made on heat treatment processes in 4330 steel.

The High Price of Economic Success in Fassbinder's "The Marriage of Maria Braun"

Claire Andreae

Director Rainer Werner Fassbinder's biggest critical and commercial success was the film "The Marriage of Maria Braun", which centers on his titular female protagonist living in West Germany during the aftermath of World War II. Fassbinder, a New German Cinema filmmaker, as an admirer of classical Hollywood cinema and a devotee of the melodramas of Douglas Sirk employs stylistic and formal techniques from both art and entertainment cinemas to make his "German-Hollywood" film. This paper argues that Fassbinder's successful adaptations of both the Hollywood melodrama and New German Cinema helps create an accessible, yet visually unique film that depicts the development of the main character, Maria, from a devoted working-class wife to an emotionally empty middle-class businesswoman with great nuance. By strategically referencing the work of Hollywood's great melodrama auteur Sirk, Fassbinder ably appropriates the woman's film to expose the psychological burdens of post World War II Germany, and critiques how the race for economic recovery comes at a high moral and emotional price. A close analysis of the film's mise-en-scène including the use of camera angles and movement, lighting, costume, and color in its unflinching portrait of Maria will demonstrate how Fassbinder himself is a standout auteur of New German Cinema, an artist whose masterful use of visual design provides a richer meaning to her actions and emotions as her rise and fall is deeply allegorical. Through her, Fassbinder asserts that West Germany's economic recovery comes at the high price of emotional happiness.

The Historical Exceptionalism of William Bartram: How an 18th Century Naturalist Complicates the American Environmental Narrative

John Livingston

William Bartram is an oft-forgotten American naturalist, famous for his published Travels, which depict his observations of the southern American colonies just a few years shy of the American Revolutionary War. European inspired, Bartram utilized a scientific approach to studying flora and fauna encountered, and, in light of his historical setting, has been especially noted for his sympathetic depiction of Native Americans he encountered. Mainstream American Environmental History narratives tend to begin with Roosevelt's conservation movement, with those that do go further back spending little focus on anything predating the transcendental movement. The question considered is whether this historiographical tendency is an accurate assessment of Environmental History. I argue that the specific case of William Bartram captures a figure whose environmental outlook, in his historical context, exemplifies an environmental exceptionalism. To make this argument I first look at the effect Bartram's Quaker religious upbringing had on his environmental outlook, using correspondences, writings, and Bartram's own Travels to explore this. Next, I examine Bartram's economic considerations, principally utilizing Bartram's own writings, but also through examining contemporaneous observations written of Bartram. Lastly, I explore Bartram's positive relationship, and opinions, on Native

Americans, exploring the language evinced in *Travels*. It is with these three factors that Bartram ought be evaluated in a particularly exceptional light, complicating a field of study that, especially in the contemporary environmental climate, is of enormous importance.

Homelessness and Responsibility on Los Angeles' Skid Row

Savannah Woolston

The pervasion of "personal choice" and "personal responsibility" language in research on homelessness is incorrect and damaging because it causes us to look at homelessness as the result of the personal flaws and failings of those who experience it, instead of as a societal structure that leads some people to be precariously housed and others to be better able to overcome obstacles such as mental illness and losing a job. This assumption of personal responsibility falsely portrays homelessness as something that everyone is equally at risk of experiencing and ignores alternate accounts of responsibility that would call into question our current policies. I take up the experience of homelessness from the point of view of those who experience it directly in order to retheorize responsibility and examine root causes of poverty and homelessness on Los Angeles' "Skid Row." Based on interviews with people who reside or have resided within Skid Row, I take up how respondents—as themselves theorists of their own experience—understand responsibility both in the abstract and in terms of their own situation. I turn to them to identify institutional improvements and changes in societal norms that could alleviate the problem, and offer new conceptions of responsibility that can be used to rethink policy directives and how we do research on homelessness. I develop an account of responsibility that allows us to rethink conditions that perpetuate cycles of chronic homelessness and critique institutions and systems that prevent individuals from rising out of Skid Row. Using John Rawls' "A Theory of Justice" as a framework and incorporating theories of homelessness and responsibility from homeless individuals themselves, I lay out a new way of looking at who or what is responsible for homelessness in order for society to address the problem differently.

Human Movement Initiation Music Generation

Rachel Rivera

The objective of this project is to design and build a system to take data from the Microsoft Kinect camera in order to control sound using the human body. The Kinect camera provides three dimensional data of a person's movement in physical space. The system will be programmed to automatically generate musical notes based on the user's motion. The system uses different modulation and trigger techniques for controlling and generating sound in real time. The mapping of movement to sound will ultimately allow dancers to accompany themselves, using their own movement as a sound controller. Though other movement-sound mappings have been developed in recent years, the majority of the projects have researched

general gestural control of digital music. This system will be designed specifically for dancers, mapping appropriate music phrases to fundamental movements of different dance styles.

I

Identification of Quorum Sensing Mechanisms in *Burkholderia tuberum* mutants

Hailey Dodson

Burkholderia tuberum is a β -rhizobia proteobacteria that possesses the ability to form nodules on the roots of legume plants, such as black bean and alfalfa. The exact genes that influence the process of nodulation have not been entirely explored. However, recent studies have shown that the mechanism of nodulation is influenced through genes in a quorum sensing model. One such mechanism was proposed in an experiment conducted in 2006, where an observed correlation between quorum sensing and nodule formation in an α -proteobacteria nitrogen-fixing rhizobium, *Mesorhizobium tianshanense* (Zheng et al., 2006). Similar quorum sensing systems have been noted to influence nodulation regulation in other α -proteobacteria, such as *Sinorhizobium meliloti*, *Bradyrhizobium*, and *Rhizobium etli* (Sanchez-Contreras et al., 2007). After sequencing the complete *B. tuberum* genome, homologous genes for the LuxI and LuxR were found: *braI* and *braR*.

I generated primers bordering the *braR* and *braI* genes in order to produce *braI* and *braR* deletion constructs. Multiple PCR events were conducted in order to hybridize the upstream and downstream regions of both *braI* and *braR*, thus producing the *braI* and *braR* deletion constructs. A restriction digest was performed to place the constructs in a *pk18* vector, and thereafter transformed into *E. coli*. Future work with this experiment will include a mating between *E. coli* and *B. tuberum*, as well as tests for exopolysaccharide production, motility, and plant inoculation. These future tests will be conducted in order to see the physical manifestations of the deletion constructs of *braI* and *braR* in *B. tuberum*.

The Importance of Water Current Speed on the Sampling Rates of Polycyclic Aromatic Hydrocarbons in Polyethylene Passive Samplers

Nadya Charista

Many aquatic ecosystems have been compromised by persistent organic pollutants that can pose danger to human life and the environment. Passive sampling has been demonstrated as a useful method for measuring truly dissolved and freely available concentrations of these contaminants. In situ rates of absorption and time to equilibrium are functions of many variables (e.g., chemical size, water current speed, etc.). Performance reference compounds may be added to estimate the time to equilibrium and correct for disequilibrium. This study used low-density polyethylene (PE) samplers to measure the rates of absorption and desorption for selected polycyclic aromatic hydrocarbons (PAHs), specifically phenanthrene, pyrene, and benzo(a)pyrene at varying water

speeds to mimic existing water currents in the natural environment. PE samplers were spun inside stainless steel vessels filled with water in the laboratory at approximately 0, 2, 30, and 120 cm/s. The differing speeds resulted in varying water boundary layer thickness and rates of absorption and desorption. The absorption rates for phenanthrene and benzo(a)pyrene and desorption rates of pyrene were measured by using synchronous fluorescence. As the water speed increased, the water boundary layer thickness decreased and the rate of both absorption and desorption of the PAHs increased. Specifically, as the water speed increased from 0, 2, 30, to 120 cm/s, the absorption rate of phenanthrene increased from 0.01, 0.08, 0.23, to 0.75/hour. To close the mass balance, hexane extraction was done to measure the final concentration of the PAHs in the PE samplers using synchronous fluorescence. The percent loss ranged from 12 to 41 % for phenanthrene and 10 to 16 % for benzo(a)pyrene. The next step is to use this data to assess the validity of a physically-based Fickian diffusion model so that samplers used in the field may be corrected for disequilibrium.

Indo-American Children

David Martinez

Today's crisis of migrants and refugees fleeing to Europe from the Middle East is well known. One of the least recognized groups of refugees are Indo-American's: Latin American's with Middle Eastern roots who are making their way to England. These Indo-American refugees are finding it difficult to establish themselves within British society for many reasons, but mostly due to the language barriers and the lack of opportunities for stable employment. Last spring, I interned for the Indo-American Refugee and Migrant Organization (IRMO) in London. I documented the lives and experiences of Indo-American children as they attempted to adapt to life in London and I shot a short film over a 4-week period. Through the film, the audience gets a glimpse of the daily life of these children and how the IRMO helps them to integrate into British society. By showing these children's experiences and hopes, I intend to make the story of these children, and the work of IRMO, known to both the people of Great Britain as well as to the rest to the world.

Inertial Electrostatic Confinement (IEC) Fusion

Austin Hentrup, Joshua Solberg

In powering the modern world, nuclear fusion is a promising technology since it has the potential to become an endless source of clean energy. This principle is demonstrated here through the construction of a Farnsworth-Hirsch Inertial Electrostatic Confinement fusor. Fusion is incited by using a large electrical potential difference between an outer vacuum chamber and an inner grid to ionize deuterium (an isotope of hydrogen) and accelerate these ions toward a central point. If two ions strike each other with enough energy and at the right orientation, they have the potential to fuse together to create either He-3 and a neutron or tritium and a proton. By precisely

controlling the voltage applied to the central grid and the pressure within the chamber, we have succeeded in achieving detectable levels of fusion, verified by several neutron bubble detectors placed around the fusion chamber. Currently, the main goal of the project is to improve the quantitative analysis of neutron production. Neutrons will be detected and counted by amplifying and processing the signals from a boron-10 lined proportional counter tube. Deuterium input will be precisely controlled using a recently installed mass flow controller, helping to improve understanding of ideal fusion conditions within the reactor and allowing for more accurate and reliable creation of those conditions. In researching improvements to the fusor's current design, we hope to gain useful insights into the construction of large-scale fusion reactors.

Injected: A Raw Look at the Meat We Consume

Lauren Eejima

Recently the World Health Organization released a statement declaring that processed meat is classified as Group 1 (carcinogenic to people) and red meat as Group 2A (probably carcinogenic to people.) Despite this dire news, young adults including myself have not made the necessary dietary changes due to factors such as lack of awareness and a love for meat. In addition, many students have defaulted to a life of convenience. This is compounded by the marketing of conveniences such as fast food and packaged meals. The reality is that the meat we consume is getting exponentially hazardous to our long-term health, as many slaughterhouses continue to inject harmful hormones into animals, as well as processed meats. For example, deli meats are preserved with nitrates that contribute to not only cancer, but also other chronic diseases as well. Young adults need to be awakened to the dangers of the meat they are consuming for the sake of assuring a longer, healthier quality of life. The secrets of the meat companies must be revealed before they completely rob us of our health.

Through visual representation and the element of shock (as if the additives and hormones could be seen by the human eye), I will depict raw versions of the meats we are consuming alongside menus that further explain all the dangerous additives. I plan to expose the serious impact that additive-filled animals and processed meats have on the human body in hopes that people of all ages will take the time to pay attention to and selectively choose what they put in their bodies.

An Insight on Chinese Communist Propaganda

Cameron Villadiego

This essay focuses on Chinese Communist Party's (CCP) propaganda films, and in particular their representation of Mao Zedong and nationalism. Propaganda is notoriously known for giving biased and exaggerated representations of historical events and thereby creating national memory and promoting national pride. Yet the inner mechanisms as to how exactly propaganda films work in achieving these goals have been little explored. Looking at old propaganda films as well as contemporary ones, this essay closely examines various aspects of cinema including

audio and visual techniques, voice-over, dialogues, and themes that the CCP uses in order to instill national patriotism into its Chinese citizens as well as international audiences. Specifically, the essay will analyze three historically noteworthy propaganda films, *Battle on Shanggangling Mountain* (1956), *The Founding of the Republic* (2009), and *The Beginning of the Great Revival* (2011). I will show that while the older propaganda films exemplify a didactic mode of promulgating communist propaganda, most recent films demonstrate a new trend that increasingly blends elements from commercial blockbuster films to attract audience's attention, manipulate its patriotic sentiments, and recreate national myths. I will conclude with a fourth film, *Let the Bullets Fly* (2010), which exposes and critiques exactly the origins and maneuvers of Chinese propaganda cinema.

The Intersection of Faith and Cultura: LMU Latino Students' Faith Formation

Cynthia Garcia

The Latino culture itself stems from a religious foundation; the values, culture and identity is intertwined with religious identity. Most LMU students are raised in religious homes and despite some Latino students not being religious, their core values still stem from a religious view. Currently, there is only one official space through LMU's Campus Ministry for Latino students: the Latino Retreat. The lack of resources allocated to this specific retreat yields a smaller number of participants. This project will hopefully pave a path toward increased representation and support for the Latino retreat and Latino spiritual spaces, as well as multiplying the resources to reach out to more Latino students. We have conducted a literature review to understand how identity, faith and culture intersect on college campuses. From this literature review, we have derived questions for a survey that best capture the relevant themes that emerging from the literature. The survey is set to go out in mid-February to a convenient sample of Latino students identified through Chicano Latino Student Services. We hope to address some of the following questions: What spaces currently, outside of the Latino Retreat, on campus allow for spiritual and religious growth for Latino students? How can LMU offer more spaces for Latino students to spiritually thrive in? And what do these space look like?

Investigating the Role of an LPS Transport Gene, *lptE*, in Nodulation by *Burkholderia tuberum*

Brandy Kwak

Nitrogen fixation is a plant process in which atmospheric nitrogen (N₂) is broken down into a usable form, ammonia (NH₃). Symbiotic, nitrogen-fixing bacteria that reside in structures on plant roots called nodules can be categorized as either α -rhizobia or β -rhizobia, with β -rhizobia being the more recent discovery. These bacteria provide fixed nitrogen to the plant in exchange for carbohydrates. *Burkholderia tuberum* is a β -rhizobium strain that is known to nodulate legumes such as beans and cowpea. The overall objective of my research experiment will be to

identify genes that are important to plant-microbe symbiosis, specifically nodulation. To begin, a transposon mutagenesis was performed on *B. tuberum* and transposon mutants were identified. *Phaseolus vulgaris* (bean) seeds were germinated and using a hydroponic system, the plants were grown and tested for nodulation. During these trials, 84 different mutants were tested and compared to nodulated plants inoculated with wild type *B. tuberum*. Plants inoculated with mutant BT362 showed altered nodulation, confirmed in three independent trials. Molecular work was conducted to find that the transposon inserted just upstream of *lptE*, a gene encoding a protein involved in the transport of LPS (lipopolysaccharides). A deletion mutant was generated and the nodulation phenotype was confirmed to be similar to that of BT362. The next stage will be to complement my deletion mutant, and confirm that reversion to wild type results in the restoration of the wild type nodulation phenotype. Also, *lpxA*, a gene involved in attaching LPS to the outer membrane, and *lptD*, a gene that forms a barrel complex with *lptE* that is essential for transport of LPS, will be deleted and the effects on symbiosis will be examined. The discovery of genes altering nodulation will provide insight into processes in β -rhizobia that are still not well understood, like the mechanisms behind nodulation and symbiosis.

Investigation of a Mycobacteriophage Transcription Repressor

Kathryn Orban

Mycobacteriophage HelDan is a lysogenic, or temperate, phage (virus) of the bacterium *Mycobacterium smegmatis*, which is a fast-growing, close relative of *Mycobacterium tuberculosis*, the causative agent of tuberculosis. The phage replication cycle is dependent on time-coordinated gene expression events. In order to study the regulation of gene expression during phage replication, we seek to study the HelDan protein gp73, a putative transcriptional repressor. Characterization of gp73 structure and function, such as DNA binding activity and affinity, was done using both bioinformatics and biochemical analyses. To this end, the gene encoding gp73 was cloned and the ability of the recombinant gp73 protein to bind to HelDan genomic DNA was examined. This work contributes not only to the understanding of mycobacteriophage repressor function, but also has implications in human health.

L

Lipid Peroxidation Recovery after an Acute Thermal Challenge in a Marine Intertidal Mussel (*Mytilus californianus*)

Jeremiah Dallmer, Helena Drolshagen, Chase Dugay, Emma Strand

Mussels live in the intertidal zone, a dynamic environment ranging from completely aquatic to terrestrial. Heat stress can induce reactive oxygen species (ROS) formation which can lead to lipid peroxidation (LPO) damage in cellular membranes. It is known that an acute thermal challenge to 33°C causes increased LPO in gill, but there is no evidence for chronic

accumulation LPO after daily exposure to 30°C. The objectives of this study were 1) to determine the time it takes LPO to return to baseline, and 2) to investigate whether 30°C causes any rise in LPO. Fifty animals were sampled at various time-points (n=5-6 per time-point) after a controlled thermal challenge. Animals exposed to a 33°C heat ramp were sampled at the following time-points: baseline (before heat ramp), top of the ramp, and 1, 4, 12, and 24hr recovery. Animals exposed to 30°C were sampled at the top, 1hr, and 12hr time-points. Gill tissue wash harvested, and LPO damage was assessed using a microplate-based version of the Ferrous Oxidation of Xylenol Orange (FOX) assay. LPO did not vary significantly across the time-points in either group; additionally here was no acute increase in LPO in either thermal challenge. These data are contrary to our expectations. As there was no acute rise in LPO (as had previously been observed), no recovery could be measured. This study does not indicate that 30°C causes an acute rise in LPO. Subtle differences in experimental context might explain the disagreement between our current and previous work.

Loading Patterns of Rubber-Based Resistance Bands Across Distributors

Alex Fuentes, Connor Smith

The rehabilitation and resistance training communities often include the use of rubber-based resistance (RBR) bands for improvements in musculoskeletal performance. In order to minimize safety risk and improve program prescription, an understanding of the nature and consistency of RBR loading patterns is vital. The purpose of this study was to examine the consistency of RBR band force-production across four RBR band distributors (Elitefts, Power Systems, Rouge Fitness, and RubberBanditz). A minimum of five sample bands were acquired across a spectrum of reported distributor widths. In total, six sets of Elitefts (0.635, 1.27, 1.27, 2.86, 4.45, 6.35 cm widths), Power Systems (0.635, 1.27, 1.27, 2.86, 4.45, 6.35 cm widths), and RubberBanditz (0.635, 1.27, 2.22, 2.86, 4.45, 6.35 cm widths) and five sets of Rouge Fitness (0.635, 1.27, 1.27, 2.86, 4.45 cm widths) bands were tested. A total of 125 RBR bands were stretched in 5 cm increments from resting to twice their resting length (200 cm) while force-production was measured with bands in series using a load cell (DBBP-500; Kistler-Morse; Spartanburg, SC) affixed to a digital controller (SVS2000; Kistler-Morse; Spartanburg, SC). Each band was tested twice (n=250) on different days to assess intertrial reliability. Reliability for all bands demonstrated an ICC greater than 0.99 and SEM less than 5%. One-way ANOVAs for each band width group revealed statistical differences ($p < 0.05$) in mean force production at twice resting length for bands of equal width across distributors. Band force-production inconsistency exists across RBR bands available from distributors in a range of -8.5-12.6% of the mean per width. This study may be useful to strength and conditioning professionals and clinicians who should be cognizant of loading variance between both band widths and distributors and work to quantify a set of loading parameters specific to their training environment.

M

Maintaining Humanity Amidst Crises

Brynn Bodair

My research explores the ways in which the portrayal of the other in the sci-fi television show, *Battlestar Galactica*, mirrors today's current political environment. The show, which ran from 2004-2009, was a critical hit, celebrated for the way it grappled with a post-9/11 world. My paper argues that the fears faced by the remnants of humanity, fleeing total annihilation can be compared to the present day's political conflicts that challenge the safety of the world community. The realization that the Cylon, the threatening other, is undistinguishable from humans creates an atmosphere of inextinguishable terror. This serves as an example for a better understanding of the variety of reactions and erratic responses that arose surrounding the Syrian refuge situation, especially the fear that there might be terrorists among them. *Battlestar Galactica* probes its character's reactions to the devastation of a destroyed 'home', and how to maintain humanity in these extreme circumstances. Utilizing a construct of today's political atmosphere, I was able to uncover a relationship between those who lost their home due to war in both the show and real life atrocities. The goal of this study is to define what it truly means to be a human under times of crisis, and the ways through which one might maintain their humanity.

Mathematical Modeling Reveals Zap1's Role in the Gene Regulatory Network the Controls the Response to Cold Shock in "Saccharomyces cerevisiae"

Kristen Horstmann, Brandon Klein, Tessa Morris

Transcription factors are proteins that act together in a gene regulatory network (GRN) by repressing or activating the expression of target genes. The purpose of this study is to determine the GRN for "*Saccharomyces cerevisiae*", budding yeast, that controls the response to cold shock. The Dahlquist Lab has conducted DNA microarray experiments to measure gene expression after 15, 30, and 60 minutes of cold shock treatment for the wild type strain and a strain deleted for the Zap1 transcription factor. The data were used as input to a MATLAB software package called GRNmap, which uses ordinary differential equations to model the dynamics of a medium-scale gene regulatory network. The program estimates production rates, expression thresholds, and regulatory weights for each transcription factor in the network using a penalized least squares approach. A modified ANOVA showed that 1859 genes (30%) had a \log_2 fold change significantly different than zero with an adjusted p value of < 0.05 for at least one timepoint for the Zap1 deletion strain. These genes were submitted to the YEASTRACT database to determine the transcription factors that regulate them. From this, a family of GRNs ranging from 34 genes and 98 edges to 15 genes and 27 edges was generated. Parameter values, production rates, regulatory weights, and expression thresholds were compared for each of these GRNs. From the modeling of the network families, we have observed

that Zap1 plays an important role in the gene regulatory network that controls cold shock response in "Saccharomyces cerevisiae".

Mathematical Modeling Shows that Gln3 Affects the Dynamics of the Gene Regulatory Network Controlling the Cold Shock Response in Saccharomyces cerevisiae

Tessa Morris

A gene regulatory network (GRN) consists of a set of transcription factors that regulate the expression of genes encoding other transcription factors. The focus of this study was to determine the GRN that controls the cold shock response in budding yeast, *Saccharomyces cerevisiae*, and to model its dynamics. Microarray experiments were performed in the Dahlquist lab to measure gene expression after 15, 30, and 60 minutes of cold shock for both the wild type strain and a strain deleted for the transcription factor Gln3. These data were used as input to a MATLAB software package called GRNmap, which uses ordinary differential equations to model the dynamics of a medium-scale gene regulatory network. The program estimates production rates, expression thresholds, and regulatory weights for each transcription factor in the network using a penalized least squares approach. A modified ANOVA showed that 1356 genes (22%) had a log₂ fold change significantly different than zero with an adjusted p value of < 0.05 for at least one timepoint for the Gln3 deletion strain. These genes were submitted to the YEASTRACT database to determine the transcription factors that regulate them. From this, a family of 49 GRNs ranging from 35 genes and 120 edges to 14 genes and 26 edges was generated. Parameter values, production rates, regulatory weights, and expression thresholds were compared for each of these GRNs. These results show that the presence or absence of Gln3 affects the dynamics of the gene regulatory network controlling the cold shock response in yeast.

MayaCam: Virtual Camera Capture on Mobile Devices

Cameron Billingham

The growth of computer graphics rendering in both final production and previsualization of visual media has driven the development of tools that allow for quickly creating realistic camera movements. Large computer visual effects and animation studios have built entire motion capture rooms for creating cinematic camera movement, such as Steadicam, dolly, and handheld camera movements. These movements are time consuming to recreate by hand using traditional keyframe animation. However, the tools used by these studios are expensive and complicated. MayaCam is a proposed application that uses the technology of a mobile devices as a camera capture tool. The goal of the project is to bring the ability of easily positioning the camera and recording camera movements to computer graphics artists that cannot afford these expensive tools. In addition, development will delve into the limitations of current mobile devices' ability to accurately track position and the speed of network communication. MayaCam will provide a fast and affordable method of recording previsualization and final quality camera movement that is intuitive and cinematic.

Measuring Runoff Pollutant Removal Efficiency in the Ballona Creek Rain Garden, Culver City, California

Nicole Enciso

Runoff in urban settings can contaminate surface water with bacteria, metals, oil, and other pollutants. One solution to dealing with these contaminants is through the use of Low Impact Development (LID) strategies using biofiltration systems that capture and infiltrate contaminated runoff back into the ground. Through natural processes, pollutants are decontaminated and groundwater supplies are augmented. The goal of this study is to measure the pollutant removal efficiency of the Ballona Creek Rain Garden located in Culver City, California by determining the loading of pollutants entering the gardens, and when filled, discharging into Ballona Creek. This 1000 ft biofiltration system captures runoff from about 5 ha of commercial area during rainstorms. During the 2015-16 rainy season, our goal is to sample three storms; presently, two have been sampled. During each storm, sets of samples are collected from four inlets and two outlets during rising, peak, and descending arms of a storm, and Hobo water-level data loggers are used to measure flows. Samples are tested for fecal indicator bacteria, total suspended solids, turbidity, metals, and petroleum products. Pollutant removal efficiencies will be determined by estimating pollutant loading (flow times concentration for each contaminant) entering and leaving the gardens. Preliminary data show a decrease in solid concentrations and turbidity, and FIB over the course of the storm in runoff ultimately discharged into Ballona Creek. All data will be assessed over the coming summer, and preparations will be made to sample three more storms during the 2016-17 rainy season.

Mentor/Mentee Class Differences in a Middle School Mentoring Program

Marianna Hernandez

This research project examines mentor and mentee class differences in the El Espejo mentoring program, which is associated with Lennox Middle School and Loyola Marymount University. The purpose of the project is to investigate whether class differences between adult mentors and mentees affect mentee satisfaction and to evaluate what adult mentors do to create successful mentorship relations, and thus increase overall mentee satisfaction. This project is highly important because although prior research has found that racial differences can affect mentoring relationships, we still need to improve our understanding of how other social factors such as class may affect them. This project uses a combination of qualitative and quantitative data collected from a group of 11 mentors and 19 mentees. For mentors, survey data was collected to assess their efforts in creating successful mentorship relations and to increase overall mentee satisfaction. Mentees were surveyed in order to determine their satisfaction with the relationship they hold with their mentors. The surveys were followed up with field notes and observations over a 3-month period.

My expected findings are that mentors and mentees of similar class backgrounds will report more satisfying relationships than those from different backgrounds. However, mentors who are of a different social class than that of their mentees may overcome class divides by demonstrating commitment and enthusiasm for mentoring and/or working with children in general. Very little is known about the role of social class in mentoring relations, so my project will shed light on a new area of research.

Measuring Runoff Fecal Indicator Bacteria Removal Efficiency in the Ballona Creek Rain Garden, Culver City, California

Jacob Stuivenvolt Allen

Runoff in Southern California is commonly impaired by fecal indicator bacteria (FIB) from urban storm drains and sprawling urban development. Other contaminants such as metals, oils and increasing chemicals of emerging concern are common to urban runoff, resulting in the increased usage of Low Impact Development (LID) strategies that use bio-retention and filtration to capture polluted runoff. The goal of this study is to measure the FIB removal efficiency of the Ballona Creek Rain Garden (BCRG) located in Culver City, California. This biofiltration system is 1000 ft in length, and collects runoff from 5ha of commercial area during rainstorms. FIB loads entering the gardens, and when filled, discharging into Ballona Creek will be determined using Idexx chromogenic methods. Individual species will be identified in runoff influent vs. garden effluent discharged into the Creek using a Vitek bacterial identification system in order to test for differences in species composition between these two types of flows. During the 2015-16 rainy season, our goal is to sample three storms; presently, two have been sampled. During each storm, sets of samples are collected from four inlets and two outlets during rising, peak, and descending arms of a storm, and Hobo water-level data loggers are used to measure flows. Preliminary data shows a decrease in FIB over the course of the storm in runoff destined for Ballona Creek. This process is ongoing as data will continually be assessed throughout the summer; through the 2016- 2017 rainy season.

Microstructure Analysis of an Aluminum Alloy

Alina Garcia Taormina, Johann Kim, Kenneth Ravelo, Adrian Rodriguez

This study is a microstructural analysis of Aluminum alloy parts used in testing a new generation of dissipating systems based on the mechanical assembly: the Absorption-Compression-Plastic-Torsion (ACPT). Reliable and safe designs of components and systems (vehicles, nuclear plants, different structures...) need to have large energy dissipation properties to minimize damage and improve the components' crash worthiness. The energy dissipation depends on the load, strain, strain rate, deformation, displacement pattern, and material properties. To evaluate the energy absorption properties of the material, multi-axial dynamic plastic buckling loads were performed at different inclination angles (30°, 37°, 45°, 60°, and -45°) and were studied under severe stress

conditions at University 8 Paris. The microstructure of the aluminum alloy parts used in testing were evaluated at Loyola Marymount University. The effects of dynamic loading on the absorbed energy were investigated by using optical and scanning electron microscopy. The grain size and shape of the samples were correlated to the mechanical properties. /

Modeling the Interaction Dynamics between Honeybees and Food Availability

Carlos Cruz

The success of honeybee (*Apis mellifera*) colonies is critical to the United States agriculture with 35% of American diets dependent on honeybee pollination. There are various complex factors that can contribute to a colony's failure, such as nutritional stress. Nutritional stressors primarily pertain to food scarcity, lack in diversity of food, and the availability of food with low nutritional value. Previous mathematical models have examined the impact of nutrition and the early recruitment on honeybee population dynamics. These models do not include the impact of a food supply with a limited storage space within a single hive. In this work, we use a mathematical model to investigate the impact of food scarcity and limited storage space on honeybee viability, early recruitment rates of workers into foragers, and the influence of these rates on the growth of a colony. A threshold, R_d , was found for conditions when a colony will persist or collapse. We found conditions for the stable coexistence of a honeybee population and food supply as well as conditions for periodic behavior. Through sensitivity analysis we find that a honeybee colony is most sensitive to changes in the rate at which a worker bee encounters food and the rate food is entering the food supply. There are no qualitative differences between using a Holling Type I or Holling Type II functional response in honeybee population persistence when modeling the interaction between a honeybee colony and the availability of food.

Morphological Asymmetry as an Indicator of Stress in Rodents, a Comparative Study of Rodent Species in Southern California

Amanda Muñoz, Joshua Ramsey

Vertebrates generally develop in a bilaterally symmetrical manner, but it is hypothesized that this pattern may be disrupted by stressors, one of which is pollutants in their environments. Pollutants, absorbed during nutrient uptake, can make their way into the food chain through plants. Rodents eating these contaminated plants may be environmental indicators; they are found in urban regions of Southern California and may provide information on the effects of pollution on bilateral symmetry. As they develop, if exposed to pollutants, they may not be able to develop as symmetrically, and fluctuating asymmetry (FA) may be introduced. FA is a random deviation from bilateral symmetry towards either the right or left side. While a variety of methods to measure bilateral symmetry have previously been used including rulers and calipers, more modern equipment may gather higher quality data. A three-dimensional digitizer accurately collects points in a three-plane coordinate system. This tool was used to collect measurements from rodent skulls to compare the degree of bilateral symmetry of the specimens. By measuring

distances between points on the skull, differences between left and right sides were calculated, and differences within and between species were compared. In the future, this data will be compared to heavy metal concentrations found in skin samples of specimens to determine correlations between pollution levels and bilateral symmetry in these mammals.

N

Nebraska: 2016

Samantha Blaz, Kay Hampton, Gigi Todisco

We began our choreographic project, Nebraska: 2016, at the 2015 Plunge Dance Intensive at LMU, taught by Bill T. Jones/Arnie Zane Dance Company members Janet Wong and I-Ling Liu. We learned a movement phrase, titled “Nebraska.” The phrase was created by Bill T. Jones in 1995, on the day of a protest in Lincoln, Nebraska, led by outspoken homophobic pastor and disbarred lawyer, Reverend Fred Phelps. Phelps was protesting outside the Lied Center before a performance of Jones’ dance Still/Here. He believed the show condoned homosexuality and sympathy for gay people living with HIV/AIDS. That day, Jones created a phrase inspired by the functionality of the body. While not consciously responding to the protest in the moment of creation, Jones now acknowledges that the “Nebraska” phrase embodies his lived experience on that day. In our project, we investigated this phrase, which was a response to a political climate very different from the one in which we live today. Our investigatory questions include: What inspires us to move the way Jones did? What aspects of our own lives can be explored and expressed through abstract, functional movement exploration? How do we make this material relevant in a contemporary time? In a field that can be guided by image, form and visual spectacle, what guides our creative process when presented with the task to avoid decoration and prioritize biomechanic function and somatic awareness? Our presentation includes the performance of several original choreographic studies, created by us, using “Nebraska” as the raw material.

A New Combinatorial Interpretation for Fibonomial Coefficients

Juan Carrillo

The Fibonacci sequence, 1, 1, 2, 3, 5, 8, 13, ... was made famous by Leonard Fibonacci. Each term in the sequence is the sum of the two previous Fibonacci numbers. Binomial coefficients count the number of ways to make unordered selections without substitution. The (n,k) binomial coefficient, where $1 \leq k \leq n$, is defined by $\binom{n}{k} = \frac{(n \cdot n-1 \cdot n-2 \cdots 1)}{((k \cdot k-1 \cdots 1) \cdot (n-k \cdot n-k-1 \cdots 1))}$. Fibonomial coefficients are similarly defined, except that every integer is replaced with its corresponding Fibonacci number. Surprisingly, the Fibonomial coefficients are always integers. Thus it is an important mathematical problem to discover what the Fibonomial coefficients count (called a combinatorial interpretation). Sagan and Savage present such an

interpretation using the well-known fact that Fibonacci numbers count the number of ways to tile $1 \times n$ rectangles with 1×1 squares and 1×2 dominoes. In this work we present a new interpretation of Fibonomials building on previous work by Sagan and Savage as well as Benjamin, Plot, and Reiland. This interpretation provides a conceptual understanding behind the Sagan and Savage result and allows for combinatorially proofs of various Fibonomial identities.

"No cause for worry!": War, Masculinity, and Disease in the case of Corporal Alton Miller Arriona Randazzo

When America entered WWI in 1917, the country mobilized young men for war. Despite innovative developments on the home front, in industry, travel, and communication, no one was prepared for the Influenza Pandemic of 1918. The collision of war and disease set the stage for changes and challenges to the cultures of gender. Young Alton Miller, only twenty-one when drafted into the First World War, experienced both civilian masculinity in his life in New York, and military masculinity during his posting at Camp Taylor, Kentucky. While Corp. Miller struggled with the twin objectives of training for war and becoming a man, a plague of flu hit him as it would so many others in 1918. Scholars have addressed the pandemic's extensive effects on American populations, which while important, can have a distancing effect on the study of history. This case study seeks to combat that, revealing the complexity of personal experience, by studying how expectations of gender intersected with World War I and the Influenza pandemic. Through the collected personal letters, documents, and artifacts of Corp. Miller and his family—contained within a scrapbook—his fears of inadequacy and dependency become evident; the ultimate battle between one soldier and an invisible fatal enemy unfold to paint a picture of how health and masculinity were intertwined during the 1918 pandemic for the soldiers who would suffer, die from the illness, and never make it to war in Europe.

Not So Happily Ever After: How Fairy Tales Have Changed Nazeli Ekimyan

Once upon a time, the Little Mermaid watched her Prince marry another woman, the Sleeping Beauty was raped by a Prince and woke up from her deep slumber to find out she was the mother of twins, the Little Red Riding Hood never made it out alive, and Goldilocks broke her neck jumping out of a window. This project examines original fairy tales and how they have changed over the years through various adaptations in media and film. The purpose is to find an answer to the question of why these sugarcoated changes have been made over time. In order to answer the question, several earlier versions of fairy tales will be examined, along with how they have been adapted into popular culture and how their modern day interpretations differ from the original source. Research should show that popular culture turns fairy tales into stories with happy endings that will be easier to monetize, straying away from the original sources that were intended to teach young children a lesson. The project will conclude with the research being used

to write an adaptation of a fairy tale into a feature-length film that stays as true to the original moral and story of the source material. This adaptation is intended to depict that fairy tales can still be monetized and appeal to general audiences, even if they are strict adaptations of the original source in all of its gruesome glory and hard-to-swallow truth.

Novel Inhibitor of Pig Liver Esterase Activity

Samantha Garcia

Enzymes are specific proteins that work in coordination with a substrate to decrease the activation energy of a reaction by providing an alternative lower energy pathway, which will result in an overall faster rate of reaction. Enzymes are imperative for most biochemical reactions and are specific to the substrate they work on. The first part of our research used saturation kinetic experiment techniques to calculate the Michaelis constant (K_m) and the Maximum Velocity (V_{max}) of Porcine Liver Esterase. After the K_m and V_{max} were determined for Esterase alone these two values were then determined in the presence of Guanidine HCl and 4-methoxyphenylacetone (MPA) respectively. These two compounds are supposed inhibitors of the esterase enzyme. In order to measure the affect of the individual inhibitors on the activity of esterase it was necessary to conduct this procedure multiple times using varying concentrations of the inhibitors while keeping the esterase concentration constant. This procedure allowed us to construct Michaelis-Menten and Lineweaver Burk plots, which are crucial in enzymology studies for determining inhibition type. It was found that Guanidine HCl is a mixed inhibitor and 4-MPA is a competitive inhibitor of esterase. Mixed inhibition is characterized by having a higher K_m and a decreased V_{max} ; Competitive inhibition is characterized by having a higher K_m with the V_{max} remaining the same. With these promising results we will prepare a laboratory procedure for submission to be published in Biochemistry and Molecular Biology Education.

O

Observable Effects on Relativistic Orbits in Generalized Uncertainty Principle Space-time

Michael Lerner

Recent research has proposed modifying the Schwarzschild metric for space-time curvature by incorporating the generalized uncertainty principle, an extension of the Heisenberg uncertainty principle of quantum mechanics. The new metric was developed by Max Isi et. all and has the potential to better describe space-time curvature within the framework of General Relativity. These corrections, however, are incredibly minute and would only result in observable differences from the classical Schwarzschild metric when used to describe the motion objects travel in close proximity to incredibly large masses. These differences are most readily observable in the deflection of starlight bordering the event horizon of super-massive black holes, such as Sagittarius A* at the center of our galaxy.

The new GUP metric differs from the standard Schwarzschild metric by incorporating a minimum length scale for the distribution of mass. This equates to no singularity being present within a black hole; the mass instead reaches a quantum threshold density and then proceeds to “smear” into a physical area rather than collapse into one infinitely dense singular point. With this new description of mass distribution and associated differences in the curvature of space-time described by the GUP metric, observably different results arise when describing relativistic orbits of light-like particles in close proximity to large collections of mass. Incorporating this new GUP metric, the deflection of starlight around black hole events differs significantly enough from standard calculations to predict observable differences.

Utilizing the computer program Mathematica, deflection of starlight around Sagittarius A* was calculated with regards to both Schwarzschild and GUP metrics. The results offer potentially observable differences in the size of the black hole shadow of photons trapped in orbits precisely at the event horizon of the black hole.

The predicted deflection of starlight around supermassive black holes under each metric can then be compared to real world observations of Sagittarius A*, which will be obtained in the future by the Event Horizon Telescope project. Conclusions are then drawn from the comparable accuracy of each theory in predicting the observed effects.

The Old Sorrow: Adapting the Troubles in Northern Ireland to Theater

Emmett Schlenz

From 1969 to 1998, the conflict known as the Troubles raged in Northern Ireland, killing 3,500 people and devastating Belfast. It has been the source of many dramatic adaptations, from Neil Jordan’s Oscar-winning “The Crying Game” to “The Devil’s Own.” Hollywood adaptations, however, often dilute the complexities of the Northern Irish situation in favor of a streamlined, sensationalist narrative. One of the reasons for this, perhaps, is that while Jordan himself is Irish, those heading the Hollywood adaptations frequently are not and, consequently, are distanced from the material. My question, then, is how can I, an American writer, adequately address the Troubles despite my emotional and political distance?

To explore this question, I embarked upon a creative project of my own: a play about a hospital in Troubles-era Belfast. To get closer to the topic I visited Northern Ireland, attending lectures and festivals and performing interviews. I also explored Northern Irish drama, examining how local writers explored the topic of the Troubles, as well as reading about the history of hospitals in Northern Ireland and the stories of those who worked there. Through research and through the playwriting experience I learned that the crucial element of an honest and sensitive approach to the Troubles is a recognition within the text of authorial distance, an acknowledgement of one’s outsider status – not only is that absent from the sensationalist adaptations, but it is what I am

trying to capture with mine, and what all American writers adapting other people's history must consider.

Optimization of Heat Treatments and Mechanical Properties of 15-5 PH Stainless Steel for Fastener Applications

Elias Ashe, Xiaodong Sun

The objective of this project is to evaluate the mechanical and microstructural properties of 15-5 PH stainless steel for fasteners applications. In Sargent Aerospace & Defense Company, fasteners are heat treated prior to sending them to the aircraft industry and D.O.D. In random testing of the fasteners, many of them fail testing after the heat treatment. There is a need to optimize the heat treatments and find a narrow window that will ensure obtaining acceptable mechanical properties. Steel bars from two vendors (Gloria and UTA) were provided. Each of these were around 40 feet in length and 1" in diameter. These bars were cut to smaller dimensions and then machined to tensile bars and shear specimens. The heat treatments, tensile testing, and microstructural studies were conducted at LMU while the shear testing will be conducted at Sargent Aerospace & Defense Co.

The heat treatments were performed at the following temperatures: 900, 925, 950, 975, 1000, 1025, 1050, 1075, 1100, 1125, 1150, 1175, 1200, and 1225 degrees Fahrenheit. The duration of heat treatments was between 1 and 4 hours. The yield strength, ultimate strength, percent reduction in area, and percent elongation were calculated after the tensile testing was done. In the microstructure analysis, the grain structure was determined and the grain sizes were measured. A correlation between the mechanical properties and the microstructure was made and a model was derived to predict the different mechanical properties at different heat treatments.

An Original Protest?: Influences on Martin Luther's Theology in "The Freedom of a Christian" and "The Ninety-Five Theses on the Power and Efficacy of Indulgences"

Claire Andreae

German friar, priest, and professor of theology Martin Luther, is most widely known for initiating the Protestant Reformation. In one of his major reform treatises, *The Freedom of a Christian*, Luther presents theological concepts that opposed the Catholic doctrine on salvation. In his 95 Theses, Luther further attacks the Catholic Church and the papacy by exposing the false reasoning and justification behind many different clerical abuses, such as using the sale of indulgences to finance the construction of cathedrals or crusades. While many of Luther's ideas are radical in their novelty, some are also adapted from earlier religious thinkers and movements. This paper analyzes the three main influences on Luther's theology, namely St. Augustine, Ockhamism, and the vicar-general of the German Augustinians, Johann Staupitz, and focuses on the topics of faith, works, sin, and redemption. This research paper argues that Luther's new stance on Christianity was not as original as most people assume, but rather a conglomeration of

various other Christian movements and ideas. In certain cases, Luther directly adopts earlier teachings, such as St. Augustine's notion that two opposing forces characterize the human being's nature. In other areas, Luther develops existing ideas further to create his own original interpretation of Scripture and Christian belief. Therefore, Luther cannot be seen as an isolated individual developing new revolutionary ideas about Christian teachings separated from his theological, philosophical, and historical context. In fact, without his exposure to different teachings, schools, and writings, Luther's texts would not have been as theologically and culturally influential, groundbreaking, and subversive as history proved them to be.

Our Climate of Inequality

Clara Brackbill

Climate change inequality, perhaps one of the most daunting challenges facing future generations, is an established topic on the international agenda. It is well known that impoverished nations face the largest climate change-related impacts, while wealthy nations have the largest footprints. Equally as unjust, but discussed with far less regularity, are the realities of local environmental disparities. In Los Angeles, certain communities face greater risk of air quality-related health effects than others. Combining records from the EPA AirData set and the Los Angeles Times "LA Mapping" initiative reveal that differences in pollutant concentrations, specifically NO_x, are divided along racial and economic lines. A byproduct of automotive combustion, nitrogen oxides (NO_x) are linked to respiratory illnesses and cardiovascular complications. In a sample of eleven Los Angeles neighborhoods, NO_x concentrations from 2010 to 2015 are generally higher in less affluent and more diverse neighborhoods than in wealthy, less diverse neighborhoods. These results are consistent with the findings of similar studies: a project completed by scholars from USC and Occidental College found that Latino children are more likely to attend school near hazardous facilities associated with outdoor toxin exposure. Amidst the current events highlighting racial inequality in the United States, issues of environmental justice must be part of the dialogue.

Out from the shadows: Black midlife and older gay and lesbian adults' experiences of resilience and marginalization

Aaliyah Jordan

Out from the Shadows is an intersectional analysis that is designed to examine the manners by which social institutions enforce social norms, and the effects of these processes. The research question guiding this study is: What are the ways in which social norms and stigma affect middle and older gay and lesbians adults experiences? My specific focus is the intersection of gender, race, aging, and sexual orientation. Out from the Shadows is a qualitative study that analyzes the interview data from six black gay male and lesbian participants collected in the Caring and Aging with Pride and Aging Under the Radar studies. Processes of open coding were used to identify the themes that are present in the interview transcripts. Preliminary findings demonstrate

that participants' means of self-identification are often a reflection of the ideals and values that are supported by community structures and organizations; this becomes troublesome for midlife and older lesbian and gay adults of color, as hegemony dictates these forms of identity in an unfavorable manner. For example, older, gay, African American, men whose religious and community identities are Southern Baptist or Evangelical may face challenges in identifying as gay due to the ways that masculinity and homosexuality are treated in their religious communities, especially considering the historical and cultural legacy of the church in black communities. In other words, these individuals' processes of self-identification become complicated by societal pressures to achieve "normative" status, the associated benefits of the status, stigmatization, and internalized oppression.

Oxidation of Water Catalyzed via Natural and Synthetic Organic Species

Alexandra Horvath

There is evidence of catalytic formation of peroxide and ozone products via reactions between some amino acids and singlet oxygen in the presence of water. The initial process of the oxidation mechanism involves the amino acid and surrounding reactive singlet oxygen reacting to yield an endoperoxide at a chiral carbon. From these foundations we propose two possible mechanisms for the oxidation of water in the presence of the mentioned endoperoxide. The first mechanism we explore oxidizes water to hydrogen peroxide and leaves an alcohol group on the amino acid, while the second mechanism yields the original amino acid and trioxidane, which promptly degrades to form hydrogen peroxide. Employing density functional calculations to investigate the reactant, product, and transition state energetics, we characterize the potential energy surface of these two independent mechanisms for amino acids histidine and tryptophan. Additionally, the mechanism has been explored experimentally by studying the decomposition of tryptophan hydroperoxide intermediates. Tert-butylindole was synthesized using the Fischer Indole Synthesis. Upon the addition of oxalyl chloride, ammonia, and subsequent reduction, t-butyl tryptamine was synthesized in good yields. Protection of the free amine using acetic anhydride resulted in formation of N-acetyl-t-butyl-tryptamine. Singlet-oxygen mediated oxidation afforded the tryptophan hydroperoxide, and decomposition studies are currently under investigation. The energetics for the two catalytic pathways provide insight into water oxidation reactions via common organic molecules.

P

A Pair of Horns and a Tail: Approaching an Aesthetics of Ugliness

Raciel Cuevas

The category of ugliness has been largely overlooked by philosophical aesthetic investigations. Traditional theories identify it as a privation — a deformity that merely denotes the absence of

beauty and, more often than not, signifies moral turpitude. Given ugliness' minor role within these aesthetic theories, remarks regarding the category are typically said in passing and without supplemental arguments. But why care about ugliness as a substantive aesthetic category? It seems that an investigation of beauty is incomplete without a full account of its supposed opposite; surely, no one is surprised when ethicists inquire about evil or physicians about illness. Even if we grant the status of ugliness as privation— in other words, that it does not exist — we behave as if it is a real quality obtaining in objects we everyday encounter. At the very least, this requires some explanation. The aim of this project is to critically examine the treatment of aesthetic ugliness by five 18th century thinkers: the Earl of Shaftesbury, Francis Hutcheson, David Hume, Edmund Burke, and Immanuel Kant. An analysis of their texts, I argue, motivates us to reconsider the response to the question of whether ugliness can be a pure aesthetic category, a value independent of moral and conceptual reflection. My central claim is that the problems faced by these thinkers in accommodating ugliness ought to incline us toward a pluralist theory of aesthetic value, which would account for negative aesthetic judgments more robustly.

Perceptions of Appearance Toward the Self and Others

Allison Swenson

This study explored perceptions of appearance toward oneself and others. Researchers investigated how people view their own appearance differently than images of others, and how gender may influence these perceptions. Researchers hypothesized that people would perceive their own body image negatively in comparison to the ways in which strangers viewed their appearance. Three college-age males and three college-age females were selected and gave consent to be the main participants in the study, which consisted of three distinct phases. In the first phase, each selected individual was photographed and asked to write perceptions of his or her own appearance on a mirror while looking into it. In the second part of the study, people passing by were asked to write comments about how they perceived the appearances of the main six participants in the photos. Last, the main participants met with researchers, who revealed what commenters wrote about their appearance. Their reactions were filmed. The study confirmed the research hypothesis, and also found that others' comments on an individual's appearance tended to be more personality-driven than physicality-driven. Researchers also found a slight variation in results by gender, with males reporting more positive comments toward their own bodies than females. After explaining the findings, this paper goes on to discuss the findings' relationship with the literature on body image, as well as implications with regard to future research and the goals of the capstone course.

Perceptions of Criminality based on Facial Photographs

Elizabeth Key-Comis

This study will examine if individuals can perceive criminality based on facial photographs and will investigate facial qualities that might be related to these perceptions. In a pilot test for the 2015 Summer Undergraduate Research Program, 15 participants rated, photographs of violent and nonviolent criminals, and noncriminals, on perceived criminality (1 = not at all to 7 = extremely). Results revealed a significant effect of face type whereby faces of violent ($M = 3.61$, $SD = 0.77$) and nonviolent criminals ($M = 3.64$, $SD = 0.89$) were rated as more criminal than noncriminal faces ($M = 2.84$, $SD = 0.78$), $F(2, 13) = 15.48$, $p < .01$. The present study is an extension of the summer project with new participants and measurement of new variables. Stimuli photographs of 50 target male faces were collected from public online databases; 20 convicted criminals from violent/ sexual offender registries, 10 individuals arrested but not necessarily convicted, 20 noncriminals from LinkedIn and a UT Dallas face database (Minear & Park, 2004). Data have been collected from 176 participants, from Amazon's mTurk (www.mturk.com), and they rated target photographs on perceived criminality. It is predicted that participants will perceive criminality and recidivism at above-chance levels. An additional 24 participants rated target faces on facial qualities such as perceived aggression and masculinity to test the prediction that higher perceived criminality will be associated with facial qualities. This research is being completed as part of an Honors in Psychology thesis project.

Photon Geodesics of a Generalized Uncertainty Principle (GUP) Inspired Metric

Luciano Manfredi

In this project, characteristics of photon geodesics in a class of GUP black holes that mimic dimensional reduction at the Planck scale are investigated. This is achieved by theoretical derivations as well as computer calculations and simulations to display the results. Moreover, the static metric is modified to account for rotation. Specifically, gravitational lensing effects and morphological characteristics of the photon sphere are studied in detail. Finally, to provide experimental verifiability, deviations from standard general relativistic (GR) predictions will be determined, and the likelihood of observing such effects in the Event Horizon Telescope (EHT) will be addressed, thus providing a direction for future research in this area. While such corrections are likely to be small and confined to the near-horizon regime, it is anticipated that the projected resolution of the EHT will be able to provide a first-order glimpse of such potential deviations from GR.

Photosynthetic Characterization of Invasive Plant Species in Los Angeles County, CA

Rulla Al-khayat, Erich Eberts, Lauren Pangburn

The increase in atmospheric CO₂ levels due to climate change may greatly impact invasive plant species, which are non-native organisms that spread unchecked in space and negatively impact native organisms. The success of these invasives may be related to specific traits, such as their photosynthetic pathway. We acquired the specimen information for invasive species registered in the Consortium for California Herbaria of the University of California Berkeley to evaluate the community dynamics of 1,000 invasive species in Los Angeles County. We found that both diversity and richness of invasive plant species has / increased over a period of 180 years. We hypothesize that the pattern of occurrence of a given photosynthetic pathway may correspond with historical increases in atmospheric CO₂ concentrations, therein favoring invasives with a C₃ photosynthetic strategy. We utilized the primary literature to identify the photosynthetic pathway for all of the invasive plant species in our database, then used curve-fitting techniques to evaluate the change in richness for C₃, C₄, and CAM. We found evidence to support that C₃ invasives were indeed favored over C₄ and CAM. We are currently examining stomatal densities of historical specimens in order to link this finding to CO₂ levels. If stomatal densities of these C₃ invasives has decreased, they have been responding to increased CO₂, supporting our hypothesis.

Physiology of Addiction in Performance: Opioid Pharmacology in Character Development for the Theater

Lacey Smith

Actors inquire into the physical, mental, and emotional impulses of their respective characters in the effort to develop a cohesive persona for the stage. The goal of this research is to determine whether a more thorough, scientific understanding of the physiopsychological phenomena a character experiences, specifically opioid withdrawal, will aid in the depiction of symptoms on stage. The project began with a research period and culminated in physical dissemination through theater performance. Both video, audio, and text media were utilized to establish a thorough comprehension of the physiological mechanisms in opioid addiction. Further profiling of the characteristics and symptomatic episodes of addicted persons were emphasized in the research period to be implemented and represented in rehearsal. The rehearsal process was comprised of three-four hours of rehearsal for seven weeks and included both individual character work with the director as well as scene work with fellow actors. Six shows in total were performed in the Barnelle Theater and research was found to be particularly applicable in Act 1, Scene 2 of the show. Physical symptoms of withdrawal, such as hot and cold sweats, muscular cramping, shaking, and physical anxiety, were mimicked and integrated into performance to convey opioid dependence. It was determined that understanding the science behind the symptoms allowed for a more realistic depiction of addiction in performance. Further

research should include in-person testimony and interviews from individuals who have experienced substance abuse, withdrawal, and addiction.

Playing it Safe: The Role of Safetivism in Political Participation

Ugonma Nwankwo

The rise of social media has provided people and political organizations with the ability to easily access information, communicate, and organize. However, despite the efficiency of social media, most young adults remain unwilling or unmotivated to engage in high-risk forms of political participation, such as rallying, demonstrating, and recruiting supporters for the cause. The existing literature on political participation in the social media era defines a spectrum of civic engagement from true activists on one extreme, slacktivists in the middle, and nonparticipants on the other extreme. However, there has been little exploration of an alternate mode of political activism within the spectrum. In this study, I introduce a new conceptualization of online political activist: the safetivist. A safetivist is a person who engages in low-risk activism (e.g., social media activism) not because they are “slackers,” but rather because they fear the repercussions they may face if they engage in high-risk political participation. This study allows for an examination of the role of safetivism in modern movements. First, I will administer a survey to 500 participants to gauge safetivist behavior among young people between the ages of 18 – 29. Second, I will conduct a case study to evaluate how the risk level involved in the Black Lives Matter and the Bring Back Our Girls movements informs a person’s decision to participate either online or offline. Through this study, we will better understand why some people choose to politically participate offline in certain movements and online in others.

Political Roadblocks to Economic Integration: Comparative Case Studies

Michael Busse

The globalizing economy is changing the way nations relate to each other, but not nearly as quickly or as smoothly as has been predicated by many scholars and the business community. The root of the roadblocks lie in the relationship between political and economic integration. Functionalist interpretations of global economic integration dictate that strengthening economic ties between states will lead to inevitable political integration. Such economic globalization has been accelerated not only by new technology, but also by politically facilitated free trade agreements. However, even though globalization and free trade have led to net economic growth in both developing and developed nations, opposition to the resulting political integration has grown among local electorates. As a result, a pattern of government leaders resisting global economic integration for domestic political reasons has emerged. To illustrate this paradox, my research examines two case studies, Indonesia and France. Integrating theories of regional economic integration with trade data, the parallel between the two cases – one developing nation

and one developed – illustrates how domestic politics provides hurdles to the supposedly inevitable political integration that comes with the globalized economy.

Power and Gender: British Women’s Role in 19th Century Imperial India

Mary Densmore

The following paper looks at the complex role British women in nineteenth and twentieth century India played, exploring specifically their experience of the domestic sphere in imperial spaces. Like Alison Blunt, geographical scholar and historian, I consider the exercise of imperial power on a domestic scale, rather than viewing the spheres of home and empire as two separate experiences. By studying various household guides, meant to give advice to new wives on how to create and run a British home in a foreign space, I examine the pressures and mechanics of how British women were meant to fulfill their own imperial duty within the home — just as men were expected to enact imperialism in public spaces. I argue against the stereotypical trope of the “memsahib” as passive, lazy, and frivolous, instead focusing on the intersectionality of British woman’s gender and class-driven imperial power relations. Lastly, I propose a link between British women’s expanded roles of power abroad at the expense people of color, and the beginning seeds of a socio-economically and racially exclusive First Wave feminism in the western world — a legacy that still exists in issues surrounding today's feminist discourse.

Predator and Prey Availability: A study of the Impact of Prey Accessibility and Watershed Conditions on the Growth Rates of Juvenile Chinook Salmon in the Salish Sea

Margaret O'Neil

Since the 1980’s, Chinook salmon survival rates have been reported as below 1% in the Salish Sea. Due to the large economic, cultural, and ecological impacts Chinook have on the surrounding area, the Salish Sea Marine Survival project was created to determine the cause of the low survival rates in these fish. Under the supervision of Dr. David Beauchamp and Madilyn Gamble of the University of Washington’s School of Aquatic and Fisheries Sciences, this 2015 study looked at the impact of diet composition and energy availability on the growth rate of juvenile Chinook salmon which were collected the previous summer. The diet composition and growth rates were used to determine which regions of the Salish Sea were most and least productive towards juvenile Chinook growth rates throughout the summer. Diet composition data was collected through dissecting the stomachs of the salmon sampled, categorizing based off of prey type, and weighing the prey. Scale sample data was collected from each fish to predict their growth rate, and the growth rates were compared between categories to determine which watershed, time of year, and origin type were found to be the most conducive or harmful to growth rate. It was found through this analysis that the Nooksack watershed in August is the most productive of the four watersheds studied, and that the Skagit watershed in Early July was the least productive.

Programmable, Inexpensive, Visual Aid System in the Classroom using Augmented Reality

Sean Cunniff, Patrick Foster

According to the CDC, 14 million people in the United States have visual impairment, and 21.4% of them cannot see with the use of a glass lens. Low vision can have an exceptionally negative impact on a student's ability to learn, especially in the conventional education system. The goal of this project is to create a customizable application for a smartphone (Android) that implements selective image processing to make it easier for visually impaired students to learn from lectures.

This application will consist of two primary components. The first is the image processor, which modifies the image received by the camera on the phone in order to selectively alter key aspects of it. For example, in the context of this project, the image could be a whiteboard with handwritten notes on it. The application will use the open-source OpenCV library, consisting of filters, image transformations, feature detection and object tracking functions. This processor must work on a real-time feed to be useful. Hardware acceleration, the second component, consists of parallelizing fundamental processes to speed up computations. This is achieved in practice by distributing these computations to the phone's GPU using OpenGL ES (a C-like language) which will interface with the OpenCV technology.

A direct consequence of this project is solving a problem in the classroom for visually impaired students not yet addressed by current technologies. If this project is successful, it will make lectures more accessible to visually impaired students as well as work environments outside of the classroom.

Q

Quantification of Anthocyanins with UV Spectroscopy

Michael Erike, Johanna Lugo

Anthocyanins are vacuolar pigments that play important physiological and defense roles in plant biology. Anthocyanins absorb UV radiation, which serves to protect plant tissues from lignin degradation and high-light stress (termed photoinhibition). The Castor bean plant (*Ricinus communis* L.) is a pioneer species that grows in high light environments and has anthocyanins in its leaves and stems that give it a distinct variable red coloration. However, Castor bean plants also attract ants to defend its plant tissues, via specialized extra-floral nectar glands located along its leaves and stems. In accordance with the principle of allocation, ant-loving plants (termed myrmecophytes) must compromise between chemical defense and biotic defense investment. The objective of this study is to evaluate investment tradeoffs in chemical and biotic plant-defense strategies in Castor bean plants growing in non-native habitats in southern California. The goal of this project is to develop a methodology to detect and quantify anthocyanin

concentrations in Castor bean leaves and stems by means of a portable UV-VIS spectrometer. The methodology involves analyzing light intensities at specific wavelengths in order to create an index to quantify color, and therefore be able to quantify how much energy the plant is allocating for sugar production. This analytical technique will ultimately be linked to an evaluation of the variation of myrmecophyte defense optimization strategies across different ecological communities.

Quantitation of Anthocyanins in an Exotic Myrmecophyte Via UV/VIS Spectroscopy

Gabriel Huacuja, Kewku Larbie

Anthocyanins are a type of chemical defense distinguishable by red, vacuolar, pigments and help plants with important physiological and defensive roles in plant biology. They help to absorb UV radiation, which serves to protect plant tissues from lignin degradation, and can potentially be used as a form of solar cell. Anthocyanin synthesis in plants also produces an unpalatable phenolic compound, which serves to protect plant tissues from herbivores. The Castor bean plant (*Ricinus communis* L.) grows in high light environments and has anthocyanins in its lamina and petioles that give its' distinct and variable red coloration. The ability to produce anthocyanins is a powerful defense mechanism within the castor bean, which is also accompanied by its own biotic defenses known as extra floral nectar glands (EFN). Plants like the castor bean are known as myrmecophytes, meaning they attract ants to defend its plant tissues, via these extra-floral nectar glands located along lamina and petioles. In accordance with the principle of allocation and the optimal plant defense theory, ant-loving plants must compromise their energy distribution between the chemical defense (anthocyanins) and biotic defense (EFN gland) investment in accordance with its environment. There is a unique negative correlation between the red pigment (anthocyanin) and the number of EFN glands located on the petiole that is not present on the lamina. The objective of this study is to evaluate investment tradeoffs in chemical and biotic plant-defense strategies in Castor bean growing in non-native habitats in southern California. Additionally, the goal of this project is to troubleshoot and develop a methodology to detect and measure anthocyanin concentrations in Castor bean leaves and stems by means of UV-VIS spectroscopy. This analytical technique will ultimately be linked to an evaluation of the variation of myrmecophyte defense optimization strategies across different ecological communities.

R

Race, Space, and Police in Los Angeles City: Narratives of Resistance and the Limits of Agency

Alexia R. Barbaro

What is the relationship between material practices of policing and crime reporting in the United States and how we think about resistance, political agency, and democratic theory? Building on a case study of policing in Los Angeles from 2005 to 2013, I ask two questions: 1) do current policing techniques (organized around “zero-tolerance” models that infringe upon citizens rights) and the 911 system (which invites police into neighborhoods to potentially infringe upon the civil rights of minorities) jointly lead to higher likelihoods of arrest and conviction of members of within communities in urban areas? And 2) what are the conditions of possibility that allow these events to occur? This paper draws on multiple methods of analysis, first on quantitative analysis demonstrating a strong positive correlation between the number of arrests amongst minorities in Los Angeles and the number of 911 routine calls made to the LAPD, second, on a critical genealogy of the 911 system and LAPD patrol car maps, and third, on an original survey instrument administered to members of over-policed communities in Los Angeles. In conversation with existing theoretical scholarship on race, policing, and space, I offer an account of agency that underscores how limited political agency may be identified through precarious forms of resistance. This account prioritizes our attention to the specific limitations placed on action by unseen forces and silent deployments. The seemingly “neutral” workings of the state may help us better understand "deviant" political actions as also resistant political actions.

The RE Rental Market near LMU, for Students and Investors

Timothy Nguyen

LMU’s 90045 ZIP code is one of few in Southern California that has seen housing and investment real estate markets return to pre-crash levels. In fact, the rental market is the least affordable it has ever been, and housing prices in the area have climbed 25% in the last two years alone. One significant contributor is the emergence of Silicon Beach, the tech and real estate phenomenon that is rapidly gentrifying areas just north of Westchester including Santa Monica, Venice, Marina del Rey, and especially Playa Vista. At the moment, over 500 technology start-ups reside in or have relocated to this ‘Silicon Beach’ region as well as big boys and girls such as Google, Yahoo!, YouTube, and Snapchat. This has increased the population in the vicinity, the demand for housing, and in turn, rent levels. For the LMU student, what do rents currently look like living off-campus compared to living in dorm or apartment on-campus? For the real estate investor, what might rates and prices be in this new market? Additionally, what trends might help to understand where rates and rents may go in the future? Using a combination of real estate fieldwork with CoStar data and analytics, this thesis seeks to be a comprehensive report of the apartment real estate market for both students considering leasing off-campus and investors

wishing to finance a property complete with building descriptions, amenities comparisons, rent/vacancy forecasts, and investment feasibility analyses.

The Recreation and Evaluation of a Human Hand Using Low-Cost Reverse Engineering and 3D Printing Systems

Elias Ashe, Cassandra Jacobsen

The primary goal of this research is to evaluate the effectiveness of a low-cost reverse engineering system to recreate a physical, three-dimensional model of a human hand. In order to achieve the goal of this research, three key objectives were fulfilled: (1) the first objective was to recreate the physical model of the human hand using a low-cost experimental setup (<\$5000), (2) the second objective was to assess the ability of the reverse engineered hand to perform common tasks of every-day life, and (3) the third objective was to investigate the potential biomedical applications of the reverse engineered human hand. A chosen test subject had his/her hand molded and cast into a plaster three-dimensional model that could be held steady and scanned very precisely by a NextEngine Desktop 3D Scanner. Other methods could have been employed to achieve the scanned model, but given the experimental setup and timeline a casted model was assumed to be the most appropriate method to achieve the best results. The plaster casting of the subject's hand was scanned several times using different orientations of the model relative to the stationary 3D scanner. From these scans, a computer CAD model of the human hand was generated, modified, and 3D printed. The printed model was evaluated by its ability to perform common every-day tasks such as picking up a cup/bottle, holding a pen/pencil, or opening/closing around an object. Several iterations of the printed human hand were evaluated in order to determine the best design for the fingers' joints and cable-driven motion system. Although the possibilities of reverse engineering and 3D printing systems have greatly expanded as a result of greater affordability and increased accuracy, their applications in the biomedical field have yet to be fully explored.

The Relationship Between First-Generation College Status and Co-Curricular Engagement on the University Satisfaction of Students

Angelica Diaz, Nicole Muldoon

As an increasing number of first-generation students attend college, it is important for universities to understand and meaningfully respond to the unique needs of these students in order to ensure that they have the same quality of experience as non-first-generation students. The purpose of this paper is to examine the relationships between first-generation college status, co-curricular involvement and engagement on university satisfaction amongst students. The sample for this study consisted of 204 first- and fourth-year university students who completed an online survey administered as part of the Youth Cultures Study conducted under the auspices of the International Federation of Catholic Universities. Results showed a significant interaction effect between generational status and co-curricular activity on university satisfaction. Non-first

generation students who were involved in co-curricular activities showed significantly higher levels of satisfaction as compared to those not involved. The level of satisfaction for first-generation students followed a similar pattern, but those first-generation students who reported no involvement in co-curricular activities showed the lowest level of satisfaction with their university experience as compared to other first-generation students who were involved. Additionally, level of university satisfaction increased significantly in a stepwise fashion as level (none, some, high) of co-curricular involvement increased. There were no differences between first-generation students and non-first generation students with regard to overall co-curricular engagement. However, first-generation students were significantly more engaged in spiritual and/or service-based activities as compared to non-first-generation students. The findings of this study suggest that first-generation college status is an important factor associated with type of co-curricular involvement and university satisfaction. Implications for further research on special programs for first-generation students are discussed.

The relationship between self-esteem, academic satisfaction and life satisfaction in first and fourth year students

Cielo Garat

This study was conducted in order to examine the relationship between self-esteem and academic and life satisfaction. Previous research shows the difficulty students are faced with when choosing a major or career path and the possible characteristics that assure a good selection over a poor one. In order to expand on this research, I analyzed data previously collected from college students. The Youth Cultures study was conducted by the International Federation of Catholic Universities' Center for Coordination of Research and LMU between 2012- 2013. Loyola Marymount was one of over 70 Catholic universities participating in the project. The study sample consisted of 204 (60 males, 144 females) first and fourth year LMU students. I predicted that those who have higher levels of self-esteem would report higher levels of academic satisfaction as compared to those with lower levels of self-esteem. My second prediction was that males would have lower levels of academic satisfaction as compared to women and lastly that those who express greater confidence in achieving their future goals will report greater life satisfaction as compared to those who express less confidence. Results indicated a significant positive, moderate, correlation between high levels of self-esteem and academic satisfaction. Results also supported my second hypothesis that men have less academic satisfaction as compared to women. Furthermore, a significant positive correlation was found between expressing greater confidence in achieving future goals and life satisfaction. The results suggest that high levels of self-esteem can be key in achieving higher levels of academic satisfaction and thus play a role in selecting a major and career path. Such findings are consistent with the literature. Implications for these findings are explored.

Relationships of Location and Quantity of EFN Glands with Recruitment of Ants

Claudia Aliman, Megan Ho

The Castor bean plant and Argentine ant are two invasive species that have no evolutionary history together, but have a mutualistic interaction with one another. Castor bean plants have extrafloral nectary glands that secrete nectar with a chemical composition of 1:1:1 ratio of sucrose, fructose, and glucose. This nectar attracts Argentine ants to the Castor bean plant, and in return the ants provide defense against plant herbivores. The objective of this study was to manipulate the location and number of extrafloral nectary glands on Castor bean plants to determine if these two factors play a part in the recruitment of Argentine ants to the plant. The effects of quality and quantity of resources on mutualism is also determined. It was hypothesized that the recruitment of Argentine ants to Castor bean plants are influenced by the quantity and location of extrafloral nectary glands. Results show that there was a change in the mean number of Argentine ants recruited to the leaf-laminas of Castor bean plant with respect to location of the artificial extrafloral nectary glands, but there was no change in the mean number of Argentine ants recruited throughout the entire plant. More Argentine ants were recruited to plants with two artificial extrafloral nectary glands. However, there was no change in the mean number of Argentine ants recruited throughout the plant and to the leaf-laminas with respect to the quantity of the artificial extrafloral nectary glands. Plant morphology structure recruits a non-native species of ants creating a mutualistic interaction between the two of them.

Requirements for Utilization of the Wireless Emergency Alert System to Help Increase Low Voter Turnout in State and Local Elections

Christian Beltran

Low voter turnout is a recurring issue amongst municipalities and states across the U.S. In the City of Los Angeles, only 23% cast ballots in the 2013 mayoral election. This project focuses on outlining the appropriate legislative and non-legislative routes necessary for implementation of the Wireless Emergency Alert system as a method for increasing voter turnout. By using existing infrastructure of the Wireless Emergency Alert system, managed by the FCC and FEMA, a reminder could potentially make people vote increasing voter turnout. In comparison to SMS messages and robocalls, Wireless Emergency Alerts are efficient and cost effective methods to communicate to the public. This is particularly true with millennials, who historically have the lowest turnout. An analysis of FCC and FEMA regulations, along with congressional records of how the AMBER and Silver alerts became federal law will be used to analyze the plausibility of this recommendation. Academic journals regarding the utilization of a data network for emergency alerts will also be used to analyze the effectiveness of this system. The goal of this project is to assess the feasibility of this proposal and to outline the steps necessary to take in order for implementation to occur.

The Role of Working Memory in Problem Solving and Mental Workload

Alice Gavarrete Olvera

In the field of neuropsychology, working memory and problem solving performance have been heavily studied. However, neuropsychologists have not taken mental workload into consideration when looking at these variables even though it can reveal additional information on a person's cognitive state. The purpose of this study was to examine problem solving performance and working memory and identify their relationship with mental workload using the scores of college students on the Letter Number Sequence Task (LNS) and Tower of Hanoi (TOH). It was predicted that students with better working memory would have better problem solving performance and reduced mental workload compared to students with poorer working memory. Problem solving performance was measured using the time and number of moves needed to complete the TOH (3-disk, 4-disk, and 5-disk) while working memory was evaluated by trial score on LNS task. Mental workload for the TOH was measured using self-reported scores on the NASA Task Load Index (TLX), a questionnaire developed by human factors psychologists to assess factors like effort and frustration. The results of a sample of 104 students who completed the TOH revealed there was a significant negative correlation between the scores on the working memory task and the effort and frustration experienced during the completion of the TOH-5. However, this correlation was not significant for the TOH-4 or TOH-3. These results suggest that participants with better working memory experience lower levels of frustration and effort than those with poorer working memory as the difficulty of the task increases.

S

Santa Maria: Intercessor, Guide, and Mother

Shannon Hayes

The basilica of Santa Maria Maggiore in Rome is the oldest church in the West built to foster devotion towards the Blessed Virgin Mary. It illuminates the evolution of Marian theology and art history through its architectural layout, iconography, and mosaic programs, which offer important insight into medieval artistic traditions. Due to the upwards progression of symbols from the "Holy Crib" beneath the altar to the late thirteenth-century mosaics decorating the apse, as well as the intercessory use of the Byzantine icon known as the "Madonna Salus Populi Romani," the basilica stands as a testament to the life and influence of Mary in the Catholic Church. In an LMU Study Abroad course titled "Christianity and Art in Rome," I had the opportunity to conduct on-site research at the basilica. This method of inquiry allowed me to engage with the subject more effectively than I could have through only literary, historical, or photographic sources by allowing me to view it in its three-dimensional context—more than simply as a distant artistic and architectural marvel. From the altar to the cathedra, then upwards through the apse, the basilica artistically communicates that Mary guides Christians toward her

son, Christ, through the sacrament of the Eucharist. The basilica's visual dialogue among Marian images—her life as a mother to Christ, her relationship with His followers, her death and resurrection as queen in God's eternal kingdom, her love for later generations—reveals her role as an intercessor, guide, and mother to all Christians.

Seasonal Trends in BVOC Content of Local Native and Nonnative Plants

Allison Croul

Biogenic Volatile Organic Compounds (BVOCs) are naturally produced organic chemical compounds produced emitted into the atmosphere. The overall research goal is to identify and quantify the BVOC emissions that affect the climate and air quality. The specific focus of this project is to quantify BVOCs present within local vegetation in order to identify potential high BVOC- emitters. Leaves from three native and two nonnative plants were taken from the vicinity of Loyola Marymount University campus approximately every month since July of 2014. Terpenes (a class of BVOCs produced by plants) were extracted from the freeze-dried leaf samples and analyzed using gas chromatography-mass spectrometry instrumentation. The results will show seasonal trends in the monoterpene (C₁₀H₁₆) and sesquiterpene (C₁₅H₂₄) content within the leaves, specifically focusing on the BVOC response to temperature fluctuation and rainfall. Preliminary data suggests that reducing the stress caused by drought provides additional resources for the biosynthesis of terpenes.

Shifting Tides and the Subway to the Sea

Matthew Campos

How did the areas surrounding the Expo Line stops change demographically through the public announcement, the construction, and the operation of the Expo Line? This project examines the demographic shifts caused by the construction of the Expo Line from Downtown Los Angeles to Culver City. The Expo Line started construction in 2006 and was completed and opened to the public in 2012. The Exposition Metro Line Construction Authority, created in 2003 to plan and construct the Expo Line, was charged with moving towards Context Sensitive Solutions which aim to improve transportation options while also considering the social and economic contexts of new development. This project examines the demographic shifts caused by the construction of the Expo Line from Downtown Los Angeles to Culver City, and analyzes the efficacy of Contexts Sensitive Solutions. I will consider Tapestry Segmentation, a geodemographic system based on socioeconomic and demographic characteristics, of these areas in combination with American Community Service data from 2005-2012 to analyze how each area within a quarter mile of the Expo Line stops have changed. Using geographic information systems (GIS) software I can visualize the areas affected. My project will also include a predictive component for the future of the Expo Line's expansion to Santa Monica and Metro Rail's other expansions planned through 2036.

Societal and Biological Interactions of the Culver City Rain Garden

Emily Simso

Green infrastructure, an offshoot of urban ecology, is a sustainable strategy to address some of the problems caused by climate change. Looking at urban greening is increasingly relevant as cities reconsider their planning and development to better accommodate their citizens.

Background research demonstrated that there is a delicate balance between humans and the environment, which is an important contributor to standard of living. This study aims to look at the importance of the Ballona Creek rain garden in Culver City, California to residents living adjacent to the site. Cities are relevant sites for climate related research because they are the centers of both many of the major problems and the innovative solutions. Residents around the rain garden will be surveyed to measure their view of, how often they use, and how they perceive benefits of green spaces. This will be done through an online survey, the link for which will be distributed to residents within $\frac{1}{4}$ mile of the rain garden. It is expected that residents will have varying degrees of understanding regarding how the garden connects to other issues, but that they may feel more of the societal impacts. By examining the opinions and viewpoints of residents, it is predicted that Culver City will feel encouraged to implement other green infrastructure projects. Similarly, this could expand to other neighboring cities that are interested in urban greening, specifically rain gardens, providing more knowledge on how humans interact with their environments.

Spatial Mismatch in South L.A.

Damian Gatto

Spatial mismatch is a paradox observed in cities whereby low-income residents often live furthest from viable employment opportunities. McKenzie's (2013) study of spatial mismatch in Portland, Oregon—and similar studies—have identified several causal patterns: lower educational levels, poor job opportunities associated with the decline of American downtowns, transit-related expenses, the prevalence of sedentary lifestyles, and comparatively lower automobile ownership amongst lower classes. My research evaluates the findings of McKenzie (2013) and others in the context of South-Central and Southeast Los Angeles. As the dependent variable I use "transit route choice," indicating the walking distance to available transit stops or methods and as independent variables, I use households with/without cars, population density, race, age, and prevalence of renters. Through performance of multiple-regression analysis of these variables using data from the Census Bureau's American Community Survey, this study will explore whether incidences of spatial mismatch amongst lower-class Angelenos are shaped by access to personal or public transit, or purely proximity to work, or whether spatial mismatch is even a serious problem in L.A. I expect to find poor labor market outcomes, as well as many of the causal patterns noted in academic studies, in areas furthest from Downtown, from rail

transit, and/or that have the lowest car ownership. What steps should be taken to reduce these symptoms of spatial mismatch, and which of the above factors need the most urgent attention? In the long term, I aim to contribute to resolving the paradox of spatial mismatch in Los Angeles.

Star-Spangled Man with a Plan: Captain America as Resonant Historical and Political Literature

Jaime Maier

This project examines the Captain America franchise for its significance as historical and non-partisan political literature. Created by Jack Kirby and Joe Simon, two first-generation Jewish immigrants from New York, Captain America first appeared punching Adolf Hitler in the face in 1941, months before the United States entered WWII. This pivotal Marvel character has withstood every subsequent era of American history. How does he resonate with Americans across the board and across the times? To explore this question, key eras of Captain America texts will be read for plot, character, and other vital rhetorical elements in context with their respective time periods, with the findings paired with interviews of persons related to the Captain America franchise and story. Since this project is currently underway, the completed findings on the film "Captain America: The Winter Soldier" would be presented in context with the greater findings of the project to-date. In context with its historical era (early 2014, relevant to the Snowden/NSA scandal) and examined through the rhetorical theory of Fantasy Theme Analysis, "The Winter Soldier" speaks to the "everyday" American's views on government surveillance; an era critical to the nation's current climate. Captain America as a hero successfully embodies the sentiments of the American people in a uniquely non-partisan way, and seems to do so in every era in which he's existed. Continued analysis of the Captain America franchise, including projected interviews, will produce further results.

Straight Outta Misogyny: A Womanist Critique of the N.W.A. Film

Nicole Powell

Straight Outta Compton is an important cultural relic; it retells the coming of age story of the black artists who popularized gang culture through hip-hop. The film serves as a narrative and a social criticism; analyzing how black men are institutionally oppressed through poverty, crime, drugs, and police violence. Despite this important critique, this film erases the rich perspectives of black women. Instead, Straight Outta Compton chooses to offer singular-dimensional characterizations of black female identity, based on sexual objectification and rage. Through the erasure of black women, Straight Outta Compton neglects to dive further into the character's volatile relationships with women in their song lyrics and in their lives. This essay calls attention to how black women's trauma has been erased in the context of this film, through the theoretical lens of womanism. Womanism is the most useful tool for analyzing black women's pain because it is intersectional; it draws on feminist and cultural critiques without prioritizing one over the other. This womanist textual critique of the film argues that by erasing the violence enacted on

black women, it legitimizes and promotes black woman pain. Straight Outta Compton gives space for cultural criticism and empowers black men. Still, the film erases misogynist violence and tolerates sexist tropes, both of which successfully silence the suffering of black women.

A Study of Seasonal Changes in the Reproductive Output of the Green Lynx Spider *Peucetia viridans* (Araneae, Oxyopidae)

Kiran Singh

We determined the relationship between female bodily characteristics and reproductive output in the green lynx spider *Peucetia viridans*. Between 9/2013 and 1/2014, 153 *P. viridans* females and their egg sacs were collected from Kenneth Hahn State Recreation Area on seven sample dates. Three measures of female body condition (size, weight, residual index) and 11 measures of reproductive output were determined for each spider. Female weight was positively correlated with egg sac mass, clutch mass, egg sac silk mass, clutch size, and average egg mass, though average egg mass was only weakly related to female weight. Early season and late season females were no different in size and weight, while the residual index varied randomly with no seasonal trend. As for reproductive performance across the season, two indices (percent silk, silk/young) increased; one (average egg mass) was uniform; and the remaining indices declined. Since heavier females have greater reproductive output, and since early and late season females were of similar weight, the general decline in reproductive performance observed in this study is not due to having lighter females at the end of the season. These declines are also not due to females having produced more than one egg sac, since the females sampled all made only one egg sac. Thus, these declines are probably due to seasonal changes in prey composition. The seasonal increase in percent silk and silk/young may provide spiderlings with greater insulation as temperatures decline with the approach of winter, as well as greater protection from parasitoids.

Survey of heavy metal concentrations in insects and western fence lizards of the Ballona Wetlands of Los Angeles, California

Colin Wikholm

The effects of heavy metal accumulation in ecosystems has increasingly become a topic of discussion as industry continues to invade natural habitats. In this study the heavy metal content of insects and the western fence lizards (*Sceloporus occidentalis*) in Ballona Wetlands, Los Angeles, CA were analyzed. In insects, we hypothesized that there would be a significant differences in heavy metal concentrations among sites, morphospecies, and guilds. We also expected a correlation between heavy metals and both wing hue intensity in insects and belly hue intensity of lizard. Two moth morphospecies, one membracid morphospecies, and the lizard species were collected from Ballona Wetlands and tested for heavy metal content using Inductively-Coupled Plasma-Mass Spectrometry (ICP-MS). Hues of some species were also analyzed using Digital Imaging Analysis. A significant difference was found between heavy

metal concentrations in insects and among sites, morphospecies, and guilds. A correlation was found between moth hue and the metals Barium (Ba137) and Titanium (Ti205) and among morphospecies two for the metals Selenium (Se82) and Cadmium (Cd111). A correlation was found between the heavy metal concentration of Vanadium (V51) and the red hue intensity of the bellies of western fence lizards. The results from the insects suggest that the metals may reach the wetlands by way of runoff from the Ballona Creek and may affect various species levels within ecosystems, including vertebrates. Further experimentation is needed to understand the extent to which various heavy metal concentrations affect insects and lizard interactions and reproductive fitness.

Sustainability and Business Performance

Cedric Char

Climate change is real and has many impacts. Environmentally, it has been predicted that global sea levels will rise seven to twenty-three inches. Economically, rising sea levels can force more than 100 million people into poverty. Socially, climate change has been cited as a catalyst for social unrest. The drivers of climate change – pollution, over-consumption, etc. – do not come from a specific industry, but from a wide range of industries and all over the world. / It is widely recognized that action must be taken and many companies have taken steps towards being “green.” This research aims to examine the relationship between sustainability and business performance, in order to determine if “green” companies can outperform non-sustainable firms. This study used Newsweek’s Green Rankings for 2014 and 2015, and measured four variables (cost of goods sold, profit margin, revenue, and operating expenses) by performing various statistical tests. It was found that none of the relationships between sustainability and the variables were statistically significant. These results proved to be a double-edged sword; sustainability does not seem to have immediate financial benefits, yet sustainability does not have any additional costs or expenses. Although this study yielded non-results, the conclusions drawn can hopefully encourage firms to implement sustainable initiatives. Some companies assert it is too costly to go “green,” however, the results from this study refute that claim. This study illustrates that there is little downside in going “green,” yet has many potential benefits that can help us leave a cleaner world for future generations.

Synthesis and evaluation of novel G-quadruplex-stabilizing molecules

Nicole Baghdasaryan, Christopher Coyle, Mali McGuire, Vincent Ovalle,

DNA G-quadruplexes (or G-quartets) represent a new, promising target of anticancer therapies. The G-quadruplex structure is composed of a stack of four guanine nucleobases formed around a metal cation, strengthened through hydrogen bonds. G-Quadruplexes have been shown to stop unrestricted cell growth in cancerous cells by inhibiting the enzyme telomerase from extending DNA length. The goal of our research is to synthesize novel molecules that stabilize the G-

quadruplex structure. Through the derivatization of azobenzene, ellagic acid, and indigo based dyes, a small library of novel organic and metal complexed compounds was synthesized in 2-3 steps. These compounds were purified, characterized, and then tested for G-quadruplex stabilizing abilities by measuring changes in melting point curves of telomeric DNA as measured by circular dichroism. Several of the drugs increased the melting temperature of the DNA, demonstrating that these core structures possess the ability to stabilize the telomeric G-quadruplex structure.

Synthesis of Guanine Quadruplex Macrocycles

Lauren Thurlow

Our genetic information is protected by single-stranded, guanine-rich DNA sequences called telomeres, which have been shown to form guanine quadruplex structures in vivo. When stabilized, G-quadruplexes have been shown to inhibit telomerase, an enzyme that contributes to the immortality of cancer cells. Due to this recent interest in the anticancer potential of guanine quadruplexes, the need exists for understanding their self-assembly. As such, recent studies have focused on the formation of these structures from guanine derivatives. We have successfully synthesized: N9-(3,5-bis(pent-4-enyloxy)benzyl)-guanine, N9-(3,5-bis(hex-5-enyloxy)benzyl)-guanine, N9-(3,5-bis(hept-6-enyloxy)benzyl)-guanine, and N9-(3,5-bis(oct-7-enyloxy)benzyl)-guanine from the coupling reaction of 2-N-acetylguanine and 3,5-di-substituted benzylbromide derivatives followed by amide deprotection. Upon addition of potassium salts, these compounds were confirmed, though nuclear magnetic resonance (NMR) analysis, to form G-quartets. We report preliminary evidence indicating the successful synthesis of several G-quadruplex macrocycles from these N9-modified guanine derivatives. Formation of these G-quadruplexes was carried out through cation-templated ring-closing metathesis using Grubb's 2nd generation catalyst. The synthetic macrocycles are currently being characterized using Nuclear Magnetic Resonance (NMR) and High Performance Liquid Chromatography Mass Spectroscopy (HPLC-MS).

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Teaching Simultaneous Systems of Equations with Gaussian Elimination.

Kyle Casto

To meet the needs of the modern workforce, educational systems around the nation have adopted the Common Core State Standards (CCSS) in both English and in Mathematics. In mathematics, the CCSS include content standards and call for mathematical practices that foster mastery of 21st century skills, which include critical thinking, attention to detail, communication, innovation, problem solving, and creativity. With the implementation of the CCSS, teachers need innovative lessons and tasks that engage students in next generation skills, while delving deep

into the mathematical content. Under the real-world guise of an astronaut rescue mission, we have created an algebra lesson that works to satisfy the content of the CCSS. In this lesson, students will be asked to solve systems of linear equations algebraically, and using matrices via Gaussian elimination. Further, they will be asked to model real world situations with such a system, and after solving, explain their reasoning, describing the solution in context of the problem. The tasks in the lessons are structured to be cognitively rigorous and permit students to access higher depth of knowledge. It is our goal that a student who completes the lesson should be able to answer the following question 'How do you use a matrix to solve a system of three equations?' The lesson plan will be implemented in a local 8th grade algebra class, to analyze student response.

Test-driven development improves GRNsight: a web application for visualizing models of gene regulatory networks

Mihir Samdarshi, Anindita Varshneya

Test-driven development improves GRNsight: a web application for visualizing models of gene regulatory networks Anindita Varshneya¹, Nicole A. Anguiano², Mihir Samdarshi¹, John David N. Dionisio², Ben G. Fitzpatrick³, Kam D. Dahlquist¹. ¹Biology, ²Electrical Engineering & Computer Science, ³Mathematics, Loyola Marymount University, Los Angeles, CA / / GRNsight is an open source web application and service for visualizing models of gene regulatory networks (GRNs). A gene regulatory network consists of genes, transcription factors, and the regulatory connections between them which govern the level of expression of mRNA and protein from genes. GRNmap, a MATLAB program that performs parameter estimation and forward simulation of a differential equations model of a GRN, can mathematically model the dynamics of GRNs. GRNsight automatically lays out the network graph based on GRNmap output spreadsheets. GRNsight uses pointed and blunt arrowheads, and colors the edges and adjusts their thicknesses based on the sign (activation or repression) and magnitude of the GRNmap weight parameter. Visualizations can be modified through manual node dragging and sliders that adjust the force graph parameters. We have now implemented an exhaustive unit testing framework using Mocha and the Chai assertion library to perform test-driven development where unit tests are written before new functionality is coded. This framework consists of over 160 automated unit tests that examine over 450 test files to ensure that the program is running as expected. Error and warning messages inform the user what happened, the source of the problem, and possible solutions. The completion of the testing framework marks the close of development for version 1 (the current release stands at version 1.12). In version 2.0 of GRNsight, a new feature will be implemented that colors the nodes (genes) based on expression data provided by GRNmap. GRNsight is available at: <http://dondi.github.io/GRNsight/>.

Theological Reconciliations in Constantinian Art and Architecture

Cedric Char

Rome is a physical manifestation of the intersection between art and religion. This phenomenon, in part, can be contributed to the Emperor Constantine, the ruler during the times of the cult of the emperor and the emergence of Christianity. My research sought to examine how Constantine balanced these two faiths and how this balance was manifested. I assert that it was through the architecture that Constantine sponsored, and the actual content of those building programs, by which Constantine cleverly maintained the cult of the emperor while simultaneously supporting the rise of Christianity. Several famous structures that illustrate this balance are the Arch of Constantine and the Lateran Basilica. The arch, through the use of spolia, aligned Constantine with his great predecessors such as emperors Trajan, Hadrian, and Marcus Aurelius, legitimizing his power as the Roman emperor. The Lateran Basilica, on the other hand, is the first major Christian structure in Rome. By sponsoring its construction, Constantine makes a bold statement of support for Christianity.

To explore the religious equilibrium maintained by Constantine and the subsequent rise of Christianity, I participated in LMU's Christianity and Art in Rome Study Abroad program. For this program we visited Rome, engaged in on-site learning, and read primary sources to investigate the interdisciplinary connections between art and religion. Using architecture to balance pagan Rome with Christianity, Constantine bridged the gap between both art and religion, and the two faiths, facilitating a smooth transition for Christianity and helping it become what it is today.

"This is my Reply": A study of the social influences and implications of piano music

Matilda Rudolph

In the shadow of the assassination of John F. Kennedy in 1963, Leonard Bernstein said, "This will be our reply to violence: to make music more intensely, more beautifully, and more devotedly than even before." As a pianist and performer, I am curious as to how the music I perform functions as a response to the different social issues of my time or of the times that came before me. My research is centered on the question of whether I can create a recital program consisting of music as a response to issues in society that range across four different eras of Western music: Baroque, Classical, Romantic, and Contemporary. Further, how can I, as a pianist and a performer, do my part in replying to social issues through my music? To answer these questions, I have spent time reading materials, listening to different interpretations of specific piano music, and playing these selections in the practice room. As a result, I have created a proposal for a piano recital with music written as either a response or a reflection of salient events occurring in society during each of these four musical eras. This is my unique reply, which provides an approach to performing classical piano music through a lens of societal awareness and understanding.

THz Medical Imaging Optical System to Measure Corneal Hydration

Lucia Ramirez

In this study, a practical medical imaging optic system is developed to operate at terahertz (THz) frequency for diagnosis of corneal diseases and dystrophy. THz frequency shows high sensitivity to polar compounds such as water and low photon energy (4.1meV at 1THz) that is safe for medical application. Applied in Ophthalmology, THz imaging can provide quantitative tissue hydration sensing capabilities. As previously known, the cornea collects and controls light drawn into the retina and its hydration is precisely regulated. However, there are no clinical capabilities to measure its hydration accurately. The optical system that creates THz imaging, 2' x 2' x 1' in size and composed of off-axis parabolic mirrors, has the capability to measure the corneal hydration accurately. The purpose for this project is to improve the optic design, aiming to provide precise remote sensing instrumentation. In particular, the imaging head is designed and dimensioned in Solidworks aiming to maintain proper alignment. Upon fabrication, the system is assembled and the optic mirrors are aligned using a low powered laser. Further alignment methods are also implemented to allow for maximum performance. Additionally, various target alignment methods are evaluated to ensure a uniform scan on the target. The new design also provides the ability to accommodate the aperture, attach a visible camera and maintain precision. In the near future, we look to maximize signal-to-noise ratio and optimize alignment. With the improved system, THz medical imaging can provide early detection and implement the appropriate medication sooner.

The Transcription Factors Swi4 and Hap4 Contribute to the Regulation of the Transcriptional Response to Cold Shock in *Saccharomyces cerevisiae*

Monica Hong, Kevin Wyllie

Budding yeast, *S. cerevisiae*, responds to cold shock by changing gene expression. Which transcription factors control this response is unknown. We screened nine transcription factor deletion strains for impaired growth at different temperatures on solid media, and found that the Δ phd1 and Δ gcr2 strains were impaired for growth at all temperatures (15°C, 20°C, 30°C and 37°C), the Δ nrg1 strain was impaired for growth at warm temperatures (30°C and 37°C) and enhanced for growth at cold temperatures (15°C and 20°C), and the Δ ash1, Δ swi4, and Δ hap4 strains were impaired for growth only at cold temperatures. Liquid cultures of the Δ swi4 and Δ hap4 strains were then subjected to cold shock at 13°C, followed by recovery at 30°C. Samples were collected before cold shock (t0), after 30 and 60 minutes of cold shock (t30, t60), and after 30 and 60 minutes (t90, t120) of recovery. DNA microarrays were used to measure global changes in gene expression for four replicates for each strain. An ANOVA test showed that 2233 out of 6189 (36%) genes had a significant change in gene expression at an adjusted p value < 0.05 for the Δ swi4 strain, while 1749 genes (28%) were significantly changed in the Δ hap4 strain. Both strains showed patterns of expression where genes were up-regulated during cold

shock and down-regulated during recovery or vice versa. Genes showing these patterns of expression belong to the ribosome biogenesis and glycogen metabolic processes, respectively, processes used by the cell to survive cold shock.

Traversable Wormholes in Fourth-Order Conformal Weyl Gravity

Kellie Ault

We present an analysis of the classic wormhole geometries based on conformal Weyl gravity, rather than standard general relativity. The main characteristics of the resulting traversable wormholes remain the same as in the seminal study by Morris and Thorne, namely, that effective super-luminal motion is a viable consequence of the metric.

Improving on previous work on the subject, we show that for particular choices of the shape and redshift functions the wormhole metric in the context of conformal gravity does not violate the main energy conditions at or near the wormhole throat.

Some exotic matter might still be needed at the junction between our solutions and flat spacetime, but the averaged null energy condition does not seem to be violated for a certain class of wormhole geometries.

Therefore, if fourth-order conformal Weyl gravity is a correct extension of general relativity, traversable wormholes might become a realistic solution for interstellar travel.

Tri-weekly aerobic and resistance exercise improves cardiovascular markers in cancer survivors

Heather Lowell, Harper Woker

Introduction: Maintaining cardiovascular vitality through physical activity has a plethora of long-term health benefits. Cardiovascular fitness can be measured by how much oxygen a person can utilize on a cellular level during prolonged, submaximal exercise (VO_{2max}). Previous studies support that cancer survivors who have undergone chemotherapy or radiation have decreased cardiorespiratory health.

Purpose: The Improving Physical Activity after Cancer Treatment (IMPAACT) study aimed to determine if cancer survivors could improve their cardiorespiratory fitness by exercising three times a week, the following markers were assessed: Rating of Perceived Exertion (RPE), resting heart rate (HR_{rest}), exercising heart rate, supine blood pressure (BP), and VO_{2max} .

Methods: At baseline and 13 weeks, YMCA Submaximal Bicycle Protocol, (HR_{rest}), and supine BP were assessed. The program consisted of tri-weekly, 60-minute circuit sessions of moderate-intensity combined aerobic and resistance exercises. Participants' heart rates were measured using Polar RS800CX monitors, RPE, and attendance were assessed throughout each session.

Results: A noticeable improvement was found in mean VO₂max from baseline to midpoint (M = +2.70, SD ± 6.27) and in HR_{rest} (M = -0.77, SD ± 7.78). Significant relationships were not noted between attendance and VO₂max.

Conclusion: The majority of participants experienced improvements in VO₂ max and HR_{rest} measures. The results indicate that based on the cardiovascular markers, tri-weekly combined aerobic and resistance exercise sessions may be successful at improving measures of cardiorespiratory fitness in cancer survivors.

Tri-weekly Exercise Positively Improves Balance in Cancer Survivors

Alex Franco, Nicole Gobreial

Introduction: Cancer treatment can lead to numerous negative neuromuscular side effects on the neuromuscular system, which is highly involved in sustaining balance and mobility.

Chemotherapy and radiation therapy can damage nerves and cause peripheral neuropathy, affecting the feet and hands. As a result, cancer survivors are at a higher risk for falls and can experience difficulty when performing Activities of Daily Living (ADL).

Purpose: An aim of the comprehensive Improving Physical Activity After Cancer Treatment (IMPAACT) study was to determine the effects of a triweekly exercise and balance program on cancer survivors during a 13-week study.

Methods: The Fullerton Advanced Balance (FAB) scale to assess postural instability and Balance Efficacy Scale (BES) subjective survey were performed at baseline and 13 weeks (post). The FAB assessment battery included ten balance test domains, an 8-Foot Up-and-Go assessment, and the BES survey, which consisted of 18 questions regarding participants' ability to perform ADLs.

Results: Subjective BES scores were observed to be positively related to objective FAB and 8-Foot Up-and-Go scores at midpoint ($r = 0.223$, $p = 0.212$; $r = -0.431$, $p = 0.025$). Greater improvements in FAB scores from baseline to midpoint were positively correlated with session attendance ($r = 0.210$, $p = 0.258$).

Discussion: Correlation between BES and FAB scores suggest reduced risk for future falls and increased self-efficacy in balance capabilities. Longer exercise intervention is needed to confirm significant results.

U

Understanding the Nodulation Pathway in *Burkholderia tuberum*

Ashley Arnell

Nitrogen is the most limiting macronutrient for plant growth despite its abundance in the Earth's atmosphere, as plants are incapable of harnessing atmospheric N₂. Some bacteria are capable of fixing N₂ into ammonia (NH₃), a form usable by plants. Nitrogen-fixing bacteria known as rhizobia engage in a symbiotic relationship with legumes and trigger the formation of nodules on roots within which the bacteria are housed and fix nitrogen for the plant in exchange for carbohydrates. The bacterial nod genes are induced by flavonoids secreted by plants experiencing nitrogen stress, which results in the production of Nod factor, a critical signal triggering nodule formation. In the well-studied α -rhizobia, nodD encodes a constitutively expressed regulatory protein sensitive to these flavonoids and induces the expression of the nod genes. It is thus far believed that β -rhizobia function similarly to α -rhizobia both genotypically and phenotypically, however few studies have addressed the regulatory mechanisms in β -rhizobia. In order to shed light on the nature of the nodulation pathway in *B. tuberum*, I am investigating the role and regulation of the bacterial nod genes in nodulation by looking at nod gene mutants and a nodC-lacZ transcriptional fusion. A mutant in nodC, which encodes the core backbone of Nod factor, forms no nodules. In contrast, a nodD mutant is still able to nodulate. However, β -galactosidase expression of the nodC-lacZ fusion indicates that the deletion of nodD inhibits the expression of nodC. This analysis shows that there is conservation between the nodulation pathway in α - and β -rhizobia.

Usability Improvements to GRNmap: Software for Gene Regulatory Network Modeling and Parameter Estimation

Juan Carrillo Quinche, Trixie Anne Roque

A gene regulatory network (GRN) consists of a set of transcription factors that regulate the level of gene expression of other transcription factors. The dynamics of a GRN describe how gene expression in the network changes over time. GRNmap is a complex MATLAB software package that uses ordinary differential equations to model the dynamics of medium-scale GRNs, such as those from budding yeast, *Saccharomyces cerevisiae*. The program estimates production rates, expression thresholds, and regulatory weights for each transcription factor in the network based on DNA microarray data, and then performs forward simulations of model dynamics. Since v1.0, we have made design changes, added new features, fixed bugs, implemented a testing framework, and created documentation. Our current focus is to add functionality and make the program more user friendly. We have standardized the format of the input and output Excel workbooks, making them more readable. GRNmap can now perform multiple successive runs for fine tuning of optimization parameters. We also added an optimization diagnostics output worksheet which includes both the actual and theoretical minimum least squared error

overall, and the mean squared errors for the individual genes. Using test-driven development, we created tests for all new features to speed up debugging and to prevent future code regressions. The source code and executable (which contain demo files and can run without a MATLAB license) for the updated version 1.4 are available for download at <http://kdahlquist.github.io/GRNmap/> under the BSD open source license.

Using Computational Fluid Dynamics to Model Tracer Transport at Treatment Plants

Matthew Goodman, Cassandra Nickles

Recycled water from Water Reclamation Plants (WRPs) has become critical to California especially in the current drought. Current regulations require a minimum 90-minute modal contact time for recycled water during disinfection at peak dry weather design flow to meet public health standards. This project consists of simulating the transport of an instantaneous conservative tracer through the chlorine disinfection reactors at a WRP in California. Using SolidWorks, models of the two different reactors from each plant were created from as-built drawings and operation parameters to match the actual geometries. By applying a computational fluid dynamics software from ANSYS, the turbulent flow, transport, and contact time of a conservative solute can be found for several real operating scenarios. These turbulent flow solutions are used as the basis to model the path of a turbulently diffusing conservative tracer added instantaneously to the inlet of the reactors. In this case, the tracer represents the dispersion of the chlorine disinfectant. The data collected from these simulations determines breakthrough curves and modal times at the outlets of the disinfection reactors. Calculated results and breakthrough curves are compared with field results, with each successive run attempting to match the field results within a certain amount of error. Currently, four of the six field tests have been successfully modeled, and near acceptable results have been found for the last two. Once the accuracy of these simulations are confirmed, extreme cases that the WRP cannot safely replicate in the field can be simulated as well.

Using Drones to Optimize Invasive Species Management Strategies

Karina Lawrence, Angela Rabe

Iceplant (*Carpobrotus edulis*) is a non-native, invasive species that has invaded chaparral habitats in Southern California. Our objective was to evaluate the relationship between the shape of the area covered by an iceplant patch and the survivorship of the individuals that make up the patch. Iceplant cohorts (based on size) indicate a Type III survivorship curve. Survivorship correlated positively with a deviation from circular patch shape. This suggests that the accumulation of longer (and presumably older) individuals contributes to a patch shape that will become less circular over time. We used an unmanned aerial vehicle (drone) to measure the shape and rank the priority for the removal of iceplant patches. This experiment aimed to find a relationship between overhead and drone area, producing an equation that could be applied to the drone areas

to correct for the distortion of the fish eye lens used on a drone. By linking landscape elements, like patch shape, to population dynamics, like survivorship, this project successfully applied drone-technology to inform best-practices for invasive species management. Drones have the further potential to be used to optimize management practices for invasive species by ranking the priority of patches based on patch shape and survivorship.

Using Qualitative Data to Develop Supportive Experiences for Seniors

Lucia Gonzalez

Much of the existing scholarship on the undergraduate senior experience fails to recognize the intersections of ethnicity and senior year and the impact that these factors have on graduate and professional school attainment. Thus, this research examines the experiences of underrepresented undergraduate seniors and juniors interested in attaining a graduate or professional degree. This research focuses on the Academic Community of Excellence (ACE), a program at Loyola Marymount University whose mission is to prepare underrepresented students for graduate and professional school. The purpose of this research project is to formulate the ACE senior year experience to better reflect the needs of seniors in the program.

V

Vibration Energy Harvester-Powered Wireless Sensor Network for Infrastructure Monitoring

Ray Colquhoun, Adrian Elias Rodriguez

A research effort was undertaken during Summer 2015 to determine the possible use cases for an energy generation technology called vibration energy harvesting (VEH). This technology transforms mechanical oscillations directly into electricity, either through a piezoelectric material or via electromagnetic induction. A literature review found that the technology holds promise for powering remote networks of wireless sensors, particularly to monitor the health and performance of industrial infrastructure equipment. VEH could enable sensors to be powered purely from ambient, wasted mechanical energy, thus greatly reducing the requirements for maintenance and power infrastructure. Conceivably, these sensors could be “place-and-forget” devices, transmitting information for years without any necessary direct intervention. However, limitations still exist as the power outputs are quite low (μW to mW), and wireless transmitter power requirements are much larger. Nonetheless, these outputs are on the same order of magnitude as required for sensors such as accelerometers, simple thermometers, and others. Moving forward, the research effort shall try to implement a simple VEH-powered sensor network to monitor infrastructure elements on LMU’s campus, in order to provide machine health information to Facilities Management. This would allow for continuous remote monitoring of equipment such as air conditioning units, and as a result, enable a highly effective

preventative maintenance program and cost savings for the University. If successful, the technology is highly scalable, and could change the landscape of industrial infrastructure maintenance and accident prevention.

Visualizing the Invisible: Exploring the Motif of Sight Through the Game Development Process of "Visions: Chaos in Naango"

Mattie Coccia, Hunter Gibson, Katarina Klask, Taylor Roseberry

"Visions: Chaos in Naango", a third-person action adventure video game created at LMU, first entered into existence as a question. What is sight and how can it be manifested within the context of a video game? Our team started to address this question in our story development process. We laid the foundation for the creation of a virtual world in which humans respect nature and understand that animals see differently than people do. From there, we sought to emphasize the importance of sight through our game mechanics, dialogue choices, and visual design decisions. Adhering all of these sight-conscious elements together required the use of three different industry-standard software products: Adobe Photoshop, Autodesk Maya, and Unity 3D. In "Visions", the player character is born with special powers and must use them to learn how foxes, cobras, and mosquitos see in order to save her village, her twin brother, and herself from destruction by ultimate chaos. Through "sight-shifting", the player solves environmental puzzles, engages in combat with corrupted animal enemies, and has visions of the past that illuminate the circumstances of the present. This project seeks to consciously break the stereotype that video games are a form of entertainment void of deeper meaning and purpose. As an art form, they can be read similarly to literary works because they are able to tackle heavy themes in ways that are appropriate for audiences of all ages.

W

Weapons of Mass Hunger: The Latent Threat to Human Security

Hannah Gioia, Priscilla Torres

Typically, individuals fail to thrive in environments plagued by armed conflict. One specific, detrimental cost to a human being's livelihood is food insecurity precipitated by violence. The relationship between conflict and food insecurity has been an understudied topic and past attempts of measuring the relationship tend toward qualitative analysis. Our study attempts to fill a gap in research by both conducting a quantitative study and providing much needed further insight into the topic. We also offer a new framework definition by which food security should be assessed during times of conflict. We hypothesize that as conflict intensity, measured by the number of casualties, internally displaced persons, and conflict duration, increases, food insecurity will also increase. Using regression analyses, a quantitative study of 81 countries is conducted based on war prone regions from the years 2000-2010. The results show an inverse relationship between conflict and food insecurity; as conflict intensity and duration

increases, food insecurity decreases. Although unresponsive to our original hypothesis, these results provide direction for future research. For more robust results, variables such as population size and the contribution of foreign aid, by country, should be included in the analyses and future research should include cases studying food wars, as this will illustrate a more precise relationship between conflict and food insecurity.

What's Yours is Mine: The Collective Threat of Afrocentric Hair in the Black Community

Aisha Walker

Black women have many options for how they wear their hair, ranging from natural (e.g. Afro/ Afrocentric) to processed (e.g. straight/ Eurocentric); as such, hair has become a defining trait for many Black women. Limited research has shown that Black women fear that Afrocentric hair in the workplace might cause White coworkers to view them as “militant.” Though some data suggest this to be true, it also surprisingly shows that Black individuals are even more likely to make this negative judgment. The current study seeks to explore this finding further, investigating whether this particularly negative response from Black participants may, in part, be explained by collective threat—the fear that confirmation of a negative group stereotype by a member of the in-group will reflect poorly on the self and other group members. Individuals with a stronger Black racial identity should then interpret Afrocentric hair in a professional setting as a threatening representation of the in-group, thus rating it unfavorably when compared to ratings of Eurocentric hairstyles. To test this prediction, Black participants, recruited through a variety of organizations for professionals, rated Black female job candidates with either natural or straightened hair. Ratings were made regarding perceived competence, warmth, and professionalism. Participants additionally completed a measure assessing strength of racial identity. Implications of the specificity of phenotypicality biases within the Black in-group will be discussed, as well as the possible adverse consequences of stronger racial identifications.

When does White Privilege Awareness lead to Dismantling Behavior? The Role of Correspondence Bias and Social Empathy

Spencer Head, Caiti O'Hern

Racial disparities in power, wealth, and opportunity endure in the United States. To redress these disparities, White individuals must recognize their existing privilege and be willing to dismantle it; that is, embrace policies and behaviors aimed at reducing racial privilege. Importantly, recognition of White privilege does not always lead to dismantling behaviors and can, in fact, reinforce the status quo. Previous research has not yet shown what factors may lead an individual to dismantle or reduce privilege in the face of their own understanding that they possess that privilege. In this study, we investigated two potential moderators – the correspondence bias, or the tendency to attribute others' behaviors to internal rather than external factors, and social empathy, or concern for others at a group rather than an individual level. We predict that when White individuals' awareness of privilege is heightened, those who are high in social empathy

and low in correspondence bias will be more likely to dismantle their privilege. To examine this prediction, an experiment was conducted in which White undergraduates were either made aware of their White privilege or not and then completed measures assessing correspondence bias, social empathy, and intended behaviors aimed at dismantling privilege. Implications for social change and reductions in racial inequities are discussed.

Whitewashing, Marginalization and Commodification: Hegemony in Aloha

Amy Higa

Minority cultures have a long history of marginalization and oppression in the media. In America, white faces and perspectives often replace that of minorities. This whitewashing and marginalization has resulted in misappropriation, commodification, and the continued hegemonic oppression of minorities. Hegemony refers to the power that a dominant social or, in this case, ethnic group holds as the ruling class of society. This rhetorical analysis asserts that Cameron Crowe's 2015 film Aloha continues this trend by portraying Native Hawaiian culture through a hegemonic perspective, ultimately altering its realities to appeal to a hegemonic ideology. The film features a whitewashed cast, skewed portrayal of the culture of Hawaii, and exaggerated stereotypical Hawaiian characters. Using the narrative critique, this essay analyzes Crowe's use of characters, settings, and audiences to perpetuate stereotypes, marginalize the Native Hawaiian community, and utilize Hawaiian culture as a commodity. Although Crowe intended for this film to be his "love letter to Hawaii," white actors/characters marginalize characters of color and uphold a perspective of superiority. As a result of my research and analysis, future filmmakers will be able to understand what an oppressive hegemonic perspective looks like and how to portray minority cultures in a more authentic and representative way.

Wireless Authentication of Smart Doors using RFID

Austin Hentrup, Deyi Lu, Peter Roldan

Radio frequency identification (RFID) is an exciting type of near-field electronic communication that could have the potential to revolutionize convenience and security for consumers worldwide. The goal of this senior Electrical Engineering CAPSTONE project is to create a prototype enterprise-scale network of RFID-enabled doors. The project seeks to evaluate the feasibility and projected cost of RFID becoming the new standard for electronic business security systems. The minimization of system cost is paramount, as the project serves to investigate the excessive costs of current commercial RFID solutions which can cost thousands of dollars per door. It is the position of the team undertaking this project that a system with nearly all of the convenience and security of a professional solution could be built for a price nearly two orders of magnitude below the market average.

The system currently in development maximizes the available features while aiming for a low price point of approximately \$35 per door. Each lock in the system independently communicates

over the Internet to a cloud server to eliminate the need for the expensive installation of a dedicated local network controller . The business is able to easily manage user access profiles, remotely disable lost RFID cards, view door access logs, and schedule temporary periods of access for specific users using a web interface. This provides the system with a wealth of features at a low cost, while keeping control in the hands of the client.



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