March 17, 2023

Dear LMU Students, Faculty, and Staff,

Welcome to the Fifteenth Annual Undergraduate Research Symposium! For over a decade, this event has been a campus-wide tradition celebrating the very best in faculty-mentored undergraduate research and creative projects at LMU.

This year’s Symposium is an in-person celebration back on the main campus to showcase student research and the fantastic faculty-student partnerships that have come to define an LMU education. We come together to celebrate a LMU tradition that never stopped, or even paused: Loyola Marymount’s unwavering commitment to academic excellence both inside and outside of the classroom. To this end, please engage with the over 70 posters set up in St. Robert’s Hall Auditorium, listen to and participate in the more than 60 oral presentations and panels in St. Robert’s Hall, and share a meal or some coffee with friends, family, and fellow presenters on St. Robert’s Grass.

We are pleased to feature student work from all five undergraduate colleges and schools. The diverse presentations will be intellectually stimulating for all. Among these sessions, students wrestle with complex issues, including public opinion on higher education, Angelenos perceptions on various city issues, and the effects of colonization. They explore issues of domestic and foreign policy, alcohol consumption and its various effects on college students, and concepts of diet and food consumption.

Finally, student discussions range from the media’s effect on political views, attachment styles and responses to relationships, the characterization of black holes, and social justice in action.

The Undergraduate Research Symposium provides an excellent opportunity for students, faculty, staff, parents, and members of the LMU community to actively engage with students who have been immersed in thought-provoking questions and 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 today is evidence of this learning process.

Congratulations to this year’s presenters and to all the students and faculty participating in the 2023 LMU Undergraduate Research Symposium!

Sincerely,

Kathleen Weaver, Ph.D.
Vice Provost for Research,
Professional Development and Online Learning

Elizabeth Wimberly-Young, M.F.A.
Director, Office of Research & Creative Arts
Friday, March 17, 2023

12:00pm – 4:00pm  REGISTRATION
St. Robert’s Hall First Floor

1:00pm – 2:15pm  ORAL SESSION I
2nd and 3rd Floors, St. Robert’s Hall

2:20pm – 3:35pm  ORAL SESSION II
1st and 3rd Floor, St. Robert’s Hall

2:30pm – 4:30pm  BIOLOGY DEPARTMENT ORAL SESSION
Featherston Life Sciences Building 120

3:40pm – 4:55pm  ORAL SESSION III
2nd and 3rd Floors, St. Robert’s Hall

4:30pm – 6:00pm  POSTER SESSION
St. Robert’s Hall Auditorium
## ORAL SESSION I
1:00 pm – 2:15 pm  
2nd and 3rd Floors, St. Robert’s Hall

### STR 237: Film & Theatre

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<thead>
<tr>
<th>Presenters</th>
<th>Title</th>
<th>Advisors</th>
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<tbody>
<tr>
<td>Bettina Ernst</td>
<td>Representations of Religion in Short Documentary</td>
<td>Susan Scheibler</td>
</tr>
<tr>
<td>Nelea Fong</td>
<td>Representations of Time in Time-Based Media: An Exploration of the Human Experience of Temporality in Film and TV</td>
<td>Susan Scheibler</td>
</tr>
<tr>
<td>Layla Rainosek</td>
<td>Ideas on Ionesco: Designing a Set for a Classic Play</td>
<td>Christopher Murillo</td>
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</tbody>
</table>

### STR 239: Into the Criminal Justiceverse

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<thead>
<tr>
<th>Presenters</th>
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<tbody>
<tr>
<td>Andrea Guardiola</td>
<td>Sex Work: Criminalization, Regulation, and Liberation</td>
<td>Andrew Dilts</td>
</tr>
<tr>
<td>Andrea Younes</td>
<td>We Should All Be Terrorists: A Study of Surveillance and Their Consequences on Arab American Behavior and Community</td>
<td>Andrew Dilts, Richard Fox</td>
</tr>
<tr>
<td>Kaya Rodrigues</td>
<td>Missing the Mark: The Trouble with the Trafficking in Persons Report</td>
<td>Jodi Finkel</td>
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### STR 242: Beyond the Scope of Physics

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<thead>
<tr>
<th>Presenters</th>
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<tbody>
<tr>
<td>Will Schouten</td>
<td>Experimental Investigation of Rayleigh-Bénard Convection Using Freshwater and Saltwater</td>
<td>Emily Hawkins</td>
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<tr>
<td>Daniel Alvarez</td>
<td>Optimizing Particle Image Velocimetry (PIV) for Fluid Spin Up Experiments</td>
<td>Emily Hawkins</td>
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<tr>
<td>Juan Uribe</td>
<td>Characterization of EUP Black Holes</td>
<td>Jonas Mureika</td>
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### STR 354: Women through the Ages

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<thead>
<tr>
<th>Presenters</th>
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<tbody>
<tr>
<td>Natalie Riddick</td>
<td>Women in the Viking World: A Tracing of Female Power in Viking Age Scandinavia and Iceland</td>
<td>Anthony Perron</td>
</tr>
<tr>
<td>Rachel Rysso</td>
<td>Mother, Virgin, and Protectress: The Importance of Mary’s Mediation in the Art and History of Santa Maria Maggiore</td>
<td>Kirstin Noreen</td>
</tr>
<tr>
<td>Sage Boyd</td>
<td>'Nackte Frau': A Mesopotamian Erotic Ideal</td>
<td>Heidi Fessler</td>
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</tbody>
</table>
### STR 369: Aging & Relationships

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<tr>
<th>Presenters</th>
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<tbody>
<tr>
<td>Yukana Inoue</td>
<td>Coming of Age in a Multiverse</td>
<td>Kenneth Provencher</td>
</tr>
<tr>
<td>Gianella Martinez-Gugliotta</td>
<td>The Potential Relationship Between Culture and Attachment Styles</td>
<td>Todd Martinez</td>
</tr>
<tr>
<td>Mason Cooney</td>
<td>Why Didn’t We Ask?</td>
<td>David Offenberg</td>
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### STR 361: The Other Side of History

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<thead>
<tr>
<th>Presenters</th>
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<tbody>
<tr>
<td>Andrea Marie Morland-Tellez</td>
<td>The Colonization of Hawaii and its Effects</td>
<td>Elizabeth Drummond</td>
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<tr>
<td>Jennifer Valentine</td>
<td>The Silenced Rebellion: Recontextualizing Revolutionary Haiti</td>
<td>Elizabeth Drummond</td>
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<tr>
<td>Gillian Mozdy</td>
<td>Making French: A Loss of Native American Female Autonomy</td>
<td>Elizabeth Drummond</td>
</tr>
<tr>
<td>Kioni Shropshire-Maina</td>
<td>Ascension at the Expense of the Other: An Exploration of Black and Indigenous Relations in Post-Civil War Indian Territory</td>
<td>Nicolas Rosenthal</td>
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### STR 353: Due Process

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<tr>
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<tbody>
<tr>
<td>Cameron Menendez</td>
<td>A Normative Account of the Supreme Court’s Legitimacy</td>
<td>Evan Gerstmann</td>
</tr>
<tr>
<td>Claire Peshut</td>
<td>The Future of Substantive Due Process Rights: An Examination of the Fragility of Unenumerated Rights</td>
<td>Evan Gerstmann</td>
</tr>
<tr>
<td>Paul Fitchen</td>
<td>Country Favorability &amp; Foreign Aid: Do Americans Give More To The Countries They Like?</td>
<td>Feryal Cherif</td>
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<tr>
<td>Julia Lemmon</td>
<td>Why Do They Not Listen to Us?: Political Violence Inconsistencies in Liberation Movements</td>
<td>Feryal Cherif</td>
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<tr>
<td>Cameron Freestone</td>
<td>The Fulfillment of Economic Rights: A Historical and Analytical Inquiry</td>
<td>Jennifer Ramos</td>
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<td>STR 357: Exploring Art, Films, &amp; Plays</td>
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<td><strong>Matthew Parachou</strong></td>
<td>Fulfilling a Sacred Duty: Art in Plato’s Phaedo</td>
<td>Erin Stackle</td>
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<tr>
<td><strong>Caidan Anderson</strong></td>
<td>The Role of Migrants at Early Bronze Age Tel Beth Yerah</td>
<td>Heidi Fessler</td>
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<tr>
<td><strong>Chester Mlcek</strong></td>
<td>Play and Technology in Martin Heidegger and Eugen Fink</td>
<td>Ian Moore</td>
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<tr>
<td><strong>Fiona Riley</strong></td>
<td>It’s a Wonderful Apocalypse: Applying Biblical Studies to Film</td>
<td>Sarah Emanuel</td>
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<tr>
<th>STR 248: Explorations in Psychology</th>
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<tbody>
<tr>
<td><strong>Estefania Valencia</strong></td>
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<tr>
<td><strong>Oliver Hatch</strong></td>
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<td><strong>Rocky Jacobs</strong></td>
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<tr>
<td><strong>Daisy Huerta</strong></td>
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<th>STR 249: Science Applied</th>
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<tbody>
<tr>
<td><strong>Shunyu Yao</strong></td>
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<td><strong>Georgia Tully</strong></td>
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<tr>
<td><strong>Michael Hennessy, Tyler Keen, David Kandah</strong></td>
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<tr>
<td><strong>Conall OLeary</strong></td>
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</table>

<p>| STR 354: PANEL | Women’s and Gender Studies Senior Panel: Feminist Interrogations of Power |
|----------------|
| <strong>Claire Shepard, Maria McGlone, Sage Boyd</strong> | What is Your Gender?: A Qualitative Study on the Instability of Gender Categorization at Loyola Marymount University | Amanda Apgar |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Maria McGlone, Claire Shepard, Sage Boyd</td>
<td>Religion and Dieting: Exploring the Quantification of Bodies</td>
<td>Amanda Apgar</td>
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<tr>
<td>Sage Boyd</td>
<td>Monstrous Women: Reclaiming Medusa’s Head</td>
<td>Amanda Apgar</td>
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<tr>
<td>Amira Mahommed</td>
<td>A Cannabinoid Receptor Controls Cranial Neural Crest Development in Embryos</td>
<td>Max Ezin</td>
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<tr>
<td>Paul Lussman</td>
<td>Development of a seed coating method using Bacillus sp. and sodium alginate to improve germination of California Poppy</td>
<td>Michelle Lum</td>
</tr>
<tr>
<td>Patrizia Tandinco, Belen Carrasco-Cazares</td>
<td>Does Size Really Matter? A Taphonomic Comparison of Small and Large Mammals</td>
<td>Wendy Binder</td>
</tr>
<tr>
<td>Claribel Alcantar, Camya Brazil</td>
<td>Effects of Multiple Stressors on the Physiology of Mytilus mussels.</td>
<td>Maria Christina Vasquez</td>
</tr>
<tr>
<td>Kathryn Inkrott</td>
<td>Project Poo: Fecal Testosterone Metabolites and Aggressive Nest Defense in Great Black-backed Gulls</td>
<td>Kristen Covino</td>
</tr>
<tr>
<td>Alexis Chun</td>
<td>Role of Sinorhizobium meliloti type IVB pili protein on legume nodule morphology and infection</td>
<td>Nancy Fujishige</td>
</tr>
<tr>
<td>Kayleigh Bhatt, Roger Ratnam, Joshua Poura, James A. Wohlschlegel, and Deepa V. Dabir</td>
<td>The yeast [2Fe-2S] mitochondrial protein Aim32 supports multiple key processes within the organelle.</td>
<td>Deepa V. Dabir</td>
</tr>
<tr>
<td>Ivana Small, Isabella Lopez</td>
<td>Tree Swallows of the Ballona Wetlands</td>
<td>Kristen Covino</td>
</tr>
<tr>
<td>Lauren Quesada</td>
<td>Using eDNA to detect the presence of the endangered horseshoe crab in Yucatan, Mexico to help make octopus fisheries more sustainable</td>
<td>Demian Willette</td>
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## STR 248: Public Opinion

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<tr>
<th>Presenters</th>
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<tbody>
<tr>
<td>Nathalie Yacoub</td>
<td>World on Fire: The Influence of Social Media On Public Opinion On Climate Change</td>
<td>Chaya Crowder</td>
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<tr>
<td>Desire Alvayero</td>
<td>A Comparative Study on Gender Equity Laws</td>
<td>Chaya Crowder</td>
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## STR 237: Love, Justice, & Identity

<table>
<thead>
<tr>
<th>Presenters</th>
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<tbody>
<tr>
<td>Kelly Supangat</td>
<td>Do we love the same person or do we only love a version or versions of them? Is love bound to be flux or does love change because a person does?</td>
<td>Clinton Carl</td>
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<tr>
<td>Denisha Caldwell</td>
<td>Souls of Justice</td>
<td>Clinton Carl</td>
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<tr>
<td>Lex Dadmun</td>
<td>Metaphysics Properties/Identity</td>
<td>Clinton Carl</td>
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## STR 239: Resilience, Meditation, and Witness

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<thead>
<tr>
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<tbody>
<tr>
<td>Dana Elqaq</td>
<td>Examining the Effects of Mindfulness Meditation Intervention on Stress Levels in Palestinian Muslims</td>
<td>Maire Ford</td>
</tr>
<tr>
<td>Maxine Boyd</td>
<td>High self-esteem and growth belief contribute to resilience following positive and negative relationship events</td>
<td>Maire Ford</td>
</tr>
<tr>
<td>Sam Yaziji</td>
<td>Geopolitical Poetics: A Study of Literary Witness in Wartime Poetry from WWI to Today</td>
<td>Sarah Maclay</td>
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## STR 242: Influencer or Influenced?

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<tr>
<th>Presenters</th>
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<tbody>
<tr>
<td>Elizabeth Iribarren</td>
<td>Voter Fraud or Voter Suppression? How the Media Affects Public Opinion About Voting Laws in the U.S.</td>
<td>Nathan Chan</td>
</tr>
<tr>
<td>Julianna Gomez</td>
<td>Siempre Estas En El Teléfono: A Study On Second-Generation Latine Youth and Their Impact On the Future of Politics</td>
<td>Claudia Sandoval, Richard Fox</td>
</tr>
<tr>
<td>Annika Lai</td>
<td>The Invasion of Immigrants: The Metaphor of Immigrants as Invaders in American News Media</td>
<td>Kerstin Fisk, Richard Fox</td>
</tr>
</tbody>
</table>
### ORAL SESSION III
3:40 pm – 4:55 pm
2nd and 3rd Floors, St. Robert’s Hall

<table>
<thead>
<tr>
<th>Speaker</th>
<th>Title</th>
<th>Co-author(s)</th>
</tr>
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<tbody>
<tr>
<td>Olivia Sabates</td>
<td>Viva La Patria: The Political Behavior of Cuban Americans</td>
<td>Claudia Sandoval, Richard Fox</td>
</tr>
<tr>
<td>Garrett Ponce</td>
<td>Statistical Analysis of Start-Up Transients of a Super Continuum Laser</td>
<td>Hossein Asghari</td>
</tr>
<tr>
<td>Rachel Meilak</td>
<td>Math and Magic: A de Bruijn Card Trick</td>
<td>Joshua Hallam</td>
</tr>
<tr>
<td>Samir Fridhi</td>
<td>The classification of the topological symmetry group of the K_3,3,1 graph.</td>
<td>Robin Wilson</td>
</tr>
<tr>
<td>Grant Ellison</td>
<td>Exploring Patterns in Human Activity Data through Clustering Techniques for Biometric Analysis</td>
<td>Delaram Yazdansepas</td>
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### STR 366: Physics, Math, & Economics...Oh My!

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### STR 235: PANEL | Social Justice in Action: Service and Engaged Learning Experiences

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<tr>
<th>Speaker</th>
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<tbody>
<tr>
<td>Iliana Chen</td>
<td>Suwandi Foundation: Teaching English in Bali</td>
<td>Sr. MaryAnne Huepper, Sr. Judith Royer</td>
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<tr>
<td>Camila Robles Ruiz</td>
<td>Discovering Latinidad: Artistic Expressions of Latinx Identity</td>
<td>Sr. MaryAnne Huepper, Sr. Judith Royer</td>
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<tr>
<td>Patricio Osegueda von Waberer, Fransisco Moore, Angelo Santi</td>
<td>Quality of Life +</td>
<td>Sr. MaryAnne Huepper, Sr. Judith Royer</td>
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</table>
## POSTER SESSION
4:30 pm – 6:00 pm
St. Robert’s Hall Auditorium

### HUMANITIES | SOCIAL JUSTICE

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<tr>
<th>Presenters</th>
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<tbody>
<tr>
<td>Lucas Verderese</td>
<td>Angeleno Support Levels for Basic Income Guaranteed</td>
<td>Brianne Gilbert</td>
</tr>
<tr>
<td>Sabrina Isaacs</td>
<td>Considering Identity-Affirming Care for Older LGBT Adults in Assisted Living</td>
<td>Anna Muraco</td>
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<tr>
<td>Kathleen Nguyen</td>
<td>Examining Asian Americans’ Perceived Barriers to Healthcare</td>
<td>Jennifer Ramos</td>
</tr>
<tr>
<td>Amani Ortiz-Syed</td>
<td>Immigration and Incarceration: A Sociological Exploration of Systems of Detention with Insight from Costa Rica</td>
<td>Anna Muraco</td>
</tr>
<tr>
<td>Natalia Gonzales</td>
<td>Mary Shelley's Hidden Authorial Voice in Frankenstein through Subversion</td>
<td>Aimee Ross-Kilroy</td>
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### SCIENCE | ENGINEERING | MATH

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<tr>
<th>Presenters</th>
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<tbody>
<tr>
<td>Osiris Guinea Zepeda</td>
<td>A Comparison of the Effects of Temperature and Salinity on the Antioxidant Activity of <em>Mytilus galloprovincialis</em> and <em>M. trossulus</em></td>
<td>Maria Vasquez</td>
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<tr>
<td>Perla Rand</td>
<td>A Comprehensive Guide to the Field Collection of Freshwater Turtle Eggs</td>
<td>Max Ezin</td>
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<tr>
<td>Frances Dygean</td>
<td>A Detailed Analysis of the Methods to Obtaining Testosterone Levels from Excreta Samples of <em>Larus marinus</em> (the Great Black-backed Gull)</td>
<td>Kristen Covino</td>
</tr>
<tr>
<td>Christina Noravian</td>
<td>A Staging Series of Embryonic Development for the Trachemys scripta Turtle</td>
<td>Max Ezin</td>
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<tr>
<td>Ahmad Mersaghian</td>
<td>Analysis of Blue Carbon Stock and Sediment Characteristics of <em>Zostera marina</em></td>
<td>Sarah Bittick</td>
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<tr>
<td>Jacqueline Oculam, Anela Leis, Ethel Guillermo</td>
<td>Analysis of the Biochemical Variation Among Potential Plant Growth-Promoting <em>Peribacillus simplex</em> Strains</td>
<td>Michelle Lum</td>
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<td>Katherine Bousse</td>
<td>Analysis of the role of DnaK in plant growth-promoting properties of <em>Pseudomonas frederiksborgensis</em></td>
<td>Michelle Lum</td>
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<tr>
<td>Name</td>
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<td>Organizer</td>
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<tr>
<td>Sarah Hofmeister, Daniella Nanula, Emily Sramaty, Delina Amanuel</td>
<td>Bad to the Bone: An Investigation into the Effect of Environmental Pollutants on the Skull Development of Canis latrans Using Fluctuating Asymmetry</td>
<td>Wendy Binder</td>
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<tr>
<td>Elizabeth Krauss</td>
<td>Bone Density in Weight-Bearing and Non-Weight-Bearing Female Athletes</td>
<td>Hawley Almstedt</td>
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<tr>
<td>Leah Mizuno</td>
<td>Co-inoculation of Bacillus simplex with Sinorhizobiummutants to enhance the growth in Medicago sativa.</td>
<td>Nancy Fujishige</td>
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<tr>
<td>Anna Monterastelli</td>
<td>Core Results From a Three-Year Management Study of Human-Coyote Conflict in Culver City, California with Suggestions for Conflict Amerlioration</td>
<td>Eric Strauss, Melinda Weaver</td>
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<tr>
<td>Bryn Weissman, Danielle Hjerpe</td>
<td>Creating Student Engagement Through Interactive Materials in an E-Textbook</td>
<td>Nicole Bouvier-Brown</td>
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<td>Alex Matos, Donald Kendall</td>
<td>Detention Basin Design for Climate Change</td>
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<tr>
<td>Catherine Channell, Odoba Okwuosa</td>
<td>Determining the genotype frequency of SNP rs4988235 that confers lactase persistence in an LMU population.</td>
<td>Kam Dahlquist</td>
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<tr>
<td>Yifan Hu</td>
<td>Develop a flexible graphical user interface software for visualizing eDNA metabarcoding output</td>
<td>Demian Willette</td>
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<tr>
<td>Lily Maddox</td>
<td>Developing Environmental Funding Networks in Los Angeles</td>
<td>Michele Romolini</td>
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<tr>
<td>Jacqueline Raetz-Vigon</td>
<td>Dietary Isotopic Ecology of Breeding Great Black-backed Gulls</td>
<td>Kristen Covino</td>
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<tr>
<td>Alana Borer</td>
<td>Effects of Multiple Stressors on Metabolic Rate and Thermal Performance of the Native Blue Mussel Mytilus trossulus</td>
<td>Maria Vasquez</td>
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<tr>
<td>Kyla Yein</td>
<td>Examination of the role of lipopolysaccharide in stress tolerance of Paraburkholderia tuberum</td>
<td>Michelle Lum</td>
</tr>
<tr>
<td>Aditi Poddar</td>
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Alcohol Consumption Associated with Increased Workload in College Students
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Chronic and sustained alcohol abuse is known to impact cognitive functioning. We examined potential differences in problem solving ability and workload in a population of young and healthy college students. Workload is a useful construct in human factors and neuroergonomics research that describes “the perceived relationship between the amount of mental processing capability or resources and the amount required by the task.” Participants completed survey questions about drinking behavior and the Trail Making Test Parts A and B, a standard neuropsychological test, with completion time and errors being recorded. After each test condition, the students completed an assessment of workload via the NASA-Task Load Index (NASA-TLX). Students were asked how many days of the week they drank alcohol during the past month, and these answers were compared with their performance and self-reported workload on the Trail Making Test. Although alcohol consumption had no significant association with completion time or errors on both Trail Making Test conditions, we found a positive association between number of days spent drinking per week and total workload in both Part A and B. These preliminary results show a relationship between rate of alcohol consumption and self-reported workload evaluations on a test requiring attention and speeded action. These preliminary results suggest that alcohol consumption, even in a non-clinical population of young and healthy college students, can be associated with a perceived increase in workload during a challenging cognitive task.

Analysis of Blue Carbon Stock and Sediment Characteristics of Zostera marina
Ahmad Mersaghian

There have been many studies researching the best methods for marine restoration and conservation projects; however, due to the dynamic nature of marine environments it is almost unfeasible to use the same method for every project. Seagrass meadows are known for their ability to sequester carbon in coastal ecosystems as well as exhibiting resilience to abiotic factors such as climate change and ocean acidification. Zostera marina is a seagrass species which is found in shallow areas with calm water such as estuaries and bays. The importance of studying Zostera marina and the communities it supports can be expressed especially as a tool in the restoration efforts for coastal ecosystems around the world. This study focuses on analyzing the shoot and sediment characteristics of four healthy seagrass meadows along the coast of California. For sediment characteristics, sample cores were taken at each site and were dried, tested for organic content using the loss on ignition method, and measured for grain size using sieves and hydrometer method as well as using acidification method to determine the inorganic content. The results show various amounts of organic content and grain size differences between the sites, some ranging from sand all the way to silt and clay. Smaller grain sizes have shown to have significant impacts on CO2 migration and trapping. With the help of this knowledge, we want to assist future conservation efforts in identifying possible locations that could benefit Zostera marina seagrass meadows.

Analysis of the Biochemical Variation Among Potential Plant Growth-Promoting Peribacillus simplex Strains
Jacqueline Oculam, Anela Leis, Ethel Guillermo

Peribacillus simplex is a known plant growth-promoting rhizobacterium that promotes root elongation, increases root and shoot biomass, and stimulates legume nodulation. Four bacterial strains, closely related to Peribacillus simplex, were isolated from the Santa Monica dunes in association with the rhizosphere of native plants. The biochemical differences between these four bacterial strains were investigated in relation to how this strain diversity affects plant growth-promoting potential in normal and abiotic conditions. A 16S rRNA gene analysis was initially performed to confirm that the four strains belonged to the species Peribacillus simplex.
To differentiate the strains and evaluate the possible mechanism for plant growth promotion, we investigated the strains for auxin production, cellulase activity, nitrogen fixation, phosphate solubilization, and spore formation. To assess the plant growth-promoting potential of the strains, pre-germinated tomato plants were further inoculated under salt stress. All strains exhibited spore formation while none of the strains showed auxin production. Only some of the strains were able to fix nitrogen and solubilize phosphate. Our data suggests that because the strains vary in biochemical properties, further testing must be performed to determine how this variability affects their ability to promote plant growth.

Analysis of the role of DnaK in plant growth-promoting properties of Pseudomonas frederiksbergensis
Katherine Bousse

*Pseudomonas frederiksbergensis* is a plant-growth promoting rhizobacteria, isolated from the roots of California poppy grown in sand from the El Segundo sand dunes. *P. frederiksbergensis* is notable for its ability to augment the salt tolerance of plants, in addition to improving fitness under temperature stress conditions. In order to better understand the mechanism that allows the bacteria to tolerate these extreme conditions, mutants were created. A mutant, KRD3, was identified that has increased salt sensitivity compared to the wildtype. KRD3 was found to have a mutation in the DnaK gene, which is a molecular chaperone that plays a role in several important cellular functions, including protein folding and managing the heat shock and stress response. In order to characterize the mutation’s impact on abiotic stress even further, an assay was performed that compared the thermotolerance ability of the wildtype and the mutated bacteria. Both strains were incubated at 30°C, then moved to 48°C for one hour, and compared to a second group that was incubated at 40°C, then moved to 48°C for one hour. Growth was determined using a drop plate method. It was found that there was a negligible difference in survival between the mutant and the wildtype bacteria, however bacteria that had been first incubated at 40°C survived better when exposed to 48°C. *P. frederiksbergensis* has previously been tested for cold shock, but this is the first report of its ability to acclimate after heat shock.

Angeleno Perceptions Towards the Future of the Homelessness Crisis
Adina Trandafirescu

Homelessness is one of the biggest issues in Los Angeles. Previous literature shows the relationship between household incomes and views of the current state of homelessness. However, there is a gap in the literature about household incomes and views toward the future state of the homelessness crisis. My project will focus on this issue and how current day Angelenos feel about the future. The data that I will be using to examine this subject are from the Center for the Study of Los Angeles’ 2022 LA Public Opinion Survey. The survey collects opinions from LA County residents (n=2,002) on the topic of homelessness. Results show that 62% of Angelenos believe that the crisis is headed toward a worse situation. Data show that there is a general trend that in lower household incomes, the crisis is a worsening issue. These results are extremely important because they provide context into Angeleno perceptions about the future of Los Angeles as it relates to the homelessness crisis.
Angeleno Support Levels for Basic Income Guaranteed
Lucas Verderese

Angeleno parents continue to persevere through financial hardships despite the ever-growing expenses it takes to live in Los Angeles while raising a child. This project focuses on the attitudes of Angelenos towards the proposal of a Basic Guaranteed Income program by number of children in household, income, and education. This study serves to gather an analysis of the interest levels whereby a Basic Guaranteed Income program is passed into legislation and implemented. Data utilized in this research are from the Center of the Study of Los Angeles’ 2022 LA Public Opinion Survey, which queries 2,002 adult residents of Los Angeles County. This research analyzes support levels of Angelenos by the following demographics: education, income, and age, toward a basic guaranteed income. The chi-squared test was used to indicate significance at $P<0.05$. Results indicate a positive level of support (65%) for basic income guaranteed across all three demographics: household income, education level, and children in household. In conclusion, this project, by closely examining number of children in household, income levels, and education levels by their support levels for basic income guaranteed has shown to lawmakers, politicians, leaders of the community, and taxpayers that there is support behind this policy. It has been brought up and rejected in the past, however, Angelenos would be supportive of its implementation into our society to truly help our fellow Angelenos and their children.

Angelenos’ Trust in the Media
Garrett Howard-Jimenez

The media is an important resource that many people rely on to stay informed, making societal-wide trust in this institution vital. This project aims to understand Angelenos’ trust in the media by deciphering societal-wide groups’ trust in terms of political ideologies and racial groups. This project examines the 2022 Los Angeles Public Opinion Survey, a survey conducted through telephone sessions and online and face-to-face surveys, from the Center for the Study of Los Angeles located at Loyola Marymount University. Opinions from 2,002 adults living in Los Angeles County were collected with a margin of error at ±3.0% for the entire sample. Results show that 47% of Los Angeles County trust the media to do what is right only some of the time and 21% of Angelenos have no trust in the media at all. White respondents appear to trust the media most among all races and ethnicities, trusting the media only some of the time at 39% while Black, Asian, and Latino/a respondents tend to trust the media some of the time at higher rates of 54%, 49%, and 50% respectively. Liberals trust the media to do what is right only some of the time at 46%, with Moderates at 46%, and Conservatives at 45%. With the media having such a vital role in our democracy and in informing the public, it is crucial for media companies to recognize this lack of trust and work to improve their relationship with Angelenos.

Ascension at the Expense of the Other: An Exploration of Black and Indigenous Relations in Post-Civil War Indian Territory
Kioni Shropshire-Maina

This project looks at the relationship between African-Americans and the Five Nations in Indian Territory after the end of the Civil War. It expands on previous literature that analyzes white-Indigenous and white-Black tensions within Indian and Oklahoma Territories. Using racial ascension as a lens, it explores how these two groups used anti-Indigeneity and anti-Blackness respectively in an attempt to secure better status during a time of profound social upheaval. It looks specifically at Black westward migration following the Civil War, Indigenous reaction to increasing encroachment on their sovereignty (by both
white and Black settlers) and the difficulties faced by Indigenous freedmen as the Five Nations pushed back against federal attempts at land-grabbing. Further research could expand both geographically and temporally—investigating Black-Indigenous relations at the Hampton Institute, Black-Indigenous relations in the Far West during and after the Indian Wars and diving deeper into the Five Nations’ history of enslavement in the Southeast.

**Bad to the Bone: An Investigation into the Effect of Environmental Pollutants on the Skull Development of Canis latrans Using Fluctuating Asymmetry**

*Sarah Hofmeister, Daniella Nanula, Emily Sramaty, Delina Amanuel*

The development of vertebrates has been shown to be negatively affected by environmental stressors, causing deviation from bilateral symmetry. This can be demonstrated in vertebrates by a measure known as fluctuating asymmetry (FA). Using a variety of skull landmarks—identifiable and repeatable points on the skull—the degree of FA within and between individuals can be evaluated. Higher levels of FA may be observed at higher trophic levels due to a greater bioaccumulation of pollutants. In previous research, Principal Component Analysis showed higher levels of FA in omnivorous *O. torridus* skulls near Owen’s Lake, CA (an EPA-nonattainment site with dangerous levels of heavy metals) compared to the more herbivorous *N. lepida* and *P. maniculatus* rodents found outside of Owen’s Lake. To better examine the effects of developmental stressors on trophic level, specimens of a carnivore, *Canis latrans* (Coyote), can be measured from inside and outside Kern County, CA (an area with elevated emissions of carbon monoxide, particulate matter, and other toxic pollutants). Landmarks had to be adjusted and the sample size was reduced, due to an increase in skull size and less availability of specimens. Because *C. latrans* occupy a higher trophic level, it’s hypothesized that there will be a higher degree of FA in *C. latrans* within Kern County, with an absence or lower degree of FA in those outside of Kern, and likely higher FA than the prior comparable study in rodents.

**Basic Income Guaranteed: Angeleno Perspectives**

*Ashley McCluskey*

Unaffordable housing and increasingly high living expenses contribute to LA County’s high poverty rate (13.7%), the highest in California as of 2021. Demographics disproportionately impacted by poverty in Los Angeles include renters and historically underinvested communities of color. Basic Income Guaranteed: Los Angeles Economic Assistance Pilot (BIG: LEAP), will intervene, by giving 3,000 parents within federal poverty levels $1,000 a month with no conditions. This project aims to understand how public support for BIG: LEAP’s poverty intervention and community investment varies by Angelenos’ demographic characteristics. I will examine data from the 2022 Los Angeles Public Opinion Survey conducted by StudyLA, analyzing BIG: LEAP support levels among homeowners, renters, and various racial/ethnic demographics. This survey consists of a representative sample of 2,002 adult residents of LA County collected through mixed methods. Differences in perspective by respondent home ownership status and race/ethnicity are analyzed using Chi-square test of independence and p < 0.05 as a statistical significance cutoff. Results reveal significant differences in support of BIG: LEAP by both homeownership status and race/ethnicity, with the highest proportion of renters (73.61%) and the highest proportion of Latina/os (70.01%) either in somewhat or strong support. These findings indicate a relationship between demographics that are the most impacted by poverty in LA and the desire for poverty intervention. BIG: LEAP’s success is important because it has the potential to pave the way for future community investment and social safety net programs that can reduce wealth disparities among underserved demographics.
Bone Density in Weight-Bearing and Non-Weight-Bearing Female Athletes

Elizabeth Krauss

Bone mineral density (BMD) is a measure of mineral deposit within the bone that can be used as an early-adulthood predictor for later development of osteoporosis. Type of exercise induces a stress-response which builds BMD. **PURPOSE:** The goal was to compare weight-bearing-athletes to non-weight-bearing-athletes and controls to identify differences in bone health. This study was modeled after work by Taaffe et al. which concluded that female athletes who do not engage in weight-bearing-activities had lower BMD. **METHODS:** Height, weight, and calcium intake was collected for female students (20.0±1.3 years); 23 runners (R), 9 swimmers (S), 15 water polo players (WP), and 24 controls (C). BMD (g/cm2) and lean body mass (kg) were measured on a dual-energy x-ray absorptiometer (DXA). Two tests occurred 5 months apart. **RESULTS:** Calcium and bone free lean mass (BFLM) were used as covariates. SPSS analysis at the anterior-posterior (AP) spine, lateral spine, trochanter, total hip, and whole body reported no statistical difference between groups (p>0.05). At the femoral neck (FN), S<WP (0.790±0.033 vs 0.922±0.030 g/cm2, p=0.005). Longitudinally, change between visits occurred for S at AP spine (p=0.028), lateral spine (p=0.049), FN (p=0.049), and trochanter (p=0.018) and for C at WB (p=0.008). **CONCLUSION:** Bone health has improved in non-weight-bearing-athletes since original analyses by Taaffe et al. Sufficient calcium intake is important to ensure proper bone health is maintained to meet the demands of physical activity. Fewer differences in BMD among groups suggests modern training methods and dietary emphasis leads to better bone health.

A Cannabinoid Receptor Controls Cranial Neural Crest Development in Embryos

Amira Mahomed

Question: Considering that the main cannabinoid receptor, CB1R, first shows expression during the early neurula stage in embryos, how does maternal cannabis use impact cranial neural crest migration and derivative morphogenesis? Methods: Early neurula stage chicken embryos were exposed to ACEA (CB1R agonist), AM251 (CB1R inverse agonist) or Blebbistatin (non-muscle Myosin II inhibitor) in ovo, and examined during migration of neural crest cells and at the condensing cranial ganglia stage. The embryos were exogenously treated at HH8 and collected at HH13, HH14, or HH18 to examine how each treatment impacted its progressive development. Results: In chicken embryos exposed to ACEA and Myosin II inhibitor, cranial neural crest cells migrated erratically from the neural tube. Further, the right, but not the left, ophthalmic nerve of the trigeminal ganglia morphometrics were altered in ACEA and AM251 treated embryos. Conclusions: This data suggests that normal activity of CB1R is required for sequential steps in migration and morphogenesis of neural crest cells and derivatives in embryos. In addition, CB1R may signal through Myosin II to regulate migration and morphogenesis of neural crest cells in embryos. Finally, the sidedness demonstrated in the trigeminal nerve phenotype may indicate a difference in expression or in activation of CB1R bilaterally.

Characterization of EUP Black Holes

Juan Uribe

Black Holes are special objects as they are at the intersection of Quantum Mechanics and General Relativity. The Extended Uncertainty Principle introduces a position-related uncertainty correction to the standard Heisenberg uncertainty relation. In a previous paper, a black hole metric associated with the Extended Uncertainty Principle was derived, by modifying the metric function of a Schwarzschild black hole.
hole. This metric introduces near-horizon structures that should produce observable effects. This project will calculate a variety of observable effects in EUP black holes, such as love numbers (parameters that characterize the deformability of an object), gravitational wave echoes (echoes of gravitational waves trapped between the black hole and a near horizon structure), and quasi-normal modes (exponentially decreasing ringing modes of black hole merger). Some of these effects could be observed with current or near-term technology such as the Laser Interferometer Gravitational Wave Observatory (LIGO) and the Event Horizon Telescope (EHT).

Co-inoculation of *Bacillus simplex* with *Sinorhizobium* mutants to enhance the growth in *Medicago sativa*.  
Leah Mizuno

The symbiosis with soil rhizobial bacteria allows legume plants to grow in nitrogen-deficient soil. Through the process of symbiotic nitrogen fixation, rhizobia infect root nodules and convert nitrogen gas to ammonia, which fertilizes the plant. As previous results indicated, infection rates by *Sinorhizobium meliloti* (Sm) and plant biomass were improved when the soil was co-inoculated with plant growth-promoting rhizobacteria (PGPR). In this work, *Bacillus simplex* (Bs), a PGPR isolated from the Negev Desert, was tested for its ability to enhance symbiosis between *S. meliloti* and *Medicago sativa* (alfalfa). *M. sativa* plants were inoculated with *S. meliloti* alone or in combination with *B. simplex*. *B. simplex* was also tested for its ability to complement or rescue *Sinorhizobium* mutants that normally have difficulty infecting the root nodule. These strains include mutants lacking Type IV pili (*ΔpilA1A2A3*), exopolysaccharide (*ΔexoY*), or the quorum sensing receptor (*sinR::Gm*). Plant size, pigmentation, and infection rates were analyzed over the course of 3 weeks. As early as week 1 post-inoculation, results indicated the presence of greater nitrogen fixation in the Sm + Bs co-inoculated plants, as they were larger and had greater root nodule infection, in comparison to their singly-inoculated counterparts. Furthermore, Bs + *ΔpilA1A2A3* co-inoculation induces more white nodules and is expected to have more extensive infection than *ΔpilA1A2A3* alone or the other Sm mutants. This experiment identifies strains of *S. meliloti* and *B. simplex* which enhance *M. sativa* growth. The application of these results has the potential to be beneficial agriculturally and improve crop production.

Coming of age in a multiverse  
Yukana Inoue

In recent years, there has been a noticeable increase in the interest in multiverse storylines in coming of age stories, with the popularity of works like “Everything Everywhere All at Once” and “Spider-Man: Into the Spiderverse” — all narratives that deal with characters who are coming of age in an unnatural environment where multiple dimensions exist. Anime, as a medium, especially possesses the unique capability to convey multiverse narratives given its freeform and limitless nature. In my research, I focus on two coming-of-age anime series that feature multiverse narratives — “Sonny Boy” and “The Tatami Galaxy” — to explore what multiverse stories about Japanese adolescents say about the experience of growing up in modern Japanese society. When talking about “Sonny Boy” in an interview, director Shingo Natsume said: “Boys and girls who square off against the illogical — the theme of this work is the frustrations and difficulties that anyone has felt through living.” At its core, this theme is what I plan to apply and investigate in the two shows — what do these stories say about growing up in a world that adolescents have no control over?
A Comparative Study on Gender Equity Laws

Desire Alvayero

In 2018 the United States introduced a new Senate Bill, SB 826 which was signed by Governor Brown in an attempt to create a more inclusive environment admitting gender quotas into Corporate Board rooms to ensure that women are properly represented as the numbers coveting women's participation have been significantly lower, this attempt towards inclusion was severed by the challenging of corporations arguing that reverse discrimination has now forced corporations to act against their own best interests. The European Union for one, has already implemented several quotas to alleviate the staggering inequalities, and through the analysis of the European Union and Affirmative Action cases this paper will attempt to also highlight how systematic change can occur, while at the same time placing an analysis on the results. In this paper, I will introduce a number of gender quotas and gender conscious laws in the European Union which will be utilized comparatively to the United States. In this paper, I will argue that gender quotas are useful and, are often employed through either an implementation of normative or legislative collective efforts leading to significant judicial results. And two I will also argue that gender quotas are necessary in a democracy such as the United States serving a compelling government interest. Thirdly, I argue that the Affirmative Action model of justice is suitable when considering the case of gender quotas.

A Comparison of the Effects of Temperature and Salinity on the Antioxidant Activity of *Mytilus galloprovincialis* and *M. trossulus*

Osiris Guinea Zepeda

*Mytilus trossulus* is a blue mussel species that is native to California but has contracted its species range due to environmental stressors and competition with the heat tolerant *M. galloprovincialis*. Studies have shown that hyposalinity and heat stress separately increase the activity of cellular antioxidants in *Mytilus* mussels. However, we do not know how antioxidant responses shift under combined stressors in *M. trossulus* and *M. galloprovincialis*. The purpose of our study was to quantify the enzymatic levels of antioxidants (superoxide dismutase, SOD; catalase, CAT) and oxidative damage (lipid peroxidation; LPO) in *M. trossulus* and *M. galloprovincialis* when exposed to multiple stressors. Mussels were exposed to combinations of hyposalinity (20, 25, and 34 ppt) and heat stress (17, 20, and 25°C) and then dissected so the gill tissue was isolated for antioxidant analysis. We found that there was an increase in SOD activity in mussels exposed to the mild temperature stress (20ºC) combined with hyposaline conditions for both species. *M. trossulus* under 25°C, 20 ppt showed the highest CAT activity. In addition, LPO in *M. trossulus* was the greatest under control conditions. *M. trossulus* increased both CAT and SOD at the most extreme condition (25°C and 20 ppt) while *M. galloprovincialis* did not, which suggests that it may use other methods to withstand multiple stressors biochemically. Thus, our study suggests that *M. trossulus* relies more on antioxidants to combat oxidative stress during multiple stressor exposure than *M. galloprovincialis*.

A Comprehensive Guide to the Field Collection of Freshwater Turtle Eggs

Perla Rand

Introduction: Understanding the breadth of vertebrate development requires exploring new species, in addition to traditional model organisms. Turtles, with their distinct shell, offer a unique perspective on vertebrate embryology. However, methods for the collection of freshwater turtle eggs are missing from
the literature. Here, we present a comprehensive method for the field collection of freshwater turtle eggs—using the most invasive turtle species, Trachemys scripta.

Methods/Results: During the 2022 nesting season, gravid female turtles were tracked daily at California State University in Northridge, where 200-300 T. scripta are housed in the Orange Grove Pond. Defined as the presence of eight or more gravid turtles preparing to lay in the orange grove, the most favorable weather conditions included these three simultaneous specifications: 7-10AM, 65-75°C, and UV index 2-5. Once laying turtles were seen, females early in the laying process were monitored from afar. A turtle in the more advanced stages of laying was approached quietly from behind, and a numbered rock was placed 2-4 feet behind its tail. A 360° video was taken to reveal three permanent landmarks, to aid in finding the camouflaged nest 3-6 hours later. The eggs were excavated and stored in specially assembled Tupperware containers, in an incubator at 27-28°C with a relative humidity of 30-60%. Our method ensured low mold infestation, embryos with a normal morphology, and high survival rates. This system led to the successful acquisition of approximately 400 eggs during the 2022 nesting season—a 550% increase compared to prior years.

A Computational Investigation on Improving Mononuclear Iron and RutheniumPhoto-oxidation Catalyst Design
Shunyu Yao

Improving hydrogen production from non-carbon sources is essential for reducing greenhouse gas emissions. Water oxidation, which splits water molecules into hydrogen (protons) and molecular oxygen, is a thermodynamically challenging, multistep reaction achieved by photosynthetic organisms via photocatalysis. Developing synthetic water oxidation catalyst is a major research objective, but optimal design for catalytic efficiency and longevity remains elusive. Investigating molecular design through energetic and structural catalytic trends and behaviors is an area where theoretical study can contribute to understanding working catalysts as well as uncovering the reasons behind nonfunctioning ones. We use density functional theory to characterize 15 mononuclear ruthenium and iron photocatalysts with varying degrees of electron-withdrawing behavior in their ligands. Ruthenium is a popular metal center for such synthetic photocatalysts, but iron is earth-abundant and would be ideal from a cost and environmental standpoint. We quantify and optimize the charges on the metal for each structure, which provides a sensitive measure of the impact of ligand modification. Following structural optimization, we perform time-dependent calculations to predict the maximum absorption wavelength for each catalyst, an important feature for functional photocatalysts. Our theoretical results are compared with some experimental characterization of working ruthenium catalysts to benchmark our calculations and develop insights to predict the best design principles for optimal catalytic performance.

Considering Identity-Affirming Care for Older LGBT Adults in Assisted Living
Sabrina Isaacs

Aging is a difficult process, as the risk of mental and/or physical health decline can manifest in the form of cardiovascular disease, limited mobility, and cognitive impairment (i.e., dementia). An estimated 2.7 million Lesbian, Gay, Bisexual, and Transgender (LGBT) adults aged 50 and over (defined as “older” for the purposes of this study) have specific care and cultural needs. Many older LGBT individuals possess distrust for health care workers and may not disclose their sexual orientation or gender identity to their physicians, for fear of discrimination. Such cultural sensitivities can pose roadblocks to providing care in assisted living facilities. When moving into care facilities, many older LGBT adults are forced into the closet and face the stress of being a sexual minority in a new community, leading to increased isolation.
and loneliness. LGBT older adults are more likely to be refused housing or evicted based on homophobic and transphobic beliefs, and some nursing homes ban same-sex partners from facilities. LGBT older adults face health disparities such as depression, obesity, cardiovascular disease, and HIV/AIDS – all of which are known risk factors for dementia. Utilizing 25 sources obtained through databases such as PsycINFO and Social Sciences Full Text, this review analyzes the current state of research and real-world health care applications regarding this population. Some common approaches to attending to older LGBT adults include cultural competency training among caregivers, creating opportunities to build community, using inclusive language, and including same-sex partners and “chosen family” members in discussions of care.

**Core Results From a Three-Year Management Study of Human-Coyote Conflict in Culver City, California with Suggestions for Conflict Amerlioration**

Anna Monterastelli

A three-year management study of urban coyotes (Canis latrans) by the LMU Center for Urban Resilience is being conducted in Culver City, CA in order to assist local government officials and residents in managing human-coyote conflicts. The study is in response to an increase in predation of domestic cats by local populations of coyotes. Our research has been focused on the ecological factors that have been drivers of the recent increase in predation events. Multiple techniques were employed to better understand coyote behavior, including radio telemetry, diet analysis, remote camera trap systems, molecular analysis and direct observations. In addition, human social surveys were conducted in order to better determine resident attitudes towards coyotes and their management. Finally, formal and informal educational materials were prepared in order to inform local residents and students about safe coexistence with coyotes. This poster provides an overview of findings and management suggests of the three-year study. Results include a strong relationship between the impacts of long term drought and risk of predation by coyotes on cats.

**Country Favorability & Foreign Aid: Do Americans Give More To The Countries They Like?**

Paul Fitchen

Foreign aid has long been a topic of heated debate, particularly within the United States. Amidst a global pandemic, emerging market debt crisis, and the resurgence of isolationist policies, the fate of many countries hangs in the balance. Although the determinants of foreign aid are relatively well defined, few scholars have investigated the influence of public opinion on foreign aid. In response to this gap in existing literature, this paper aims to evaluate the relationship between Americans’ attitudes towards a country and the amount of U.S. foreign aid it receives. Combining country-level U.S. foreign assistance data with public opinion polling on Americans’ attitudes towards 35 countries between 2000-2021, I test whether greater country favorability results in higher allocations of foreign aid. Traditional determinants such as trade openness, democracy, population, foreign direct investment, and GDP per capita are controlled for. I ultimately discover a positive relationship between country favorability and foreign aid obligation exists. These findings not only provide additional insight into the historical relationship between public opinion and foreign aid, but also shed light on the growing influence public diplomacy and strong democratic values hold in the formulation of foreign policy.
Creating Student Engagement Through Interactive Materials in an E-Textbook
Bryn Weissman, Danielle Hjerpe

In recent years, but especially since the COVID-19 pandemic, there has been a shift towards having more online academic resources like electronic textbooks. This project attempts to find creative solutions to increase student engagement using virtual interactive activities with an emphasis on environmental justice. Activities were specifically chosen to highlight “real world” examples of the topics discussed within a Climate Change chapter in the Chemistry in Context textbook. Interactive activities, such as visuals, simulations, guided searches, and interactive videos, also help students build and utilize self-regulation skills. Three different activities were created: an interactive video on the Paris Agreement that teaches students about environmental policy, a guided search focusing on ocean acidification and how it affects coral reefs, and a guided use of an online simulation to explore the changes in albedo with different types of surfaces. Specific details for each activity will be presented. Effectiveness of these activities is forthcoming as the textbook is still in production.

“Curing” Aging by Self-Tracking: Anti-Aging Practices in Quantified Health
Kyla Yein

Within the context of contemporary Western capitalism, the fear of aging pressures consumers to take measures such as purchasing anti-aging creams and subscribing to “wellness” services that promote means to achieve a youthful appearance, thereby a “healthy” body. Popular technologies have allowed everyday people to utilize methods such as DNA testing, health applications, self-trackers, and more, trying to “control” their age. Members of the biohacking and Quantified Self communities – traditionally male-dominated – may seek to reverse or prevent aging through technology and often turn to quantification, the act of measuring and analyzing the body. In this respect, aging is associated with being unhealthy, and quantification is used to measure and uphold biometric standards for health. While the anti-aging discourse within the beauty industry emphasizes the connection between femininity and age, the involvement of technology in self-tracking has moved these discourses away from being solely associated with femininity and has instead crossed into being explicitly linked to achieving health standards. I will be exploring these new communities by outlining the history of how companies have used the fear of aging to claim their products improve “health” and showing how the emergence of self-trackers in the biohacking communities have changed anti-aging practices and discourse by analyzing scholarship, literature, and online forum posts. Furthermore, I will show how modern “self-quancers” inherit the neoliberal ideology of aging as something to be “cured,” which historically has been developed by companies selling wellness and fitness products, targeting modern biohacking communities.

A Detailed Analysis of the Methods to Obtaining Testosterone Levels from Excreta Samples of Larus marinus (the Great Black-backed Gull)
Frances Dygean

Hormones play a critical role in understanding animal behavior and physiology. Although the link between testosterone and aggression has been well-documented in several species, this remains understudied in Larus marinus (the Great Black-backed Gull). In most cases, to study vertebrate hormone levels, blood samples are analyzed, providing data on the individual’s circulating hormone levels. This approach is not ideal in all systems, however, because it can be invasive and may cause the bird to become distressed. In our study, we instead use excreta (fecal and urinary waste) samples to quantify
hormone levels. The goal of this project is to obtain testosterone levels from excreta for use in later behavior studies, such as gull aggression. Once samples are collected at our field site in Maine, they are shipped to Loyola Marymount University, weighed, and freeze dried. Samples are ground and homogenized, then a standard mass of each freeze-dried sample undergoes three rounds of extraction with 80% methanol to separate the testosterone from sample debris. Extracted samples are dried, reconstituted, and testosterone levels are quantified with an enzyme-immunoassay. To date, we have quantified testosterone from our 2019 and 2021 samples (N=100 samples) and are processing those from 2022 (N=12 samples). A subset of these excreta values will be compared to testosterone values from blood samples to better understand any variation between circulating hormone levels and levels in excreta. Ultimately, our excreta hormone data will be analyzed relative our individual gull aggression scores.

Detention Basin Design for Climate Change
Alex Matos

Increasing urbanization across the US has significantly increased the amount of impermeable surfaces present on our landscape preventing infiltration and augmenting runoff. Hydrologically, rainfall events contribute to urban runoff with predictable return times and consistent amounts of rain. In extreme storms, structures like detention basins were designed to manage water surges by slowing and collecting potentially dangerous runoff. Historically, 100 year rain events are very rare (1/100) with large flood magnitude, followed by rarer 50 and 25 year events (1/50, 1/25) with smaller flood magnitudes. Recently, climate change models predict increasingly frequent 100 year events; additionally, most existing flood control infrastructure was designed for 50 year or less rainfall events making them outdated. Hence, my project is modeling a detention basin in an at-risk area in the worst case scenario per the models. I worked with ArcGIS, to map the area, topography, and watersheds of a community at risk to these storms, namely, Moorpark, CA. Next, I output this data from ArcGIS (i.e. catchment/soil group, land use code, and soil type) into Matlab to obtain the curve number for each catchment. The slopes and areas were recorded along with additional parameters needed for the Soil Conservation Service (SCS) Curve Number method to estimate excess precipitation flowing through Moorpark. The next step in this process is calculating the flow rate moving through the Moorpark detention basin with the 50 year rainfall events via HEC-RAS and iterating the design until a safe flow rate is reached.

Determining the genotype frequency of SNP rs4988235 that confers lactase persistence in an LMU population.
Catherine Channell, Odoba Okwuosa

The human trait of lactase persistence (LP) is the ability to produce the enzyme lactase, which digests the milk sugar lactose, into adulthood. Most individuals worldwide are not able to metabolize lactose effectively, referred to as lactase nonpersistence (LNP), with reports of LP expression ranging from 16-35%, though this may be an overestimate. LNP can result in mild to severe gastrointestinal symptoms such as bloating, gas, and diarrhea. Single nucleotide polymorphisms (SNPs) in the enhancer region of the LCT gene have been correlated with LNP. The best-studied SNP is the C->T variant (SNP ID rs4988235) at position -13,910 bp upstream of LCT, where the T allele confers the trait of lactase persistence. Frequency data of this SNP has been recorded for some homogenous populations, but is unreliable for the heterogenous US population. Our work seeks to fill this gap. Due to COVID-19 precautions, DNA is extracted from hair follicles rather than cheek cell lysate, and PCR-RFLP analysis is used to determine the genotype at rs4988235. We have collected samples from 52 individuals at LMU
and successfully genotyped 44 of them. From these data we predict that 22 individuals have the LP phenotype and 22 have the LNP phenotype. These results will be compared to self-reported dairy consumption and symptoms experienced, as well as demographic data. A more reliable estimate of the frequency of LP and LNP in the US population will allow us to shape US dietary guidelines so that they reflect the needs of diverse groups. (247 words)

Develop a flexible graphical user interface software for visualizing eDNA metabarcoding output
Yifan Hu

In recent years, environmental DNA metabarcoding became a powerful tool for studying biodiversity in the field of ecological research. This cutting-edge technology allows us to extract genetic information from environmental samples, providing an unprecedented level of detail about the species that exist in a particular ecosystem. However, as with any new technology, there are challenges that must be overcome. One of the most significant of these challenges is the difficulty in interpreting the massive amounts of data generated by DNA metabarcoding studies. To address this challenge, we aim to design a web-based application that can streamline the process of analyzing and visualizing data, simplifying the process for biologists. In addition, by providing a wide range of graphical visualizations, we hope to answer various fundamental and applied questions. Using Basic Local Alignment Search Tool (BLAST) on raw sequence reads, the software will use in-house Python scripts to automatically generate analyzed data. Then, these outputs will be able to be graphically visualized in a web-based dashboard format for end-users to explore and interpret. This end-to-end pipeline is currently being pilot tested on real-world eDNA data from our lab’s eDNA metabarcoding project investigating the illegal use of endangered crabs as bait in a Mexican fishery and the incidence of seafood mislabeling in a Los Angeles seafood processing plant. We anticipate this application to facilitate a broad range of biodiversity studies in an intuitive and accessible way to explore eDNA data.

Developing Environmental Funding Networks in Los Angeles
Lily Maddox

Similar to other types of non-profit funding, environmental grants have a continuing history of being inaccessible to the groups that could benefit from them the most. While many community organizations and non-profits are in need of funding for environmental projects, Los Angeles lacks a clear network of funders that would allow for efficient grant seeking. In my study, I am conducting an extensive literature review of funding practices in Los Angeles, as well as a network analysis of other cities’ environmental funders. The findings from this review are being used to compile a database of environmental grant sources in Los Angeles detailing funders and programs, and will finally lead to the creation of a preliminary funding network. This funding network will be accessible to the general public and will allow for thorough, yet efficient grant-seeking in hopes that community organizations and non-profits will increase their knowledge of funding opportunities in their cities and feel more confident pursuing grants.

Development of a seed coating method using Bacillus sp. and sodium alginate to improve germination of California Poppy
Paul Lussman

Seed priming, the pretreating of seeds prior to planting, can be used to optimize seed germination. In some cases, plant growth promoting bacteria can also be incorporated in seed priming processes. This study investigates sodium alginate for bacterial seed coating and the use of bacterial species of Bacillus,
which are known to have plant growth promoting properties, to improve California Poppy (*Eschscholzia californica*) germination. *Bacillus* bacteria also have a dormant endospore state that can withstand external environmental stressors that would facilitate seed application. Different concentrations of sodium alginate were tested for making the beads used for the seed coating. In addition, the success of media to induce spore formation of *Bacillus* was assessed. It was determined that the creation of sodium alginate beads, composed of a 2% concentration of sodium alginate and 4% starch worked well. Beads were dried and ground up using a mortar and pestle to attain a powder consistency, with a recovery of 98% mass. A 40% gum Arabic solution was successfully used to coat the seeds with the ground up alginate. Difco Sporulation Medium induced spores, which was verified by spore staining, accompanied by microscopy. Future directions would be to apply the endospores in the sodium alginate mixture to determine whether the alginate solution with bacteria increases seed germination. This data and experimental procedure provide a foundation for restoration efforts to increase seed germination of native plants.

**Dietary Isotopic Ecology of Breeding Great Black-backed Gulls**
*Jacqueline Raetz-Vigon*

Despite their ecological role of consuming natural prey and discarded human products, gulls’ dietary habits are infrequently studied. This project seeks to document the dietary preferences of Great Black-backed Gulls (GBBG) on Appledore Island (Maine) via stable isotope analysis of feathers and blood. As a quantitative measurement, isotope analysis inherently includes all food consumption, providing more complete dietary information than the time-consuming and incomplete data gleaned from direct observation. Carbon ratios indicate the source of food, terrestrial or marine, and nitrogen ratios reflect food source trophic level. Feather samples reflect food consumption when feathers were grown, while blood, a metabolically active tissue, provides information about consumption over the past several days. Thus, this study investigates variation in isotope ratios between parents and offspring, chicks within a brood (hatch order), across broods, and across the period of chick growth (from hatching to pre-adulthood). During the breeding season, feather and blood samples are collected from adults and chicks and are subsequently processed and analyzed via mass spectrometer. Preliminary results indicate that chicks that hatch first have higher feather nitrogen relative to the third and last-to-hatch chicks. This suggests that adults provide higher trophic level foods to their first hatchlings. Blood carbon levels also differ across nests/broods, suggesting that adults throughout this breeding site vary in the food sources they provide to their chicks. This study enhances our understanding of variation in isotope ratios and therefore foods consumed by GBBG, which serves to inform conservation decisions for this and other, closely-related, species.

**Diminishing Delinquency: Social Support as a Moderator Between Exposure to Community Violence and Delinquency**
*Leonardo Dominguez Ortega*

National rates of exposure to community violence (ECV) are at epidemic levels within the U.S. Increased incidence of ECV contributes to the proliferation of negative mental health, behavioral, and social outcomes. Delinquency is one adverse outcome resulting from ECV, which is higher in the U.S. than other industrialized nations. Extant literature shows a strong association between ECV and delinquency. Additionally, ECV and delinquency disproportionately affect low-socioeconomic status, minority adolescents, creating a social justice issue. Thus, disproportionate effects of ECV on underserved adolescents necessitates adequate interventions that can mitigate delinquency following ECV. Copious
research has also indicated that social support can mitigate delinquent behaviors. Rooted in the buffering hypothesis, a model used to demonstrate social support’s effectiveness in reducing stress, we posit that social support can lessen delinquency that stems from ECV in a secondary data analysis of the National Survey of Children’s Exposure to Violence III. The present study will explore social support’s viability as a moderator between ECV and delinquency. Results are expected by the time of the Undergraduate Research Symposium. If results support our hypothesis, we believe future research can utilize social support as a pathway to minimize delinquency emanating from ECV. Successful interventions would then lessen a common outcome of a noted public health crisis and reduce a disproportionate burden minority, low-SES adolescents bear.

**Discovering Latinidad: Artistic Expressions of Latinx Identity**
*Camila Robles Ruiz*

Latinx persons in the U.S. consistently feel like inside-outsiders teetering the border between their mother country and the U.S. This leads to feeling a lack of belongingness in either culture, so determining one’s identity becomes challenging. This lack of belonging stems from different factors of the intersectionality of Latinx Identity (like nationality, race, or gender) that are used to discriminate against the community. As a Latina theatre-maker, I have noticed consistent discrimination in the arts. The misrepresentation of Latinx persons and culture on-screen and behind the scenes causes others to misunderstand and disrespect the rich diversity of the Latinx community, further feeding the challenge of discovering one’s identity. As someone who struggles with their Latinx identity, I am creating an all-arts festival as my project for the Newman Civic Fellowship and to share with the Social Justice in Action Panel. Discovering Latinidad: Artistic Expressions of Latinx Identity will create a safe space for Latinx artists to express their identity through various art mediums using three principal steps. First is an introduction meeting establishing the Latinx artists. Second is the exploration of a storytelling and Latinidad workshop. Lastly, the artists will create art pieces to be displayed at the festival. As a theatre-maker, I have been impacted greatly by positive Latinx stories in theatre and on screen. With this festival, I hope to create diversity, highlight Latinx voices, break stereotypes, and create a safe space for all Latinx persons to discover a sense of belongingness and our identity creatively.

**Do Angelenos want long-term or short-term solutions to homelessness?**
*Tyler Bushey*

Homelessness is a hot button issue in Los Angeles, and it threatens the economic and social aspirations of all Angelenos, including our unhoused neighbors. Using a representative study of Angelenos, this project assesses how residents seek to deal with the current and unsustainable number of residents living on the streets, and how this differs across demographic lines. I examine data from the 2022 Los Angeles Public Opinion Survey, an annual 20-minute mixed mode survey from the Center for the Study of Los Angeles at Loyola Marymount University. The survey collects opinions from LA County residents (n=2,002) on a variety of current issues, including perspectives on homelessness in the region. I analyze differences in such perspectives by respondent age, household income, how long they’ve lived in the region, and political party using Chi-square test of independence and p < 0.05 as a cutoff for statistical significance. Results show that income is not a determinable factor in whether respondents support long term or short-term housing solutions. For example, with respect to political parties, conservatives tend to support short term housing solutions 64% of the time, while liberals support them 57% of the time. With regard to how long respondents have lived in LA, there are no determinable differences among this group. These results show that across demographic groups, Angelenos support
short term housing solutions, although there are a few recognizable differences. Overwhelmingly, however, Angelenos support short term housing solutions, as opposed to long term ones according to this research.

**Do we love the same person or do we only love a version or versions of them? Is love bound to be flux or does love change because a person does?**

*Kelly Supangat*

Finding a universal definition of the most fundamental words has still been an unresolved philosophical debate. One can only imagine the complexity to generalize a word so versatile like love. With relations to flux and stability, the question I raise is whether we love the same person or do we just love particular versions of them. In connection, my proposal is about finding a way to come to a perfect agreement on something often portrayed via ostensive definitions. The interdependence between self identity and flux are major factors that construct love. Furthermore, we accept the flux of nature; like how spring turns to summer. As a result, with relations to nature, my essay entails the acceptance of the natural and inevitable flux in personal identity and love. A prominent hypothetical situation conducted but is reality to some is sudden memory loss affecting personal connections. This situation emphasizes on the importance of physical and emotional connection, whether love will still be there when one loses his or her properties. Additionally, is this person still the same person pre memory loss even though they are physically still the same? In conclusion, my stance is to allow and embrace the natural changes in self identity and love. “Fluxing at the same pace” is what keeps the love between 2 people alive and that love being flux should be to an extent, part of the universal definition.

**Does Size Really Matter? A Taphonomic Comparison of Small and Large Mammals**

*Patrizia Tandinco, Belen Carrasco-Cazares*

The Rancho La Brea (RLB) Tar Pits provides one of the largest and most unique collections of fossils from the late Pleistocene, including a wealth of large mammal fossils that have been a spotlight of research for over a century. However, smaller mammal species were often overlooked. One area of investigation previously explored exclusively on larger species is taphonomy, which encompasses the processes of bone fossilization from death to excavation. These processes include three categories at RLB: abrasion, weathering, and pit wear. Abrasion shows the erosion of bone surface due to the physical impact of sediment or water movement; weathering showcases how climate and soil conditions have a destructive effect on bone preservation, and pit wear demonstrates bone to bone interaction within a pit. In this study, the taphonomy of a variety of mid-sized or mesocarnivore (small to medium sized mammalian carnivores) specimens are quantified for the first time and compared to the taphonomy of larger specimens already collected from Pit 91 in RLB. Because surface area is greater on larger specimens, we expect that the incidence of taphonomy will be greater for the larger specimens in comparison to the mesocarnivores, though size is continuous, and the gradual effect of size on taphonomy may be possible to demonstrate. We find that mesocarnivore specimens generally score lower in measures of taphonomy. More data and as well as size comparisons made more accurate through scaling may help us better understand the effects of size on the processes of fossilization at RLB.
Effects of Multiple Stressors on Metabolic Rate and Thermal Performance of the Native Blue Mussel Mytilus trossulus

Alana Borer

Climate change is predicted to increase seawater temperature (heat stress) and decrease salinity (hyposalinity), exposing marine animals to environmental stressors. Mytilus trossulus is a blue mussel species that is native to the Northern Pacific of the U.S. and is tolerant of hyposalinity but not heat stress. Due to the species’ limited stress tolerance, we were interested in investigating the thermal performance and metabolic response of M. trossulus to changes in environmental temperature and salinity in order to understand potential effects of climate change. M. trossulus were collected from Coos Bay, OR and acclimated to control conditions (34ppt, 17°C) for 2 weeks in recirculating seawater tanks. Following acclimation, mussels were exposed to combinations of stressors (salinity: 20, 28, 34ppt; temperature: 17, 20, 25°C) and metabolic rate was determined for each treatment. In addition, a thermal performance curve was generated by exposing mussels to increasing degrees of heat stress (from 11-26°C) and measuring metabolic rate. We found that the optimal temperature for metabolic performance was at 14°C, after which performance declines when exposed to higher temperatures. We found no interaction effect of hyposalinity and heat stress on metabolic rate in M. trossulus and only a heat effect suggesting that temperature is the main influencer of metabolic rate in this species. Thus, M. trossulus is a thermally sensitive species and this sensitivity limits its ability to tolerate multiple stressors.

Effects of Multiple Stressors on the Physiology of Mytilus mussels.

Claribel Alcantar, Camya Brazil

Climate change is predicted to influence seawater temperature and increase precipitation events that will alter salinity. These changes may influence the range and survival of the competitive mussel Mytilus galloprovincialis. Little is known regarding multiple stressor effects on the physiological performance of Mytilus. Thus, the purpose of our study was to examine the effects of multiple stressors on the metabolic rate and thermal performance of M. galloprovincialis. M. galloprovincialis was collected from Marina del Rey, CA and acclimated to control conditions (17°C, 34 ppt) prior to experimentation. Following acclimation, mussels were exposed to fully-factorial combinations of temperatures (17, 20, 25°C) and salinity (20, 28, 34 ppt) and metabolic rate (mg O₂ × min⁻¹ × g⁻¹) determined. To measure thermal performance, mussels were exposed to a heat ramp of 1°C per 10 minute to targeted temperature and acclimated for 4 hours. Metabolic rate was determined using a closed system respirometry set up. We found a 1.8-fold increase in metabolic rate due to elevated temperature (25°C). Hyposalinity exposure (20 ppt) showed a significant increase in metabolic rate compared to mild hyposalinity (28 ppt) and the control (34 ppt). A negative synergistic effect was observed under the most stressful treatment combination (25°C, 20 ppt). We found a peak performance of metabolic rate at 29°C, with metabolic rate declining at higher temperatures. Thus, our study suggests that mussels may be energy limited during exposure to elevated temperature and moderate hyposalinity, which is heightened at temperatures ranging between 26 to 29°C.

Equity Analysis: VF Corporation

Mya Thuraisingam

Buying shares in VF Corporation (VFC), which owns and operates many iconic brands, including but not limited to Vans, The North Face, Timberland, Supreme, provides a strong investment opportunity. While the company has experienced a significant repricing over the last year, an in-depth analysis of the
company’s business model, financials, and macroeconomic factors indicates VFC as a value company. Using the Bloomberg terminal, various business journals, current news articles, and a discounted cash flows (DCF) model, VFC is currently undervalued to its current price.

**Examination of the role of lipopolysaccharide in stress tolerance of Paraburkholderia tuberum**  
*Kyla Yein*

Within the outer structures of Gram-negative bacteria, lipopolysaccharide (LPS) is known to maintain structural integrity and is required for the induction of root nodules in some plant species. However, the role of LPS in the rhizobia *Paraburkholderia tuberum* has not been fully explored in scholarship, thereby this research focuses on the role of LPS in the response of *P. tuberum* to various abiotic stressors. To determine the importance of LPS in *P. tuberum*, a mutant in *lptE*, which is defective in LPS transport and nodulation, was tested for its response to numerous stressors such as antibiotics, detergent (Sodium Dodecyl Sulfate), and high osmolarity. It was found that mutants defective in LPS transport showed increased sensitivity to antibiotics, demonstrating the protective role LPS has. The SDS sensitivity assay and osmotic sensitivity assay are currently in progress. Overall, my findings show how crucial LPS is for protecting plant associative bacteria from environmental stressors, allowing this to possibly be applicable in agriculture and restoration work.

**Examining Asian Americans’ Perceived Barriers to Healthcare**  
*Kathleen Nguyen*

This research aimed to examine Asian Americans and their perceived barriers to healthcare access. Asian Americans, due to not being a homogenous ethnic group, experience health disparities that are different to those that other ethnic groups experience. Compared to whites in America, Asian Americans are less likely to have job-based insurance coverage and because of this are then less likely to be insured (Brown et al., 2000). Additionally, the most common perceived barriers to accessing healthcare for Asian Americans are cultural attitudes, financial and socioeconomic status, as well as language barriers. These barriers found in the literature served as the primary barriers that were investigated throughout the course of this study. Thus, the goals of the study were to determine whether these perceived barriers are the actual barriers that this large community faces and which of the barriers identified is the most difficult to overcome. This was done through interviews with individuals who identify as ethnically Asian currently living in America. It was determined through preliminary interviews that many of the barriers in the literature were consistent with those actually experienced, but this research is currently ongoing so new findings may be included by the date of the symposium. It is vitally important to conduct research on this topic to ensure that healthcare providers and health institutions alike are aware of these disparities in order to better serve this community through the enactment of new policy changes or adjusted procedures and protocols.

**Examining the Effects of Mindfulness Meditation Intervention on Stress Levels in Palestinian Muslims**  
*Dana Elqaq*

Given the intractable conflict in Palestine, those living in the area are exposed to constant stress and trauma. A wealth of prior research findings clearly reveals that stress, with an emphasis on traumatic stress, leads to decrements in mental and physical well-being. Thus, it is important to consider implementing interventions that might help people in this area cope with stress. Researchers have
advocated for the use of meditation to lower stress and anxiety levels. In the current investigation, I will present findings from a study that I conducted in Palestine, looking at the impact of mindfulness meditation on effective coping with stress. Given that the conversation around mental health is extremely taboo and Western psychological practices are uncommon in Palestine, this is a novel study. At the Undergraduate Research Symposium, I will present on my experience collecting data in Hebron, Palestine as a 2022 Honors Summer Research Fellow. I will discuss data on the effects of 2 different mindfulness meditations (a religion-based meditation to fit the collectivist, Islamic culture and a standard meditation) on stress levels. I will also present data on the following variables as possible predictors of effective coping: coping ability, interpersonal attachment, attachment to God, trauma symptoms, and current stress levels. Beyond expanding the conversation of mental health into the Arab world, this study intends to gain insight into factors that predict effective stress coping for Palestinians, and investigate whether mindfulness meditation offers Palestinian Muslims a therapeutic mechanism to cope with the stressors they are currently experiencing.

**Experimental Investigation of Rayleigh-Bénard Convection Using Freshwater and Saltwater**

*Will Schouten*

Jupiter’s icy moon, Europa, and Saturn’s icy moon, Enceladus, contain subsurface saltwater oceans that experience convection currents. Liquid water is a necessary component for creating and sustaining life. It is hypothesized that the emergence of life on Earth occurred in oceanic hydrothermal systems, so the search for life in the universe should start by exploring environments containing convecting oceans. A non-rotating cylindrical chamber with a horizontal temperature gradient to produce radial convection is used to experimentally simulate the subsurface convection currents of Europa and Enceladus. By changing the temperature gradient and saltwater concentration of the experiments, heat transfer and fluid velocity is analyzed to determine the potential of these moons to harvest life. Specifically, particle image velocimetry (PIV) and thermometry are methods used to study the convecting fluid. Initial experimental results using these methods will be presented and discussed.

**Exploring Patterns in Human Activity Data through Clustering Techniques for Biometric Analysis**

*Grant Ellison*

The ubiquity of smartphones and wearable devices produces copious amounts of human activity data. This data presents a valuable opportunity to gain insights into human behavior and biometrics. Analyzing such data can be challenging, requiring sophisticated data processing and analysis techniques to identify meaningful patterns and relationships within the data. In this study, we use “activity-shapelets,” which are geometric representations of the pattern from a person’s accelerometer signal while performing an activity. We cluster these activity-shapelets to compare the similarities in movement patterns between people. Making these distinctions, combined with our biometric data, allows us to find the most impactful physical characteristics of a person’s movement patterns. These insights can be used to improve the accuracy of online human activity classification systems and describe the way physical characteristics impact movement patterns. To make our analysis, we collect accelerometer-based activity data and biometric micro-data. A ruled-based algorithm is used to detect gait events and extract subsequences of gait patterns from activity data. From this collection of gait patterns, we derive an activity-shapelet for each person. We use an implementation of the global K-means clustering algorithm to classify our sample of shapelets into clusters based on their similarity. After clustering shapelets, we use descriptive statistics and comparison tests to find the significance of the difference in each biometric on the resulting activity-shapelets. Our initial results indicate significant differences in physical
Exploring the anticancer, antimicrobial, and stimulant properties of H. italicum, S. apiana, S. aromaticum
Aditi Poddar

Exploring the cytotoxicity, antimicrobial, and stimulant properties of H. italicum, S. apiana, S. aromaticum.

Previous data collection in BIOL 111 showed that Sygium aromaticum, Salvia apiana, and Helichrysum italicum demonstrated antimicrobial, anticancer, and stimulant properties. My project confirmed these results using the assays developed in BIOL111; antimicrobial assay measuring extract impact on bacteria growth, toxicity assay measuring lethality of the extract on brine shrimp, and stimulus assay measuring extract impact on daphnia heart rate. Plant leaves were collected, either air-dried or incubated at 40°C, and methanol, ethanol, acetone, and hexane extracts were made. Additionally, we developed a new 96-well plate antifungal stamp assay by evaluating the metabolic activity of yeast extract that can be used as a tool in teaching labs. 100% methanol and ethanol extracts demonstrated the strongest antimicrobial properties for all plants examined. I found that methanol, acetone, and hexane extract of Helichrysum italicum increased daphnia heart rate compared to the baseline. In addition, this experiment provided valuable insights into these medicinal plant properties and proposed a new assay for teaching labs as well.

Exploring the correlation between measured levels of skin carotenoids and reported dietary intake
Claire Duisenberg

Carotenoids are known to have benefits to human health due to their antioxidant properties. Carotenoids are consumed through food sources such as fruits and vegetables. Spectrophotometers are thought to be able to accurately measure carotenoid levels in the body, but there is a lack of research in the area. PURPOSE: The purpose of this study is to analyze the correlation between the intake of carotenoid rich foods and the recorded values of the spectrophotometer. METHODS: 21 participants (2 M, 19 F, x 18yr) completed a self reported 3-day diet record. Participants were then scheduled for a lab appointment to record two, bilateral thenar eminence scans using the spectrophotometer. Carotenoid intake was analyzed by entering diet records into Food Processor. SPSS was used to determine bivariate correlation between spectrophotometer readings and levels of Beta carotene, Vitamin A, fiber intake, fruit and vegetable intake. RESULTS: Mean spectrophotometer reading was 14.53±2.10 (min: 10.78, max: 20.50). Statistically significant (P value: ≤ 0.05) correlation (R=0.447) was found between spectrophotometer readings and beta carotene levels. No significant correlation found between fiber, fruit and vegetable, and vit. A intake (p value >0.05). CONCLUSION: Significant correlation between spectrophotometer readings and beta carotene intake, indicates spectrophotometer may be an accurate measure of carotenoid intake. Additional research should be conducted to more accurately measure food intake to determine level of absorption of carotenoids and ability of spectrophotometer to differentiate between carotenoids. Larger population of participants will aid in determining accuracy of spectrophotometer.
Features of a Mediterranean Diet and Mental Health Outcomes in College Students

Jessica Wisse

Up to 30% of college students reported suffering from depression or anxiety. Previous studies have produced correlations between nutritional variables and mental health outcomes in adults. Specifically, variables featured in the Mediterranean diet, including increased fiber, monounsaturated fat, omega-3 fatty acids, fruit and vegetable intake, and decreased added sugars have been associated with more favorable mental health outcomes. PURPOSE: This research explored relationships between specific variables included in the Mediterranean diet and mental health symptoms in college students.

METHODS: To collect data on diets, participants were given three-day diet records to record food and beverage intake. Participants completed an online survey including multiple standardized mental health questionnaires. The three-day diet records were inputted into Food Processor software to determine exact nutritional status. The mental health questionnaires were scored. The data was entered into SPSS for further statistical analysis. RESULTS: A significant correlation was found between increased grams of omega-3 fatty acids and decreased levels of depression according to the Beck Depression Inventory – (r=−0.337, p=0.025). Another significant correlation was found between greater total grams of added sugar and lower depression on the Beck Depression Inventory (r=−0.328, p=0.030). There were no significant correlations found with depression, anxiety, or mood and other nutrition variables such as monounsaturated fat, fiber, and fruit and vegetable intake. CONCLUSION: Examining the correlations in this study to highlight specific aspects of the Mediterranean diet, high intake of omega-3 fatty acids and added sugars are the strongest predicting factors to favorable mental health status.

Fog-harvesting by leaves of different developmental stages in Limonium perezii.

Taylor DeRouen

Limonium perezii (Stapf) Hubb., a flowering subshrub native to the Canary Islands, is commonly found in the southern coastal regions of California. Characteristic of the species, L. perezii leaves develop in a rosette-like pattern, with non-sessile laminae attached to the stem by distally winged petioles. This leaf arrangement pattern aligns with morphological trends of plants that heavily rely on fog-harvesting or rain-harvesting as strategies for increasing water availability to the plant. To test the fog-harvesting ability of L. perezii, individual leaves of different developmental stages were suspended into a pre-weighed test tube; the petiole inserted through a narrow plastic sleeve in an otherwise impermeable cover. Leaves were then placed in an environmental growth chamber under consistent temperature and fog conditions simulated by an ultrasonic humidifier. Fog condensate accumulated in the test tubes was weighed after three-hours. Leafless controls were run in parallel to the experimental leaves. Lamina surface area, width, length, depth, and curvature were measured immediately succeeding each experimental run. Results to date show that larger, mature leaves have a greater capacity for harvesting fog. However, younger leaves have a greater interception efficiency, as measured by the amount of water collected relative to the lamina surface area. Observations suggest that leaf curvature affects fog-harvesting. In particular leaves that are involute and/or undulate have a higher fog-harvesting capacity.

Foliar water uptake by Limonium perezii leaves at different development stages

Mason Friesch, Ryan Seifi

Limonium perezii is native to the coastal cliffs of the Canary Islands. In water-limited habitats such as these, the plants may supplement the use of soil water by foliar water uptake (FWU) from the atmosphere. Given that FWU is influenced by leaf traits and physiology, the developmental stage of the
leaf may affect the occurrence and the extent to which FWU occurs. Hydrophobicity was greatest for mature older leaves, while immature leaves were hydrophilic. This suggests water spreads readily on the leaf surface of young leaves but also runs into the leaf axil. Water spreads on the leaf lamina and petiole increases the likelihood of a film of liquid water forming on these surfaces. Foliar water uptake, tested by immersing the leaf lamina in liquid water, showed differences in uptake (P< 0.05) at different developmental stages: water content of immature leaves increased by 4.66 %; young, fully expanded leaves by 1.56 %; and mature older leaves, 3.63% A second method of testing FWU that distinguishes between fog and liquid water as sources, and the lamina versus the petiole as major sites of uptake, confirm that immature leaf laminas take up significant amounts of water through the leaf lamina consistent with their hydrophilic characteristics. All stages of leaf development show the ability of *L. perezii* to absorb water through the lamina.

**Fulfilling a Sacred Duty: Art in Plato’s *Phaedo***

Matthew Parachou

In Plato’s *Phaedo*, Socrates, awaiting execution, engages in a dialogue with close friends concerning the nature of the soul and what happens to it after death. As his own death approaches, Socrates expresses uncertainty about whether he has properly obeyed the command given to him in a recurring dream to make and practice art. Considering philosophy a high art form, Socrates had assumed that he was sufficiently carrying out the orders of his dream by committing himself to philosophy, but on his deathbed he wonders if he ought to have practiced a more conventional art form like poetry. Despite this uncertainty, Socrates proceeds to argue that the body is a sort of prison, and the soul must separate itself from the body as much as possible if the philosopher is to gain the knowledge of the forms which he seeks. I argue that a close reading of *Phaedo* reveals that Plato is illustrating the ways philosophy as a separation of soul from body is inadequate and needs to be supplemented by art which appeals to the bodily senses and emotions. Plato performs this argument himself by writing *Phaedo* in the form of a dialogue rather than as a treatise or logical proof. Moreover, in making his arguments throughout the dialogue, Socrates frequently turns to poetic language and artistic metaphors, ultimately concluding the dialogue with a poetic and vividly imaginative myth of the afterlife, allowing his interlocutors to gain knowledge they could not have achieved through strict logical argumentation alone.

**Full of Dread for Higher Ed: Public Opinion on the Value of Higher Education**

Ruth Alcantara

Public confidence in higher education has decreased steadily in recent years (Nguyen 2022). Opinion polls show that Americans, specifically Republicans, increasingly believe that higher education institutions are heading in the wrong direction (Brown 2018). Past studies show a correlation between political party identification and opinions on the current state of higher education (Parker 2019). To fill a missing gap in the literature, this research will evaluate additional factors influencing opinion towards higher education, including an individual’s education level, parents’ and friends’ education levels, and socioeconomic status, along with political party identification. The influence of one’s consumption of social media on opinion toward the importance of a college education will also be explored.

With misinformation on the rise, higher education is more important than ever. A higher educated population is vital to the future of the country as education has the power of influencing new generations’ mindsets, diminishing social divisions, and generating economic benefits. Preliminary results show that party identification is the most significant factor influencing an individual’s opinion
towards the value of higher education, but consumption of media sources, parents’ education, age, and socioeconomic status play key roles.

**Generation and Characterization of L-TRACE, a cell lineage tracing tool for Drosophila development**
*Tatum Laird*

Over the last decade, thousands of LexA-expressing transgenic lines have been generated in Drosophila. To better understand when and in which cell types LexA, a transcriptional activator, is expressed in these lines, we developed the LexA Technique for Real-Time and Clonal Expression (L-TRACE). The L-TRACE system, when crossed with a LexA-expressing line, reveals current (or real-time) expression using a LexA-responsive LexAop-ttd::Tomato reporter gene (making a form of Red Fluorescent Protein or RFP). L-TRACE also labels these cells with GFP (Green Fluorescent Protein) such that all daughter cells (its clonal lineage) remain GFP-positive even if LexA expression ceases. Thus, by examining RFP/GFP expression patterns created in living tissues by L-TRACE, we can learn about the unique and dynamic patterns of LexA expression in each line. This system will help developmental biologists understand how progenitor cells relate to descendant cells and which genes (those that are controlling LexA expression in cells) are important to establish cell identity. It is anticipated that L-TRACE will be a valuable resource for the Drosophila research community.

**Geopolitical Poetics: A Study of Literary Witness in Wartime Poetry from WWI to Today**
*Sam Yaziji*

In this paper, I analyze the work of nine international wartime poets spanning from the early 20th century into the present, incorporating selected, or singular volumes from each. The analysis is thematic and comparative, accounting for radical geopolitical changes throughout the 20th century. In the works of the World War poets Trakl, Milosz, and H.D., I trace common Christological themes of apocalypse, the Fall of Man, and transcendence through suffering. In the works of postwar poets Darwish, Qabbani, and Neruda, I trace themes of stolen identity, political freedom, and struggle against empire (in the fractalized Cold War context). In the works of contemporary poets Komunyakaa, Vuong, and Forché, I trace themes of Eros tainted by war, the keepsakes of war, and a re-emergence of apocalypse as a central image. I learn that, throughout the 20th c., the strict polarity (of Eros, civilization, and universal ideals vs. Thanatos, violence, and iconoclasm) declined in the poets’ voices, and how, by the 21st century, concerns of moral-aesthetic decay gave way to more intimate, inward concerns of fractured family, identity, and love. In each poet, however, I find a through-line of lamentation over wounded witnesses. I group the poets’ voices into two (flexible) categories—Moralists and Eschatologists—and situate the work of each into one, or both, groups. Finally, I reflect on the potency of each style in our contemporary wartime epoch, and speculate how wartime poets of the future might write—how conflicts in Syria, Ukraine, and Ethiopia might shape poetry to come.

**High self-esteem and growth belief contribute to resilience following positive and negative relationship events**
*Maxine Boyd*

Individuals differ in how they interpret and respond to romantic relationship events. Some individuals engage in responses that promote personal and relationship well-being, while others engage in maladaptive responses. It is important to identify factors that shape responses to relationship events.
The current study investigated self-esteem and implicit theories of relationships as predictors of resilient and adaptive responses to negative and positive romantic relationship events. Self-esteem (SE) plays a role in shaping these responses, with low self-esteem (LSE) individuals perceiving more threat from negative relationship events leading to more harmful responses and those with high self-esteem (HSE) responding more resiliently and adaptively to negative relationship events. Implicit theories of relationships (i.e., growth beliefs and destiny beliefs) guide individuals' inferences about relationships and their responses to relationship threats. Growth beliefs (GBs) are characterized by an individual’s belief that relationships are cultivated and developed and that relationship challenges can be overcome. Conversely, those with destiny beliefs (DBs) tend to prescribe the compatibility of partners and viability of a relationship based on the conviction that the people are either meant to be or they are not. This study examined individuals’ cognitive responses (e.g., rumination about the event), emotional responses, and behavioral intent (e.g., the likelihood of the individual reacting with hostility toward their partner following the event) following hypothetical negative and positive relationship events. Findings suggest those with HSE and GBs respond more adaptively. They experience more positive cognitions, emotions, and behavioral intentions following both positive and negative relationship events.

**How Risk and Resilience Factors Related to Shame Influence the Perceived Health of Romantic Relationships**

*Hannah Van Den Thillart, Abbey Shlossman*

Shame is the act or feeling of distress after a perceived humiliating, devaluing, wrong, or foolish experience. The experience of self-perceived shame in a romantic relationship can indicate the likelihood of a person maintaining that relationship, despite other qualitative factors. A study by Gotez et al (2016) found that there was greater shame experienced when a person valued themselves higher than their partner. This resulted in lower overall well-being for the individual. Similarly, A study by martins et al. (2021) found that higher states of shame proneness indicated how afraid a person was of being rejected by their partner. This led to people being more likely to stay in a relationship despite the quality (indicated by a relationship satisfaction subscale) of their partner. The present study aims to look at how risk and resilience factors related to shame influence the health of romantic relationships. This study uses a metanalysis to compare the different variables associated to shame and how they impact the quality of romantic relationships. Looking at how shame is acquired and presents itself in romantic relationships is important because it can help show risk factors of people being in unhealthy relationships. This also can show indicators of factors that help promote healthy relationships.

**Ideas on Ionesco: Designing a Set for a Classic Play**

*Layla Rainosek*

The theatrical trend known as Theatre of the Absurd originated in the late 1950s and houses many unique playwrights whose works surrounding the nature of the human experience are still worth consideration for modern audiences. The following research surrounding one such work, Eugène Ionesco’s *Exit the King* (1962), seeks to examine the playwright and past productions, along with the play’s various themes, messages, and influences through different analytical and contextual lenses. The goal of this work was to create a modern rendition of the scenic world of the play that was produced by LMU’s Department of Theatre Arts in February 2023. Specifically, the objective of the literature review, script analysis, and series of unique notes was to produce a working scaled model (both digital and physical) of the theatrical set of the show that can be used to build all of the scenic elements. Through the use of research tools, hand sketches, and 3D modeling software, among other practices, this project
exists as both a creative and academic endeavor, representing the culmination of a college education. It draws upon many different aspects of theatrical research, history, and criticism that have served as a strong base within the Theatre Arts department’s educational ideology. This research will act as a reference manual and portfolio of the work done to create the world of Exit the King in as much detail as possible.

**Immigration and Incarceration: A Sociological Exploration of Systems of Detention with Insight from Costa Rica**
*Amani Ortiz-Syed*

This study combines a literature review about mass incarceration, immigrant detention and their intersection as systems of state control and applies it to the case of Latin American immigrants. The comparison between these forms of detention gives insight into the similar struggles and differences the individuals in these systems face. I searched through library databases with the terms ‘immigration detention,’ ‘mass incarceration,’ ‘United States’ and narrowed down the selection to those that best fit my study. I summarized the articles and found a set of themes to identify the connections between these systems of detention. These themes are the conditions inside (mental and physical effects), the impact on families, and the struggle with re-integration. I also explore the rationale behind detention as a way of criminalizing migration and imposing punishment. I apply the themes identified in the literature to Latin American immigrants, since they have been repeatedly singled out by media and politicians and criminalized for attempts to enter the U.S. My goal is to question the fairness of detention and propose alternatives to these systems. The research question that guided this study is: How are the systems of mass incarceration and immigrant detention related to one another as means of state control? The research project coincides with my Alternative Breaks trip to Costa Rica where I have learned about immigration first-hand through talking with local Costa Ricans as well as Salvadoran and Nicaraguan immigrants.

**Impact of flagella on motility and biofilm formation in Paraburkholderia graminis**
*Caroline Ehren*

Plant growth promoting rhizobacteria (PGPR) are known to improve plant tolerance to abiotic stressors and suppress pathogens through the alteration of nutrient absorption, water uptake, and enzymatic activity. *Paraburkholderia graminis*, known to both increase plant biomass and induce resistance against a leaf pathogen, was isolated from the El Segundo Dunes from *Camissoniopsis cheiranthifolia* and characterized to determine the importance of flagellar structures in biofilm formation and PGPR activity. To do this, genome-wide mutants of the P. graminis 10MBES6R strain were generated using the pRL27 plasmid in transposon mutagenesis, and non-motile phenotypes were selected for. Two non-motile mutants, BW1 and BW3, were determined to alter the flagellar hook protein (*FlgE*) and the flagellar motor switch protein (*FliG*) and isolated for further motility testing. 96-well plate biofilm assays were conducted for analysis of flagellar structure impact on biofilm formation using BW1 and BW3. Preliminary results have shown that motility does impact biofilm formation, but further testing and complementation will be required to determine the specific role of motility in biofilm formation and PGPR activity.
**Improved Functionality of GRNsight 6.0: a Web Application for Visualizing Gene Regulatory Network Models**

*Ahmad Mersaghian*

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 is a MATLAB program that performs parameter estimation and forward simulation of a differential equations model of a GRN based on user-provided expression data. GRNsight reads Microsoft Excel input and output workbooks from GRNmap and automatically displays the model data as a graph. Graph edges are color-coded based on the activation and repression relationships between the transcription factors, and nodes are color-coded with time course gene expression data. The addition of backend gene expression and gene regulatory network databases allows users with no data of their own to generate a network, color the notes with expression data, and export an Excel workbook for modeling in GRNmap. Network data was obtained from the Saccharomyces Genome Database via the Yeastmine search and retrieval interface. A new gene expression dataset from Apweiler et al. (2012) was integrated into the GRNsight database and user interface. Developer documentation for the databases was improved, and the Application Programming Interface (API) and Data Access Layer (DAL) modules were refactored and expanded to improve separation of concerns. In parallel, the ongoing development of GRNsight is focused on fixing bugs and adding enhancements to the user interface and graph layout. GRNsight is freely available at http://dondi.github.io/GRNsight/.

**Interaction of RGG-motif peptides with MYC promoter G-quadruplex**

*Hanny Issawi*

G-quadruplexes are secondary structures of DNA consisting of two or more stacks of G-tetrads – square planar structures consisting of four guanine bases associated together through Hoogsteen hydrogen bonds. The quadruplex structure can occur naturally in G-rich sequences and has been identified to be abundant in telomeres and promoter regions. Proteins and ligands can bind to G-quadruplexes, stabilizing DNA and RNA, and inhibit or promote replication, transcription, and translation. As these structures are linked to such diverse functions, understanding how proteins can bind and effect stability of the G-quadruplex structure has garnered significant attention.

The MYC oncogene, overexpressed in a wide variety of cancers, plays a key role in cancer progression and contains a quadruplex motif in its promoter region. The G4 structure that forms in the MYC promoter, functions as a transcriptional repressor element pointing to G4 structures as a therapeutic target to downregulate transcription. Arginine-glycine (RGG) rich domains have been found in many G-quadruplex (G4) binding proteins and have shown to contribute to G4-binding affinity. The goal of our research is to evaluate the binding affinity of RGG-motif peptides on MYC promoter G-quadruplex structures and their effect on quadruplex integrity. Two RGG rich peptide sequences present in RNA helicases were studied. Binding constants were measured using DNA tagged with the fluorescent dye FAM and G-quadruplex stability was measured through the use of circular dichroism (CD) spectroscopy.
**Interactions Between Totals of the PHQ-9 and The Facial Expression Recognition Test**

Hannah Van Den Thillar, Oliver Hatch, Abbey Shlossman, Hannah Agbaroji, Rodrigo Bos, Estefania Valencia, Kieren Khalil, Sarah Omachi, Saryana Pekler, Nicholas Kantarjian, Natasha Khalil, Adriana Griot, Heather Moran

Depression is a common mental health disorder with the average prevalence in the United States of 8.4%. The PHQ-9 is a self-reported scale assessing nine different depression symptoms scored 0 (not at all) to 3 (nearly every day). The scale has shown to be a proficient way to measure depression severity with a score of 0-4 indicating minimal depression, 5-9 mild, 10-14 moderate, 15-19 moderately severe, and 20-27 severe depression. Patients diagnosed with clinical depression are thought to have abnormal responses in recognition of the six universal emotions (fear, anger, sadness, disgust, happiness, and surprise). The Facial Expression Recognition Test (FERT) is an online assessment of the six universal emotions. Participants who scored moderate or higher in the PHQ-9 were more likely to recognize fear in the FERT. We found a significant relationship ($r = .429, p = .009$) between the total score on the PHQ-9 ($M = 8.23, SD = 5.63$) and the fear subscale of the FERT ($M = 4.58, SD = 2.27$). We also found a significant group difference on the FERT fear subscale between depressed ($M = 5.67, SD = 2.1$) and non-depressed students ($M = 3.79, SD = 2.0$), $t(34) = 2.608, p = .013$. Students were considered depressed if they scored a 10 or higher on the PHQ-9 total score. Although there are mixed findings on depression and emotion recognition, the findings reported here are of particular interest because it is focused on a non-clinical population of college students.

**Investigating the interactions between mRNA and Krs-tRNA synthetase**

Stephanie Kagawa

Dominant intermediate Charcot Marie Tooth, also referred to as CMT, is a hereditary motor and sensory neurodegenerative disease that can be caused by mutations in the YARS, KARS, and HARS genes that encode for tyrosyl-tRNA synthetase, lysyl-tRNA synthetase, and histidyl-tRNA synthetase, respectively. Mutations across various aminoacyl-tRNA synthetases indicate a gain of toxic function among these tRNA synthetases, which leads to the expression of neurodegenerative symptoms associated with CMT. This research project focused on the interactions between mRNA and the three aforementioned aminoacyl-tRNA synthetases with the purpose of assessing the function of YARS, KARS, and HARS in regulating mRNA function. Yeast cell cultures were grown, in which TAP-tagged constructs of each respective aminoacyl-tRNA synthetase was expressed through galactose induction. The yeast cells were lysed, and lysyl-tRNA synthetase was isolated from other cellular components. The pull-down of TAP-tagged aminoacyl-tRNA synthetases was optimized and modified to purify the mRNAs bound to aminoacyl-tRNA synthetases. Western blots were performed to confirm protein expression, and SDS-PAGE was used to visualize the purity of the isolated proteins. A phenol-chloroform extraction was performed to separate bound mRNAs. In the future, self-regulatory loops can be investigated by testing the presence of mRNAs encoding aminoacyl-tRNA using reverse transcriptase polymerase chain reaction (RT-PCR) as well as a northern blot. A sequencing library from the isolated mRNAs can be prepared to analyze the mRNA sequences bound to the isolated proteins.

**Investigation into the environmental factors that influence domoic acid production**

Danielle Leong

Pseudo-nitzschia, a common marine phytoplankton genus, is composed of around 60 species - half of which are capable of producing a neurotoxin called domoic acid (DA). When produced, DA accumulates
in smaller filter-feeding organisms and small fish and can then get transferred up the food chain through the consumption of contaminated seafood. Upon this consumption, the organism is affected by DA poisoning which, in humans, causes the potentially life-threatening condition, amnesic shellfish poisoning (ASP), which is known to cause neurological symptoms such as memory loss, seizures, and headaches. While contracting ASP is rare nowadays due to proper monitoring of DA levels, marine mammals and birds are being affected by DA poisoning, resulting in many becoming sick and dying on an annual basis. Due to the increasing threat of DA poisoning, there became the need to understand the production process of DA. Prior research has shown that DA production is influenced by the environmental conditions, specifically the limiting nutrients such as nitrogen, copper, iron, and/or a few others. However, more research is needed to further understand the environmental factors that may influence the production of DA. This research intended to investigate this through the collection of water samples from the Santa Monica Bay. The water samples would then be measured for the presence of DA alongside the nutrient levels to find any correlation between the two and investigate the effect of the limiting nutrients on DA levels.

**Isolating the electronic effects of systematic twist in highly substituted aromatic hydrocarbons using density functional theory**

*Georgia Tully*

Organic semiconductors remain a prominent research interest as new processing technologies and synthetic techniques have preceded their implementation in novel electronic devices. Recently, dodecaphenyltetracene was synthesized which is one of a series of polycyclic aromatic hydrocarbons that exhibit a unique twisted configuration of its fused ring backbone. This preliminary characterization displayed similar electronic character to organic semiconductors used in field-effect transistors. Density functional theory (DFT) was employed to investigate dodecaphenyltetracene as well as similar molecules containing differing backbone lengths and electron withdrawing groups with interest in manipulating the twist to lower the LUMO level for increased electron mobility. Optimization and frequency time-independent calculations followed by time-dependent (TD-DFT) energy calculations were performed to analyze electronic trends as a result of increased backbone length and consequently altered end-to-end molecular twist. These calculations demonstrate a linear relationship with negative slope between the estimated HOMO-LUMO and optical gaps as a function of the number of fused rings along the polycyclic backbone. Contrasting these energy gaps with a separate series of identical molecules fixed into a planar configuration, the optimized twisted molecules display a pronounced red shift from steric hindrance due to phenyl substituents. We are now exploring the twist’s effect on exciton binding energy, a feature important to regulate for the development of small-molecule organic semiconductor films in solar cell devices. Understanding how this twisting deformation impacts the electronic properties of polycyclic aromatic hydrocarbons could provide an additional parameter for predictive tuning of organic semiconductors.

**It’s a Wonderful Apocalypse: Applying Biblical Studies to Film**

*Fiona Riley*

Biblical studies often relies on a three worlds method to analyze, contextualize, and respond to biblical and extra-biblical texts: the world behind the text (historical context), the world of the text (content and rhetoric), and the world in front of the text (interpretive history). When applied to a film, these worlds can showcase the richness and meaning-making surrounding it. In the case of Frank Capra’s *It’s a Wonderful Life* (1946), the “behind” and “of” world highlight the relationship between the story’s internal rhetoric
and the preexisting tropes and texts on which it relies. While there are considerations to the political climate of the 1940s and Studio System Hollywood, I suggest that biblical texts also apply. The story of George Bailey (James Stewart) mirrors biblical prophetic and apocalyptic tropes through his struggles against Mr. Potter (Lionel Barrymore) and experiences in a world in which he had never been born. The “front” world also expands our understanding of the film through the negative political and critical response to the film that led to it being lost until discovered by a new generation through television syndication in the 1970s. Ultimately, this paper uses biblical studies to explore the historical, rhetorical, and interpretive worlds of It’s a Wonderful Life. It also deepens this already interdisciplinary study by exploring how the film’s own rhetoric relies on biblical themes and motifs. While not all relevant materials can be explored, it says something clearer about what this essay offers to readers.

L. Polyedra and Fecal Indicator Bacteria in Santa Monica Bay
Gabriella Drumm

Lingulodinium polyedra is a prevalent species of phytoplankton in the waters of Santa Monica Bay. L. polyedra releases yessotoxin, which is extremely harmful to human health and thus it is imperative that more research be done on how to prevent overgrowth. Conducted literature reviews have shown that effluent provides the nutrients necessary to promote harmful overgrowth of phytoplankton. The question remained how does the input of effluent truly influence growth in the phytoplankton species, Lingulodinium polyedra. In order to answer this question, extensive literature review was done to determine the gaps in published research and propose future directions for addressing this issue. Little studies have addressed common Los Angeles beaches that have serious contamination. Through extensive research the proposition is the following: take samples from LAX, Santa Monica Pier, and near the Hyperion sewage pipeline to count the levels of L. Polyedra and send water samples to an outside lab to test for levels of fecal matter.

Leaf morphology, epidermal characteristics, and conductance of Limonium perezii leaves at different stages of development
Pauneez Kasmai, Taylor DeRouen, Ryan Seifi, Mason Friesch

Native to the Canary Islands, Limonium perezii (Stapf) Hubb. is a perennial subshrub that occurs in water-restricted coastal cliff habitats. Leaves have long, distally winged petioles that overlap in basal rosettes. Differences in leaf morphology that may affect water use and uptake of atmospheric water were determined for leaves at three stages of development: 1. immature, less than half expanded leaves; 2. recently fully expanded leaves; and 3. mature leaves. Measured leaf parameters included leaf area; lamina and petiole water content; distribution and density of stomata, salt glands and mucilage glands; hydrophobicity and water retention of the lamina; and conductance. The proportion of the leaf that is the lamina increases as leaf area increases. The petioles of the immature leaves have a significantly higher water content than the laminae and petioles of more mature leaves, appearing semi-succulent. Leaves are amphistomatic with gland formation occurring early in leaf development followed by the development of stomata, most of which do not mature until the later stages of leaf expansion. Glands, shown using a tannic acid-ferric chloride histochemical test to produce mucilage, were restricted to the petiolar wings. Stomatal conductance, was similar for recently expanded and mature leaves but lower for the immature leaves with few fully formed stomata. Young leaves are more hydrophilic than mature leaves, but have a lower water retention. These differences in morphology and surface characteristics are discussed in terms of water harvesting and foliar water uptake that supports especially the growth of the immature leaves.
Making French: A Loss of Native American Female Autonomy
Gillian Mozdy

French colonizers of “New France” in North America in the sixteenth and seventeenth centuries systematically disrupted the gender equality that had previously existed in Native American societies, leading to oppression of Native American women, which endures today. In this presentation, I will argue that French men forced the misogynistic ideologies that were thriving in France into Native American societies, in which women had previously shared operational, social, and religious responsibilities equally with men. Based on my review of academic literature and primary sources, I propose that the French were successful in subordinating Native American women within their own societies because of a coordinated, three-pronged approach that reshaped trade, social structure, and spirituality. First, French colonizers restructured the trade market by conducting business only with Native American men, thus eliminating key roles women had played in the distribution of resources. Second, they coerced Native Americans into setting up permanent villages near Christian missions, in order to end the nomadic ways of life, which the French perceived granted women marital and sexual freedoms that were withheld from women in France. Third, they evangelized only to men, and encouraged men to force women to convert to Christianity even through violence, which undermined the Native American beliefs that women were spiritual leaders. The French colonizers warped Native American life such that women’s place in society shifted from being relatively equal to men to being subservient to men. This created a lasting struggle for Native American women in a society centered on white men.

Mary Shelley’s Hidden Authorial Voice in Frankenstein through Subversion
Natalia Gonzales

Despite mainstream scholarly opinion agreeing on Mary Shelley as the author of Frankenstein, a general theory from publication until today questioned whether her husband, Percy Bysshe Shelley, was the actual author. This past year, a study from the University of Edinburgh revealed through stylometric analysis, a computer-assisted technique, that Shelley was the sole author of Frankenstein. The stylometric study, Charles E. Robinson’s transcripts of the original Frankenstein text, and the edition with Percy Shelley’s edits and contributions indicate Mary Shelley as the sole author of Frankenstein and illustrate her use of the provocative to portray the anxieties of motherhood. Mary Shelley disguises her feminine voice through male narrators effectively enough to convince people that women could not write the work, sparking controversy over authorship for the past two centuries. Her anxieties concerning authorship stem from her association of authorship with monstrousness. After examining the mentioned texts, the theory of Percy Shelley as the author of Frankenstein is disproved by analysis of handwriting, literary themes, and stylometric studies. However, Victor Frankenstein is inspired by Percy Shelley, symbolized in his attempts to seek knowledge, leave his family, and surpass the role of God.

Math and Magic: A de Bruijn Card Trick
Rachel Meilak

Many magic tricks are based on sophisticated mathematical ideas. For example, the 21 Card Trick, the Red-Black Pairs Card Trick, and the Baby Hummer Card Trick all rely on mathematics. In our research, we were motivated by the following question: how difficult is it to generate an original card trick based on compelling mathematics? To answer this question, we first focused on learning the mathematics behind the Hummer and Gilbreath shuffles, two shuffles that have been used to generate many prominent tricks.
We then proved why both of these shuffles work. We also looked at de Bruijn sequences and how they have been used in card tricks. We used an existing trick as well as the concept of combs and de Bruijn sequences to create our own novel card trick. In our trick, audience members are first allowed to cut a deck of cards wherever and as many times as they would like. The deck is then passed out to the audience members. After a series of innocuous questions to 5 random audience members, the performer will reveal three of the 5 people’s cards. We perform this trick and lay out the mathematics behind it. We conclude by discussing the implications of our trick, as well as how it can be adapted based on the performer’s needs. We hope that this trick can be used to inspire other card tricks, as well as demonstrate another useful application of de Bruijn sequences.

Measuring the impact of an RNA stem-loop on the HTLV-1 gag-pro frameshift efficiency

Audrey Covington, Mwanday Yamegni, Madison Maille

Many viruses use programmed -1 ribosomal frameshift (-1 PRF) sites to permit the synthesis of viral proteins encoded in alternative reading frames. The HTLV-1 gag-pro frameshift site includes a seven-nucleotide slippery sequence, a six-nucleotide spacer, and an 11 base-pair stem-loop. While the slippery sequence and frameshift site function were previously established, its frameshift efficiency is unknown and the role of the downstream RNA structure is unexplored. There is substantial conservation in sequence and structure between the HTLV-1 and HTLV-2 gag-pro frameshift sites. Thus, we hypothesized that the HTLV-1 gag-pro frameshift efficiency is similar in magnitude to the corresponding site in HTLV-2 and its stem-loop is critical to frameshifting. To achieve the objectives of the study, we first used recombinant DNA cloning techniques to create p2luc experimental and control plasmids for each frameshift site. This involved the design of DNA inserts that encode each frameshift site, the ligation of a restriction enzyme digested insert to the p2luc vector, transformation of that DNA into E. coli, and the purification and sequencing of the cloned DNA. Presently, we are evaluating the results from DNA sequencing experiments to determine if we have successfully cloned the six new p2luc plasmids. Once the cloning is complete, RNA will be synthesized, purified, and utilized in a dual-luciferase assay to measure each frameshift efficiency. The frameshift efficiency of the HTLV-1 gag-pro frameshift site with and without its stem-loop will be compared to HTLV-2 to evaluate our hypothesis and fill important gaps in knowledge related to HTLV-1 -1 PRF.

Metaphysics Properties/Identity

Lex Dadmun

The concept of personal identity as it relates to properties is a topic essential to understanding the problem of universals. My own view is that identity is an evolving form rather than a fleeting property. Passing sensations, traits, and identities come and go, but none of them define one’s true identity. Identity is a container for properties, not a property itself. For example, one can be wise, but one cannot be wisdom. In the disidentification with properties, an underlying nature of our identity is brought to the surface. In other words, as we realize what we are not, what we are is all that remains. This vessel of what we are, in which all that we are not is contained inside, reveals its shape and structure once we can take all that is within it out. However, this does not imply a rigidity of the nature of our identity; in fact, it is the opposite. We are always the container for our properties, but that does not mean our container is fixed in one way or another. To contain morphing, fleeting, and evolving properties, the container must also be able to embody such characteristics. In the differentiation of properties from their container, the distinction between the realms of ownership and identity becomes clear. Zhuangzi touches on this
subject by saying, “name is only the guest of reality.” This timeless quote identifies reality’s nature of immortality, and how a name (or a property) is just a passenger.

Missing the Mark: The Trouble with the Trafficking in Persons Report
Kaya Rodrigues

The United States publishes an annual report on human trafficking in over 170 countries – the Trafficking in Persons Report – to address concerns and identify how well countries are performing in the fight to end human trafficking. Typically, the literature around human trafficking suggests that successful responses to human trafficking come from rich, developed countries. As developing countries have been added to the list of tier one countries more frequently each year, and as disparities among the ratings of countries with otherwise similar development and human rights rankings arise, one must consider: is the Trafficking in Persons Report an accurate index for judgment of countries’ anti-human trafficking efforts? In this project, I assess five country narratives to identify problems commonly referenced in the existing literature to demonstrate the weaknesses of the Trafficking in Persons Report, including international political biases, data mis-representations, and the exclusion of efforts from non-profit organizations. This project aims to understand the successes of other forms of measurement such as the UNODC Global Report on Trafficking in Persons, the Human Trafficking and Involuntary Servitude report from the FBI, ILO global estimates on human trafficking, and the Freedom House global freedom scores. This project also aims to draw suggestions on how to ameliorate the failures of the Trafficking in Persons Report to create a more comprehensive indicator of a country’s performance in preventing human trafficking and protecting victims of the crime.

Molecular genetic characterization of the deoxyribonuclease mutant DNase2n1 in Drosophila
Paige Shukwit

Previous work identified a Drosophila mutation (DNase2n1) causing a loss of deoxyribonuclease (DNase) activity in whole-animal protein extracts. Recombination mapping placed this mutation at approximately 45.9 cM on the left arm of Chromosome 3 but the DNase2 gene was not identified. We sought to identify and characterize the DNase2 gene and determine the nature of the DNase2n1 mutation. Examination of the Drosophila genome revealed the presence of two putative DNase-encoding genes, CG6839 and CG3819, located near 45 cM, suggesting that one or both genes may be mutated in the DNase2n1 background. Genome-wide expression analysis shows that CG6839 and CG3819 are highly expressed in and restricted to the gut. Using agarose gel-based radial diffusion DNase assays, we find that protein extracts from isolated DNase2n1 larval guts show reduced DNase activity compared to wild-type control gut extracts. Furthermore, we find that the gut DNase activities active at pH 7.5 require Mg2+, typical of many DNases with neutral or alkaline pH optima. In support of CG6839 and CG3819 being functional gut enzymes, we find that flies carrying a small chromosomal duplication of these genes (but not other DNases) exhibit increased DNase activity compared to wild type. Genetic complementation analysis is underway between DNase2n1 and mutations in CG6839 and in CG3819, which should reveal (using radial diffusion DNase assays) whether the DNase2n1 mutation resides in one or both of these genes. In parallel, we are currently analyzing genomic DNA sequences for these genes to identify a potential molecular lesion.
Mother, Virgin, and Protectress: The Importance of Mary's Mediation in the Art and History of Santa Maria Maggiore
Rachel Rysso

The Basilica of Santa Maria Maggiore is a Major papal basilica, as well as the largest of all churches dedicated to Mary, Mother of Christ, within the city of Rome. From the initial rebuilding and groundbreaking ceremony in 432 CE, the basilica has been intrinsically linked with the Virgin Mary, whose importance as a Christian figure cannot be understated. The Salus Populi Romani, or the ‘Salvation of the Roman People,’ is a cult image depicting the Virgin and Child dating from the sixth century CE that is housed in the Pauline chapel within Santa Maria Maggiore. While the definitive dating of the miraculous image is the subject of much speculation, the icon is said to have been created by Saint Luke the Evangelist, with divine assistance. This paper will examine how the Salus Populi Romani acutely demonstrates and asserts the role of Mary as both a maternal figure as well as the protectress of the Roman people, in both ancient and modern times. This paper was formulated in conjunction with Loyola Marymount’s 2022 Summer Immersion in Rome: Christian Faith and Visual Culture program, a class dedicated to the studies of Christianity and art history in situ.

MOTOT EVOKED TORQUE DIFFERENCES BETWEEN ACLR PATIENT AND CONTROL
Haley Huntington

Recent study has suggested that motor evoked torque (MET) responses to transcranial magnetic stimulation (TMS) is an alternative method to determine motor cortical excitability. However, no known study has evaluated the evoked torque in ACLR patients compared to healthy controls. PURPOSE: To evaluate percentage changes in evoked torque values in response to TMS between an ACLR patient (ACLR) and a healthy control (CONT). METHODS: One ACLR (female, 21yrs, 180cm, 77.1kg) and one CONT (female, 39yrs, 160cm, 61.2kg) performed an isometric knee extension at 90° of knee flexion at 10% of their maximum voluntary isometric contraction (MVIC). METs elicited by 30 trials of TMS over the primary motor cortex at 120% and 140% of active motor threshold (AMT) were measured during the submaximal isometric contraction of the quadriceps. Participants’ resting twitch torques (RTT) were measured over quadriceps at rest. The percentage change of averaged evoked torque relative to RTT was calculated for MET at both AMT120% and AMT140%. RESULTS: The ACLR participant showed greater increases in MET at both AMT120% (ACLR: 193.147%, CONT: 179.84%) and AMT140% (ACLR: 254.92%, CONT: 220.74%) compared to the CONT. CONCLUSION: Our preliminary results may imply that TMS induced greater torque production in the ACLR patient compared to the control, possibly indicating altered corticospinal excitability of the quadriceps muscles after ACLR, with greater alteration at AMT140%. Such excessive involuntary quadriceps contraction in the ACLR patient may indicate recruiting more motor neurons than needed, leading to improper regulation of the quadriceps as well as re-tear of the ACL.

'Nackte Frau': A Mesopotamian Erotic Ideal
Sage Boyd

This research examines the representation of ancient Mesopotamian women in the corpus of nude women from the 3rd to 1st millennium BCE. These figures have been interpreted by some scholars as fertility fetishes or goddesses, given their ubiquity in the archaeological record. However, this paper argues that these figures actually represent an ideological woman, an embodiment of female sexuality and Mesopotamian eroticism. This ideological woman is not specific to any particular woman but instead
represents a cultural construct of femininity. The paper contends that, while men in ancient Mesopotamia were allowed to transcend their sexuality, women were reduced to depictions of sexuality. The representation of the nude woman in ancient Mesopotamia, however, shows that female sexuality was valued not just for reproduction but also for sexual pleasure. Through a comparison of the art and context of male and female nude plaques from 3000 to 2000 BCE, the paper highlights the patriarchal culture of the time and the greater emphasis on female sensual attractiveness than reproductive capacity. This research identifies the cultural conceptions of femininity and highlights the significance of the female body in Mesopotamian eroticism.

Neural Processing of Familiar Accents versus Foreign Accents

Liam FitzGerald

Past research has shown that the neural region Area Spt, which is within the planum temporale and sylvan fissure, is involved in speech production and integrating auditory and motor representations of speech. Therefore, this area may be involved in auditory imitation which involves reproducing speech with the same accent and prosody as that which was heard. Previous literature also suggests there are neural differences between those who are good at auditory imitation and those who struggle to reproduce foreign speech sounds and intonations. Using fMRI, the present study examines the neural bases of accent production in native English speakers. Participants were presented with phrases spoken in familiar versus novel accents. The participants then imitated the phrases in accents that they either heard before (familiar) or not (novel). We hypothesize that novel foreign accents will recruit Area Spt to a greater extent than familiar accents. This study may shed light on how people imitate speech sounds and has implications for foreign language learning.

A Normative Account of the Supreme Court's Legitimacy

Cameron Menendez

In the wake of its controversial 2021-2022 term, the mainstream media, prominent Democratic politicians, and even a few Justices have criticized the Supreme Court, saying that the institution lacks legitimacy. Overruling precedents, going against majority public opinion, and occupying “stolen seats” are the main reasons behind these illegitimacy charges. Such criticisms would be of great consequence in that various Court reforms would be in order, and the Court’s claimed authority to decide cases would be in serious doubt.

As such, it is the purpose of this paper to investigate these allegations of illegitimacy. Chapter 1 deals with whether or not the Court is illegitimate for deciding cases that do not squarely align with public opinion; Chapter 2 with the claim that Republicans have stolen some of the seats; and Chapter 3 with the notion that overruling precedent stains the Court’s credibility. I find, ultimately, that these criticisms are unfounded and misleading.

In Chapter 4, I develop a distinct, normative theory of legitimacy for the Supreme Court. Under our tripartite system of government, the judicial branch must say what the law is through legitimate interpretation, not how it should be. From this, I develop and expand several criteria for the Court’s legitimacy through which the public can judge them by 1) their degree of impartiality, 2) their faithfulness to the letter and spirit of the law, 3) that they interpret, rather than make, law, 4) consistency and clarity of methodology, 5) promulgation and, 6) workability of doctrine.
Optimizing Particle Image Velocimetry (PIV) for Fluid Spin Up Experiments
Daniel Alvarez

We present the results of experimental efforts to study ocean convection properties on icy moons like Europa and Enceladus to ultimately help determine if these celestial bodies can host biological life. Particle Image Velocimetry (PIV) is used to calculate the speed of fluid in rotating convection tank experiments. To test the accuracy of this PIV system, we conduct fluid spin up experiments and compare measurements with well-known theoretical calculations. Changing experimental parameters and comparing error values helps calibrate the PIV system to produce accurate velocity data. Data analysis from spin up trials shows that our system is accurate to within less than five percent error with optimal lighting. However, insufficient lighting can make data inaccurate, particularly when conducting thermal convection trials relevant to icy moon ocean convection. Therefore, continued work on this project aims to improve settings within our custom PIV system so that it can be applied to study icy moon ocean dynamics.

Parking Function Labelings of Noncrossing Bond Posets
Anna Salam

A graph is a mathematical structure which represents objects and their relationships. In a graph, objects are represented as vertices and relationships between objects are shown by edges connecting vertices. We can associate a graph with its noncrossing bond poset. A noncrossing bond poset of a graph is a partially ordered set whose elements are special subgraphs of the graph called noncrossing bonds. Parking functions are sequences of positive integers that model the situation where cars try to park in their preferred parking spaces along a one-way street. This research explores the question: which graphs give rise to noncrossing bond posets with nice descriptions in terms of their associated parking functions? To answer this question, we examined examples of graphs with and without nice parking function descriptions. This allowed us to find patterns and make conjectures. We then used combinatorial techniques to prove our conjectures and produce new theorems. These theorems give us a previously unknown connection between parking functions and a family of graphs called chordal graphs. Thus, the research further explores the mathematical field of combinatorics and generalizes some previously established theorems.

Participants Who Report Recent Binge-Drinking Show Greater Workload But No Performance Difference Compared to Non-Binge-Drinkers on the Visual Attention Test
Sarah Omachi, Oliver Hatch, Hannah Agbaroji, Rodrigo Bos, Hannah Van den Thillart, Saryana Pekler, Adriana Griot, Kieren Kishnani, and Abbey Sholssman

College students who reported binge drinking (BD) within the past two weeks (n = 12) and non-binge drinkers (NBD) (n = 16) completed the Trail Making Test, a standard paper-and-pencil test of cognition, used primarily in neuropsychology. Part A (TMTA) assesses psychomotor speed, visuospatial search, and target-directed motor tracking, while Part B (TMTB) additionally tests for cognitive flexibility. After each subsection, participants also completed the NASA-TLX, a standard measure of self-report workload used in the field of human factors and neurogenomics. The NASA-TLX includes six subscales and a measure of the overall workload, each with a range of values from 0 to 100. We had no predictions about group differences in test performance, and indeed, completion time scores (in seconds) on the TMTA and TMTB were not significantly different between BD and NBD groups. Based on previous findings with binge-drinking college students on another cognitive task (Hardy et al., 2022), we predicted greater
workload in the BD group. For the TMTA, overall workload on the NASA-TLX was significantly higher in the BD group compared to the NBD group. For TMTB, a significant group difference was found only with the frustration subscale, with greater reported levels in the BD group relative to the NBD group. Results, therefore, are mixed due to small sample size. Nonetheless, these preliminary analyses suggest that within the two weeks that at least four or five alcoholic beverages were consumed in one sitting, may affect workload, particularly frustration, when performing tasks that are speeded and attention-demanding.

Phenotypic Analysis and Mapping of a New Growth Control Mutation in *Drosophila*

*Juliana Venegas, Zoë Wong Vixaysongkham, and Cory J. Evans*

We are interested in understanding genetic control of cell proliferation and growth during multicellular animal development. We have identified a spontaneous mutation in *Drosophila* that causes adult wings and legs to be markedly smaller than wild type. Because of their diminutive wings and legs, we have named the mutation cherub in reference to the depiction of these angelic forms in 15th century Renaissance art. We find that cherub is located on Chromosome 3 and that the phenotype is recessive. To characterize the cherub mutation and phenotype, we have initially taken two approaches: 1) recombination mapping between cherub and dominant genetic markers along the third chromosome, and 2) morphometric analysis of cherub adult wings and legs in comparison to wild-type wings and legs. Using several dominant genetic markers, we find that cherub maps to the right arm of Chromosome 3 between Glued (Gl, 41.4 cM) and Stubble (Sb, 58.2 cM), likely within the interval 47.6-51.6 cM. We are continuing to score recombinant progeny to further refine the cherub location and will subsequently move to complementation mapping in the region with chromosomal deficiencies and single mutant alleles. Adult cherub and wild-type wings and legs were dissected and imaged using stereomicroscopy, and image files were analyzed using Fiji image processing software. We find that cherub mutant wings and legs are not uniformly smaller along their length but, rather, show growth and patterning defects in an intermediate region along the proximo-distal (P/D) axis.

Plant Growth Promoting Properties of *Methylobacterium* sp. in *Saintpaulia ionantha*

*Jaime Luis Villa*

*Methylobacteria* is a genus of bacteria that contains species that are Plant Growth Promoting *Rhizobacteria* (PGPR) or harmful pathogens. Previous studies have shown that the presence of the genus *Methylobacteria* in the soil helps increase the growth of crops (Postgate, 1982 & Madhaiyan, Alex, Ngoh, Prithiviraj, & Ji, 2015). Furthermore, *Methylobacterium* is capable of inhibiting fungal and pathogenic bacterial growth (Madhaiyan, Suresh Reddy, Anandham, Senthilkumar, Poonguzhali, Sundaram, & Sa, 2006). A sample of *Methylobacterium* sp. was found and isolated from *Saintpaulia ionantha* which appeared to be larger and more robust than average. The bacteria was grown and then identified using 16S rDNA amplification and sequencing. Current experiments with the bacteria have shown that it has anti-fungal properties. Future experiments aim to test for the specific species of fungi that the sample of *Methylobacterium* inhibits the growth and if the mechanism behind this is bacteriostatic, preventing growth, or bactericidal, kills the fungus. Further test would include testing for oxin and siderophore production, phosphate solubilization, nitrogen fixation, and other PGPR activities. These tests would accumulate into a plant growth assay to see the impact that the *Methylobacterium* sample has on the growth of plants and which species it can affect. The results of this experiment would be measured by plant biomass, shoot length, root length, and overall quality of the plants. The *Methylobacterium* sample
is capable of increasing the growth of crops and preventing the growth of fungi but requires more testing to determine the mechanism that allows the bacteria to do this.

**Play and Technology in Martin Heidegger and Eugen Fink**  
*Chester Mlcek*

How does the concept of play operate in Martin Heidegger’s thinking of the world? How might other concepts of play shed light on Heidegger’s obscure language of ‘the fourfold’? Can we see play as an act of subversion to technology’s demands on our lives? Following these questions, I examine Martin Heidegger’s *Insight Into That Which Is*, in which he reveals the concept of ‘the fourfold’, or a thinking of the external world aiming to subvert western hegemonies of philosophical thought. Drawing from Andrew J. Mitchell’s book *The Fourfold: Reading the Late Heidegger*, I situate the parts of the fourfold as various approaches to understanding. In conversation with Ian Alexander Moore’s *Eckhart, Heidegger, and The Imperative of Releasement*, I outline the fourfold’s essential relation to Heidegger’s primary dictate of subverting technology: ‘releasement’. I then examine the difference in world conception between Heidegger and Eugen Fink—one of Heidegger’s students. In applying Fink’s concept of world-play from *Play as Symbol of The World* to Heidegger’s *Insight Into That Which Is*, I argue that Fink’s work reveals how Heidegger’s thinking of the fourfold dismantles Heidegger’s own conception that play appears exclusively as the ‘world-play of being’, creating space for an interpretation of Heideggerian play that subverts technological thinking. In executing this analysis, I clarify a mistake or an overlooking in Heidegger’s philosophy that opens the door to new interpretations, contributing to the greater project of philosophical criticism.

**Procedural Level Generation For A Top-Down Rougelike Game**  
*Kieran Ahn*

Procedurally generating video game levels cuts down on time spent hand-designing areas of play, trading uniqueness for theoretically infinite replayability, and has become a staple of the rougelike genre. Additionally, algorithmically generating levels allows small teams of developers to create more content in a limited timescale than would otherwise be possible. As a part of a cross-disciplinary team of artists, animators, and programmers, I designed scaleable and robust algorithms to handle the task of generating levels for Fragment, a rougelike video game about a spirit who fights against evil monsters. This process necessitated iteratively drafting, testing, and improving multiple methods of level generation, gaining proficiency with the Unity game development software, and coordinating with other design teams to deliver a polished product. This system saved development resources and accelerated the game making process by freeing up designers to work on refining game systems and creating a fun, enjoyable experience; they were able to expand the game’s functionality since they did not have to work on its foundation.

**Project Poo: Fecal Testosterone Metabolites and Aggressive Nest Defense in Great Black-backed Gulls**  
*Kathryn Inkrott*

Many vertebrate behaviors are regulated by hormones in the blood, resulting in observable links between behavioral patterns and levels of specific hormones. One such link is between testosterone and aggression. The effect of testosterone on aggressive behavior has been widely observed in many species but is relatively understudied in seabird species, such as Larus marinus (commonly known as
Great Black-backed Gulls), our study species. While plasma (blood) is generally accepted as the main source of endocrine information from an individual, in this study we seek to use excreta (fetal and urinary) samples to access testosterone levels of individuals breeding on Appledore Island, Maine. Excreta sampling is a more holistic approach to hormone sampling; while plasma (blood) sampling provides data on hormone levels only at a single time point, fecal sampling represents long-term patterns of systemic hormone levels. Thus, excreta samples offer more insight into the overall testosterone levels in an individual temporally and how they relate to long-lasting behaviors like aggression. Testosterone levels determined from our excreta samples will be compared to the categorically-scored aggression of individual gulls, and the potential correlation between testosterone and aggression will be evaluated. The overall goal of this study is to offer insight into the link between testosterone and aggression in Great Black-backed Gulls and affirm the validity of using excreta samples for quantifying hormone levels over longer periods of time.

**Quality of Life +**
*Patricio Osegueda von Waberer, Fransisco Moore, Angelo Santi*

Quality of Life + is a student led biomedical engineering club found on the principles of providing free healthcare devices as well as supporting the disability community in Los Angeles. QL+ currently has four ongoing projects. The club splits members into teams based on interest, where they will work directly with their team lead and client to facilitate the project. On top of the engineering of these devices, QL+ general meetings are centered around disability awareness: use of person first language, guest speakers to provide knowledge about how we can care for those with disabilities.

Quality of Life + has had a tremendous impact on my life. QL+ has taught me that engineering can truly impact someone’s life in the best way possible and that the knowledge acquired in engineering should be applied in humanitarian ways. QL+ has also brought close relationships for everyone involved due to the mission of helping others.

The Quality of Life + projects have impacted the client’s quality of life which is the mission of the club. QL+ never charges clients for the work that we do, therefore, we lift the financial burden of custom medical devices, which are not covered by insurance, off their shoulders. The QL+ medical devices allow for our clients to improve certain aspects of their life that previously have been struggles due to their disabilities. Overall, the main goal of QL+ is to have the biggest beneficiary impact we can on our clients.

**Queer Friendship: A Qualitative Study on Queer Students’ Social Life at Loyola Marymount University**
*Claire Shepard*

The present study explores queer friendship at Loyola Marymount University (LMU) as a contribution to broadening the narrative of social life for queer college students. This project stemmed from popular narratives of social isolation for queer college students and intended to debunk this narrow story through interrogation of the following question: what are the effects of Loyola Marymount University, a small religious campus, on LGBTQ+ friendship formation and maintenance? Analysis of in-depth, semistructured interviews with seven LGBTQ+ identifying students at LMU, who reflect a diverse range of sexual orientations, reveal two suprathemes: (a) the flourishing of queer communities at LMU and (b) the perception of LMU as an inclusive environment. The data shows how queer students at LMU form and maintain friendships through mutual connections and are shocked when other students hold
discriminatory views. The data ultimately indicates a positive experience for LGBTQ+ college students at LMU and broadens the scope of queer social life beyond narratives of social isolation.

**Race/Ethnicity and Socioeconomic Status in the Neuropsychological Assessment of Verbal Fluency**

*Estefania Valencia*

The Controlled Oral Word Association Test (COWAT) was given to college students (n = 40) as part of a battery. The COWAT required the participants to say as many words in 60 seconds as they could think of that begun with the assigned letter (F, A, S). Language and culture differences have affected the interpretation of various cognitive assessment tools with different populations. Research suggests that for this reason many of these assessments are not fully appropriate. Due to this we predicted that different race/ethnicity and socioeconomic status would affect the total scores in the COWAT. Asian/Pacific islander had the highest mean than Hispanic/Latino, White/European and Other. However, there was no statistically significant difference among the means (p = .211). Examining socioeconomic status, the Middle class group had the highest mean score compared to Upper middle class and Upper Class, but it was not statistically significant (p = .223). Data collection of more participants could lead to these differences becoming statistically significant. Future research will include adding an English proficiency questionnaire to the battery as another variable to analyze the appropriateness in language proficiency and culture differences and how they all affect verbal fluency in cognitive assessments. Eventually this could lead to the reforming of assessments to make them more inclusive and accurate for various populations.

**Redlining in Boston and its effects on Black Bostonians**

*Aker Ajak*

The historical effects of redlining have plagued the residents of metropolitan Boston for decades. In this study, I will be examining why cities such as Boston continue to show proximate neighborhoods that reflect such stark divisions in many factors. The definition of socioeconomic status and how it is used to separate people into specific neighborhoods is racialized in Boston. This is manifested through disinvestment, discrimination, and the notion of “desirability” in housing. Through analyzing archival and current statistics, maps, documentations, and personal accounts, I aim to examine how illegal practices with legal loopholes of housing discrimination in Boston has led to continued de facto segregation in Boston. Realtors and the HOLC utilized socioeconomic status as a means of discriminating against Black Bostonians. Specifically, by restricting them to low-rated neighborhoods, redlining persists despite the illegality of it. Additionally, modern-day redlining continues to skew the way realtors think about various discriminatory practices such as blockbusting, disinvestment, and the rate of “desirability” due to the racialization of socioeconomic status in Boston. This study will give context as to why neighborhoods in metropolitan Boston vary so greatly in socioeconomic status and neighborhood development. This will also give context to the plight of African Americans in Boston.

**Reducing Stigma’s Effect on Negative Treatment Outcomes for Pedophilic Disorder**

*Rocky Jacobs*

Highly stigmatized populations often suffer from negative health outcomes because of social factors that preclude instantiation of effective healthcare methods. Individuals with pedophilic disorders in the U.S. are especially at risk of these outcomes due to the harsh social climate surrounding pedophilic behaviors. Several pharmacological and psychological treatments have been shown to help mitigate
undesired symptoms of pedophilic disorder and violent offenses, but those treatments are not widely available or public enough to ensure rehabilitation is the main course of action for minor-attracted persons. Common pedophilia treatment pathways were assessed for their efficacy in reducing child sexual abuse and how various forms of stigma can manipulate outcomes. Strategies to combat stigma were analyzed in their potential to fit into treatment pathways. Previous research suggests that stigma reduction will help move the U.S. model of pedophilia treatment to center around primary prevention. Literature from other countries like Germany suggest that community-based therapies, preventative programs, and more open-minded social climates can overall reduce the amount of violent sexual offenses committed against children. Finally, several means of implementing facets of these methods within current U.S. treatment pathways – like prisons and individual psychotherapy – are suggested. Future research should be conducted on the financial feasibility of implementing measures to reduce stigma for convicted pedophiles within U.S. correctional facilities.

Religion and Dieting: Exploring the Quantification of Bodies
Maria McGlone, Claire Shepard, Sage Boyd

This research seeks to uncover the ways in which the quantification of bodies in health sciences replicates the theological and philosophical concept of mind-over-body dualism. This project explores the presence of mind-over-body dualism, or the theory that the human body is inferior to, and should therefore be ruled by, the mind, in both Judeo-Christian traditions and philosophical theories. This project asks: How does the quantification of health, through measurements of body mass index and kilocalories, replicate a sexist mind-over-body dualism that is rooted in theological and philosophical schools of thought? Feminist scholars have found a connection between Eve, from the Book of Genesis, and the oppression of women through diet culture and beauty standards. By drawing on the work of these scholars, this research conducts an exploration of dualistic logics across the health sciences, with a special focus on the bodies of women and other oppressed groups of people. The project examines the historical origins of body mass index (BMI) and the kilocalorie (Kcal), studying the logic behind their inception through a Foucauldian lens. This research identifies a strong correlation between Western quantifications of bodies and the theological and philosophical concept of mind-over-body dualism.

Representations of Religion in Short Documentary
Bettina Ernst

As modes of documentary continue to evolve, it is essential to examine how filmmakers can utilize nonfiction storytelling, including in the short form, to represent vast and complex cultural concepts including religion. Therefore, this work explores the power, possibilities and potential obstacles of representing religion in short documentaries, integrating film studies and theological studies in my methodology. Through selecting and analyzing six short documentaries as case studies, my research examines the different strategies used by documentary filmmakers to convey messages about the complexities of religion and its intersections with identity and culture. With an investigative framework that incorporates an understanding of various documentary modes including the poetic, expository, and reflexive modes among others and a background of research into the various aspects of religion covered in each short documentary, I track emerging themes from the case studies. The short documentaries cover a range of religious traditions including Judaism, Mormonism, Islam, Haida, Baptist Christianity and Amish Christianity and aspects of religion including excommunication, religious objects, rites, rules, and resilience against prejudice. Through looking at emerging narratives such as preservation of persecuted culture and rebellion against restrictive culture, my research explores how short
documentaries can emphasize or ignore nuance in depicting elements of religion. I explore other common themes including joy, loss, and community in both the formal and narrative aspects of documentaries. I utilize this research to lay the groundwork for my own short documentary exploring the Jewish sacred object of the Torah Scroll and ritual of the B’nai Mitzvah.

**Representations of Time in Time-Based Media: An Exploration of the Human Experience of Temporality in Film and TV**  
*Nelea Fong*

Time is an aspect of the human experience that fascinates us but eludes our understanding. Humans have turned to science, philosophy, and theology in our endeavor to understand time, but our shared love and history of storytelling drives us to explore temporality through visual medias that have a structural foundation in time. Expanding our understanding of the human experience of time through time-based media such as movies and TV can point us toward comprehending various forms of time and how each person can perceive said time differently. Using film and TV theory, informed by scientific and philosophical explorations in the study of time, I analyzed the narrative and formal elements in five film and TV texts to investigate the ways they used time to explore the ways that humans experience something as complex and ineffable as time. Although time-based medias can only be consumed linearly, each of the texts engages with the concept of nonlinear time through methods such as narrative, editing, and visual design to illustrate multiple possible experiences of time to the audience. These visual media texts, as time-based objects, work to communicate various human experiences and explorations of time through their unique narrative and formal elements, thereby expanding our knowledge of time as a scientific, philosophical, and aesthetic construct and demonstrating the power of time-based media.

**Rheological Investigation of Protein Mechanics**  
*Conall OLeary*

Macromolecules like proteins preform extremely important tasks within the human body. Additionally, proteins are incredibly complex machines at the nano scale. Cellular function and efficiency are just some of the processes that are dependent on chemical reactions facilitated by enzymatic proteins. Previous research has shown that proteins are non-static objects, undergoing conformational changes within their reaction cycle. Enzymes need to integrate their chemical reactions to this mechanical motion in a very specific and methodical manner. Enzymatic activity is well understood biochemically, but there is limited data on the mechanical properties of enzymes. Consequently, further investigation of these macromolecules employing a biomechanical approach is crucial to obtain an all-encompassing view of how proteins function. In such case, this study utilizes a novel technique to evaluate the physical properties of proteins. This technique, called Nano-rheology, can measure the conformational changes of the protein under different frequencies and amplitudes of the applied oscillatory force. In this setup gold nanoparticles, tethered to a gold surface by the protein, are driven by an ac electric field while their displacement is synchronously detected by evanescent wave scattering, yielding the mechanical response function of the macromolecule in the frequency domain. Collected data on the mechanics of proteins contributes to the larger encyclopedia on the relationship of protein structure and function and can be applied to advancements in many fields.
**Role of Sinorhizobium meliloti type IVB pili protein on legume nodule morphology and infection**

Alexis Chun

The symbiotic alpha (α) Rhizobium-legume interaction requires that both nodule development in the host roots and infection occur. Successful infection involves many factors, including the type IVB pili surface protein, encoded by pilA genes. The role of these genes in the infection process is uncertain, so the effect of inoculating Melilotus alba with Sinorhizobium meliloti deficient in pilA genes was investigated. M. alba was grown and inoculated with wild type and pilA deficient S. meliloti to harvest at different stages of development. The harvested roots were fixed and stained for histological studies or stored for gene expression analysis. Plants inoculated with pilA deficient bacteria showed developmental abnormalities in root nodule formation, including patchy infection patterns, irregularly shaped nodules, and clusters of smaller, partially infected nodules growing on larger nodules that were not or were barely infected. However, when evaluating plant growth overall, the plants infected with pilA deficient bacteria looked comparable, if not healthier than the wild type control plants. These observations indicate that the nodule abnormalities caused by the pilA deficient mutants might be beneficial, as the clusters of smaller nodules could ultimately allow for more bacteria to fix nitrogen for the plant. Expression of genes associated with plant defense and symbiosis was also evaluated. RNA was isolated from the harvested root tissue, reverse transcribed and used for PCR. Preliminary results indicate that plants inoculated with mutant bacteria have reduced expression of DNF2, a gene that is necessary for the development and maintenance of nodules.

**Sex Work: Criminalization, Regulation, and Liberation**

Andrea Guardiola

This project aims to illuminate how the law has constructed sex through mutually exclusive approaches towards sex work and, ambitiously aims to imagine new ways that the law could come to understand and appreciate the complexity of sex work. While the social construction of gender is widely taken for granted, the social construction of sex enjoys far less agreement. This project considers the logical, theoretical, and practical implications of the current legal approaches for dichotomizing sex work and the people who engage in the sex industry. This project exposes the limitations of legal and policy approaches to sex work that misperceive sex workers as exclusively criminals, victims, or workers. I ask: Why has sex work been criminalized and regulated in a way that is harmful to the people who work in the industry? The objects of analysis are Texas' Penal Code 43.02 - 43.06, constitutional challenges to the Protection of Communities and Exploited Persons Act from the Canadian Sex Work Law Reform Alliance, and parliamentary debates in the third reading of the Prostitution Reform Bill in the New Zealand parliament. Through close readings of these documents, I describe the nature and complex role of sex workers in public life. Based in theoretical frameworks that prioritize epistemologies of sex, gender, and labor, sex worker perspectives will be centered. The law (understood as legal institutions, legislation, and legal practice) is not only limited in its capacity to address the sex industry but actively constructs sex in a way that obstructs attempts towards justice.

**Siempre Estas En El Teléfono: A Study On Second-Generation Latine Youth and Their Impact On the Future of Politics**

Julianna Gomez

There has been the emergence of social change and a rise in social media connections following the pandemic. Simultaneously, the voting pattern for young voters has been more progressive. However,
much of the research on voting goes to an older voting bloc; therefore I am switching the attention to younger voters and their power in politics. Specifically, there is little to explain young Latine second-generation individuals’ political mentality and behavior. Given increasing numbers of Latine youth eligible to vote and a rise in social media connections, this paper looks at how social media mobilizes young Latine voters and how this will impact politics and legislation moving forward. A survey with young second-generation Latine respondents, ages 18-25, was undertaken to determine social media usage, which issues voters care about most, political socialization, and ideological alignment. Data shows that social media has made a significant impact in the last few years concerning the mobilization of young groups, specifically young second-generation Latine individuals who want to enact political change across the U.S. Additionally, younger generations seem to be more progressive. We can expect that voting patterns and future legislation will start to become more progressive as well.

Souls of Justice
Denisha Caldwell

Justice is the moral and philosophical idea that both the law and those who enforce it should treat people with fairness, logic, and impartiality. The theory of justice can be understood from at least two meta-ethical foundations: moral realism and moral anti-realism. Moral realists claim that statements about justice and morality can be meaningfully true or false. A moral realist believes that justice genuinely exists, or at least can exist. Moral anti-realists, on the other hand, hold that statements about morality and justice cannot be true or false in the same way as statements of fact. Many legal systems today hold a moral realist position, at least implicitly. Plato, in Republic and Apology connects the concept of justice with an internal purity and order of the soul. My own view is that statements about justice can be meaningfully true or false. Regardless of whether you are performing good deeds, lived experience is what makes finding justice possible and meaningful. I draw from Plato’s theory of justice and personhood and use it as an important argument in favor of moral realism that supports the claim that statements about morality and justice are also statements about one’s inner life. These statements address and express the emotions that someone with first-hand understanding has and can be true or false in a fundamental and verifiable way. Though I do not deny that justice does not exist in a physical form, I concede that it may exist in a metaphysical sense.

Spray Integration in the Cooling of High Heat Flux Electronics
Michael Hennessy, Tyler Keen, David Kandah

Spray cooling is an efficient cooling technique for high heat flux applications like metal forming and electronic cooling. However, without fundamental knowledge of fluid mechanics in these applications, spray cooling can be ineffective due to dry-out at low spray rates, or excessive liquid accumulation at high spray rates. In electronics like computer chips, these errors can cause crucial failures. This project’s purpose is to further understand the fluid mechanics and heat transfer processes behind spray cooling. The first technique researched was single droplet impingement. To obtain data, a high-speed camera was used to take detailed videos of microdroplets produced from a piezoelectric nozzle. Microdroplets of various liquids were dropped onto a heated copper surface. Droplet diameter, velocity, and resident time were tracked, along with the associated behavior of evaporation, boiling, or Leidenfrost, and the rate at which this occurred. These results contribute to the understanding of mechanical properties of microdroplets, discovering what changes in droplet parameters will improve their function in spray cooling. Another aspect researched was the ability of multi-droplet sprays to cool a heated surface via impingement and evaporation. An experimental setup was developed and assembled consisting of a
pressurized air and water supply connected to an ultrasonic atomizer nozzle, heated plate, and thermocouples that relayed results to a data acquisition system. Preliminary results determined that cycling nozzle operation yielded similar cooling results to continuous spray with less fluid consumed. Future variables to explore include recycling atomized vapor, determining optimal timing of cycles, and testing additional liquids.

A Staging Series of Embryonic Development for the *Trachemys scripta* Turtle

*Christina Noravian*

**Introduction:** Current descriptive studies on early stages of embryogenesis in the *Trachemys scripta* turtle are lacking; a comprehensive developmental series from the early stages of embryogenesis to hatching has yet to be completed. Although the turtle is a very unique vertebrate, they are rarely used as model organisms due to the scarcity of experimental tools. Since *T. scripta* is the most common turtle species in the United States, they are widely accessible to scientists across the country. As such, it is critical to create a normal table of development, which allows for staging of *T. scripta* embryos for experimental manipulations.

**Methods:** In this project, we present a full developmental staging series of *T. scripta* from 0 days post-oviposition (dpo) to hatching (~60 dpo). Turtle eggs were collected from *T. scripta* turtles at California State University, Northridge during the 2021 and 2022 nesting seasons. Oviposition days were recorded and approximately 400 eggs were collected. All eggs were incubated at 28°C—a temperature that gives rise to mostly male turtles—with relative humidity of 56%.

**Results:** Field collection of eggs and incubation in the lab were successfully troubleshooting. Twenty-six stages between oviposition and hatching were identified, and anatomical structures were cataloged using a Standard-Event System (SES) table. Morphological characteristics were imaged using brightfield and DAPI, revealing major details about developmental changes in the embryo.

**Future Directions:** Our next experiments will aim to incubate turtles at female-yielding temperatures with the goal of describing female turtle development.

Statistical Analysis of Start-Up Transients of a Super Continuum Laser

*Garrett Ponce*

This thesis analyzes the transience of a mode-locked supercontinuum laser as it was turned on. This is done experimentally with a real time oscilloscope. A statistical analysis rooted in quantum mechanics is performed on the optical power of the laser as it became coherent. This process is chaotic, and many interesting phenomena occur, such as rogue waves.

I compare my experimental and statistical results to simulations conducted by a Ph.D. physicist in the field of nonlinear optics. This physicist assisted me in the calculations and analysis of the waves.

Student Mental Health Analysis

*Hayden Bartholomew, Julia Valenzuela, Sherlene Leonita Winarto*

Mental health disorders can affect anyone, but “students are highly vulnerable to psychological disorders” (Tessema et al, 2019). Studies show that long-term stress from courses negatively impacts the psychological wellness of students, and impairs learning and productivity. Thus, academic performance may suffer. This study explores what affects student mental health declines and how universities can provide effective and accessible support for them. We used data collected using a survey study at the International Islamic University Malaysia and published on Kaggle, a data science community. We used
Microsoft Excel for data analysis and visualization. We found that male and female experiences of mental health are similar within their major. Overall, third-year students suffered the most from mental illness but are least likely to seek treatment (excluding fourth-year students, as they seem to be doing well overall). Students in the middle range of GPA (2.50-2.99) experience mental illnesses at a higher rate than any other group and students of higher GPAs follow behind them. To address student mental health issues on campus, we advise universities to implement a wellness course for first-year students and to open a psychological services program. We hope this study takes a step in understanding and addressing the mental wellness of students, which in turn leads to improved student retention, satisfaction, and success.

Support for Law Enforcement Intervention in Homelessness in Los Angeles

Dylan Flood

Homelessness is the most visible and prominent topic of Los Angeles politics with the issue dominating the recent Mayoral election and homeless encampments and tents seen throughout the city. This research aims to identify which groups of Angelenos support law enforcement intervention in addressing homelessness in Los Angeles. This project uses the 2022 LA Votes Survey conducted by the Thomas and Dorothy Leavey Center for the Study of Los Angeles. The survey was conducted in late 2022 and surveyed 1,309 Angelenos over the phone and online. Respondents were asked various questions including their opinions on different solutions for homelessness. Results of the survey are analyzed using a chi-square test to determine statistical significance for the demographics of race, age, and gender. This research shows that many Angelenos support law enforcement intervention in homelessness. Different groups of Angelenos have different levels of support for the LA Sheriff’s involvement. For example, the youngest group of Angelenos ages 18-24 had some of the lowest support levels for police intervention compared to older age groups surveyed. In addition, Black respondents had the lowest support compared to other racial groups. This research shows that law enforcement intervention in homelessness is a controversial approach for Angelenos with support divided among different demographic groups.

Suwandi Foundation: Teaching English in Bali

Iliana Chen

I volunteered to teach English at an after-school learning center in Bali, Indonesia this past August in partnership with LMU Bali Club and the Suwandi Foundation, a non-profit dedicated to financially supporting various learning centers in Bali. The purpose of this immersion experience was to provide free, supplemental education for low-income children in the rural town, Tianyar. This is an ongoing project made possible with the fundraising efforts of BALI Club, raising tens of thousands of dollars each year; I am proud to be the Vice President and a four-year member of this club. Each day in Tianyar, I created a lesson plan and taught two classes. As a future elementary school teacher who is familiar with teaching in California K-12 school settings, this project intellectually challenged me to develop and teach lessons for students with limited English comprehension and a home language that I did not understand. In my capstone course titled “Education and Global Issues,” I am writing a culturally responsive, community-based curriculum focused on eco-literacy, innovation, and public speaking that will be implemented at the learning center next year. This program is designed around hosting volunteers from all around the world to teach the Balinese students; but, I often found myself learning from the Balinese community through cultural exchange. I look forward to returning as a volunteer this
July to continue growing the relationships I had briefly formed and to continue being both a teacher and student.

**Testing biomedical properties of traditional Chumash medicinal plants**

_Hailey Ivanson, Sabriya Seid_

For over 13,000 years, The Southern California Chumash tribe has utilized medicinal plants for their therapeutic properties. This study examines the biomedical properties of four medicinal plants used by the Chumash: *Salvia apiana* (white sage), *Salix lasiolepis* (arroyo willow), *Datura wrightii* (California jimson weed), and *Salvia mellifera* (black sage). Additionally, the well-researched *Salvia officinalis* (common sage) was studied. The plants were collected, half of each sample was dried at 40°C and half was air dried at room temperature. Plant extracts were made using 100% methanol and subjected to three assays. A stimulus assay was run by subjecting *Daphnia magna* to a set concentration of plant extract; heart rate was measured before and after exposure to determine if each extract has stimulant or sedative properties. A toxicity assay was run by subjecting *Artemia salina* to varying concentrations of plant extract; mortality of *A. salina* was plotted over time to determine the cytotoxicity of each extract. An antimicrobial assay was run using disk diffusion: paper disks were loaded with 10µL of plant extract and placed on a freshly-streak bacterial lawn, incubated, and development of clearings around the disks were used to indicate antimicrobial properties of each extract. We found that black sage, California jimson weed, and white sage may have sedative properties while arroyo willow may have stimulant properties. California jimson weed and white sage exhibited cytotoxicity. White sage, black sage, and California jimson weed exhibited antibacterial properties. These findings provide valuable insight into the medicinal properties of these plants.

**Testing Multiple Filter Media for Optimal eDNA Sample Collection in Aquatic Environments**

_Lauren Fabre, Aria Fulton, Ashley Lee_

Environmental DNA (eDNA) metabarcoding is an emerging technique for detecting and identifying biodiversity from the remnant DNA and metabolic waste organisms shed into their surrounding environment. A principle advantage of eDNA metabarcoding over traditional monitoring tools is eDNA can detect the presence of a species in an area without the need to directly sample or even see the organism. Most current methods of eDNA samples are collected by actively pumping water through a membrane – known as active filtration – which can create barriers due to the need for trained persons to take the sample. Here, we aimed to identify an effective, easy-to-use, and affordable filter membrane that could passively collect eDNA from the water - passive filtration. Three different types of commercially available filter types (paper, xxx, and xxx) were tested for their ability to collect fish DNA. Sets of filters were secured in our lab’s patented eDNA collection device, placed in a re-circulating 150-gallon aquarium system and opposite of a 200 g uncooked salmon filet, and allowed to soak for either 2, 4, 6, or 8 hours before removal. Filters were then washed of collected eDNA using a column-based DNA extraction kit (Zymo Research), and resulting DNA concentration was quantified using fluorescence spectroscopy (Promega). DNA concentration was not statistically difference between the three filter types, with all three types easy-to-use and the paper filter being the most affordable ($0.10/filter). Paper filters are now being used as our lab’s preferred filter type metabarcoding research in seafood mislabeling and fisheries monitor.
Testing the Medicinal Properties of Rosemary Methanol Extract and the Effect of Different Extraction Methods

Kristen Brammer

Rosmarinus officinalis, commonly known as rosemary, has known medicinal properties including antimicrobial, antibacterial, and antifungal properties. The aim of this work was to confirm and investigate the extent to which rosemary and its main compounds, alpha-Pinene and 1,8-Cineole, have these properties. A total of seven assays were run to examine how rosemary methanol extract from different extract methods inhibits growth of the two bacterial strains (S. aureus and C. pseudoditheriticum), and the Saccharomyces cerevisiae yeast strain GA74. These assays include thin layer chromatography, disk diffusion, an assay with fungus, a tomato antifungal assay, brine shrimp assay, effectiveness against yeast, and a serial dilution assay using a 96-well plate. Rosemary methanol extract, made from leaves that were air dried at room temperature and leaves that were incubating 40 degrees Celsius, showed the same effects; extract made from stems has virtually no properties regardless of the drying method. Leaf extract was more effective than stem extract. The results from this work will be used in the planning curriculum for General Biology Labs at Loyola Marymount University and will also provide a basis for further research on how the effectiveness of pure compounds in rosemary compare to a methanolic extract made from its leaves.

The classification of the topological symmetry group of the K_3,3,1 graph.

Samir Fridhi

Originally motivated by investigating the relation between behavior of molecular structures and their symmetries in chemistry, spatial graph theory has now found methodological purchase within the mathematical subfield of low-dimensional topology, namely in knot theory. More precisely, the topological symmetry groups of graphs embedded in the 3-sphere act as a generalization of the study of symmetries of knots and links. Thus, given an embedding of a spatial graph, we are interested in the automorphisms of the graph that are induced by homeomorphisms of the 3-sphere. We call this particular subgroup of the automorphism group of the graph the topological symmetry group of the embedding. In this talk, we will provide a full classification of positively realizable groups for the topological symmetry group of the K_3,3,1 graph.

The Colonization of Hawaii and its Effects

Andrea Marie Morland-Tellez

The Hawaiian islands, an idyllic paradise suddenly consumed by a well-known threat to many minorities and native people around the world; colonization. Hawaii is a collection of islands affected by colonization since 1778 when British explorer, James Cook landed on the islands. Since then its traditions, lands, and practices have been misused to promote money-making agendas while simultaneously forcing Native people onto the streets. This presentation was created to address the question of how Hawaii’s culture and its people have been ostracized, or “othered,” and how this persistent problem continues today. To do this, multiple sources were analyzed. Most notably, postcards from the Loyola Marymount University library special archives as well as photographs from news sources like the Public Broadcasting Service Program (PBS) in Hawaii were included. Postcards, data, and photographs were used from these resources and incorporated into a presentation. This method was completed to illustrate the “othering” of Native Hawaiians and their culture that have been repeatedly and historically demonstrated. Historically and today, there has been constant prostitution of Hawaii’s
beauty and land by people not native to the island. More than 6 billion people visit the islands each year and due to this, Hawaiian land and people have been put on display for others as a source of entertainment and money-making. While this brings money in, it also forces many of the Natives, who culturally believe their job is to protect their land, to sit by and watch their beloved island be lost.

The Creation of a Humble Abode: Habitat Restoration Using Invasive Plant Brush Piles
Donya Moghtader

Invasive plant species are a threat to native biodiversity, ecosystem stability, and ecosystem services. Numerous methods have been developed to remove invasive plant species from terrestrial habitats, including manual removal & disposal, burning, and the application of herbicides. Some of these methods can be financially expensive, ecologically damaging, or have unintended consequences to surrounding native species. This research tests a novel, low-impact approach to controlling one of the most common invasive shrubs in California, Kali tragus or tumbleweed. Specifically, we built brush piles of the invasive plant collected from the adjacent habitat, and monitored the subsequent presence of new K. tragus seedlings and recruited animals that may use the created micro-habitat as shelter. We hypothesized the piling of K. tragus would result in concentrating seeds of the plant in one location, which would then fall beneath the pile where conditions would be sub-optimal for germination. Further, we hypothesized this cooler, protected micro-habitat would provide shelter for native organisms, promoting habitat restoration efforts. To test, we built fifteen 10-kg, 1m x 1m brush piles from collected K. tragus and compared to fifteen control plots without brush piles. Light and temperature measures above and below the piles, as well as K. tragus seedling and animal biodiversity counts were taken monthly. Brush piles effectively suppressed new seedling growth compared to control plots, and piles supported statistically higher abundance of snails and some insects, but not others. These results are already being shared and adopted by local restoration groups in east Los Angeles.

The effect of a LysR Transcriptional Regulator on flagellar motility in Burkholderia unamae.
Christian Faltas

Burkholderia unamae resides endophytically in plants and has nitrogen-fixation capabilities that are beneficial to various crops, such as maize and tomato. Similar to many nitrogen-fixing bacteria, B. unamae has motility through flagella. In addition, B unamae has a flagellar master regulator gene, flhC, which has been identified to be critical for regulation of the genes that encode the flagellum and thus is required for motility. Unlike better studied bacteria, B. unamae has four copies of flhC, suggesting additional levels of regulation of flagellum biosynthesis in this bacterium. The mechanisms by which each copy work are not known. Therefore, in this study we are examining each of the four copies individually to gain information as to the purpose of each copy. The objective of this study is to identify potential transcription factors upstream of the flagellar master regulator, with the initial focus on flhC1. In order to do this, we performed a transposon mutagenesis of B. unamae carrying a flhC1 promoter fusion to lacZ. We identified a transposon mutant of a Lys R transcriptional regulator that appears to have reduced flhc1 gene expression, as indicated by decreased lacZ expression. This suggests that this LysR transcriptional regulator acts upstream of flhC1, and it will be of interest to determine whether it is also required for transcription of the additional copies of flhC. We are currently generating a deletion mutant of the LysR transcriptional regulator so we can test the impact it has on the four different copies of flhC.
The Fulfillment of Economic Rights: A Historical and Analytical Inquiry
Cameron Freestone

Economic rights establish a society’s obligation to its people like other rights. However, economic rights differentiate themselves because they guarantee universal material necessities, seeking an economic baseline and eradicating poverty for the people. Albeit these rights' theoretical usefulness, what leads to fulfilling these rights is underresearched. I conduct historical and empirical analyses in this paper to address this gap. I argue that the type of economic system has the strongest effect on the degree to which states fulfill their economic rights’ obligations. I further propose that states with socialist systems are more likely to fulfill economic rights than other economic systems. To explore my hypotheses, I conduct a large-scale analysis with data from 2019. The findings suggest that future research should examine these economic systems and whether they matter in terms of fulfilling economic rights. In addition, such research may consider the increasing effects of climate change and workplace automation on people’s ability to secure economic rights.

The Future of Substantive Due Process Rights: An Examination of the Fragility of Unenumerated Rights
Claire Peshut

In *Dobbs v. Jackson Women’s Health Organization*, the United States Supreme Court overruled the substantive due process right to abortion established in *Roe v. Wade*. The Court in Dobbs found Roe to be an “egregiously wrong” decision and returned abortion rights to the states. The decision to overturn a landmark substantive due process right has raised questions about the fragility of rights not explicitly enumerated in constitutional text. This project will examine whether unenumerated rights are less stable than rights explicitly enumerated in constitutional text. The area of unenumerated rights compared to textually grounded rights is underexplored, and this thesis aims to fill gaps in the literature. I will conduct two case studies to understand the stability of unenumerated rights. First, I will compare the Fourth Amendment protection against unreasonable search and seizure for electronic communication established in *Katz v. United States* to the substantive due process right to privacy established in *Griswold v. Connecticut*. Then, I will compare the First Amendment right to student free speech established in *Tinker v. Des Moines* to the substantive due process right to marriage established in *Loving v. Virginia*. I expect to find the legacies of these cases indicate the fragility of unenumerated rights. These findings are important for securing the rights of marginalized groups in the United States, whose rights the initial enumeration of the constitution did not protect.

The impact of disrupting serotonin receptors 2B and 2C on cardiac crest migration and heart structures by embryonic day 10 in chicken embryos
Gwyneth Garramone

Introduction: Serotonin (5-HT) is a monoamine neurotransmitter, which influences neuronal identity, limb development, and the formation of neural crest cells, in vertebrate embryonic development. Psilocybin, a compound with breakthrough FDA approval for anxiety and depression, over-activates various 5-HT receptors. Neither the effects of maternal psilocybin use nor the effects of over-activation of specific 5-HT receptors on embryonic development are known. To determine the effects of disrupting the activity of the 5-HT2B and 5-HT2C receptors, we treated chicken embryos with 1-methylpsilocin (1-MP), a synthetic agonist that selectively binds 5-HT2B/2C receptors.
Methods: A 20 µM solution of 1-MP was applied to embryos at stage 8 (28 hours) in ovo and the embryos were collected at stage 14 (Embryonic Day 2), stage 30 (ED6), and stage 36 (ED10). The embryos were collected and sectioned to a thickness of 14µm.

Results: Results show that disturbing signaling through the 5-HT2B and 5-HT2C receptors causes anomalies in cardiac neural crest migration. This is seen at stage 14 where the cardiac neural crest cells demonstrated a wider migration pattern posterior to the otic vesicle. A result of this earlier phenotype is seen at ED6 as fibrosis between the aorta and pulmonary trunk. Finally, by ED10, the phenotype has progressed to include fibrosis or absence of the membranous interventricular septum.

Future Directions: To further understand the teratogenic effects of disrupting signaling at the 5-HT2B/2C receptors, we will perturb either 5-HT2B or 5-HT2C receptors prior to 1-MP application to determine which receptor type is responsible for the phenotype.

The influence of changing temperatures on the germination rate of Juglans californica seeds from urban and rural areas
Yana Makievskaia, Sabriya Seid

Due to pressures from urbanization and climate change Juglans californica (Southern California Black Walnut), the foundational species of walnut woodland communities in Southern California, is under threat. A temperature-dependent cold stratification period regulates seed germination of J. californica and rising temperatures may negatively affect seed dormancy. Literature based on limited data from the middle of the last century suggests that the optimal seed germination temperature of J. californica is 5°C. Given prevailing climatic conditions in Southern California only briefly drop below 5°C for extended periods of time, we test this proposed requirement by quantifying the germination of J. californica seeds at 2°C intervals from 2°C to 20°C. Seeds were collected from mature trees at an urban nature park, Ascot Hills Park in northeast Los Angeles, and a rural nature preserve in Ojai, CA. Seeds were dehusked, imbibed for 24 hours, incubated at fixed temperatures, and checked weekly for germination – emergence of the cotyledon. After 15 weeks, un-germinated seeds were planted in soil and held at 22°C for 4 weeks. Pilot data from past trials in 2018 and 2020 suggested an optimal stratification temperature of 10°C. Our findings concur, with the highest germination rate at 10°C to 12°C and lowest below 6°C and above 14°C. Furthermore, germination rates were higher in rural collected seeds. These findings indicate J. californica has a higher optimal germination temperature than past research, yet rising temperatures may have an increasing impact on this vulnerable species’ survivorship in Southern California.

The Invasion of Immigrants: The Metaphor of Immigrants as Invaders in American News Media
Annika Lai

Anti-immigrant sentiments are found throughout American news media in the form of misrepresentations and derogatory metaphors. Immigrants are often framed in mainstream forms of media as economic threats, social vermin, victims of conflict, and invaders (Benson 2013). Existing literature on immigration discourse points to a discursive relation between anti-immigrant sentiments and the portrayal of immigrants in mainstream media. (Kondor et. al 2022). Neglected by scholarly literature, however, is the extent to which different frames in mainstream news media operate to incite anti-immigrant sentiments (Ocrés and Ewing 2019). The following research paper will henceforth examine various frames in mainstream news media in an attempt to distinguish whether or not certain frames are more robust than others at influencing anti-immigrant sentiments. In employing an original survey-experiment, the methodology of this research paper attempts to answer the question: How and to what extent do mainstream news media frames influence anti-immigrant sentiments? I expect to discover that framing
immigrants as invaders will elicit stronger anti-immigrant sentiments because cultural bias against outsiders are more difficult to overcome than misperceptions about the economy and health of the nation.

The Loyola Marymount University Food and Mood Study
Mikaela Corella

Dietary intake not only physically affects the body but can also affect the mental health of individuals. PURPOSE: The LMU Food and Mood Study analyzed the diets and mental health of college students to discover if there are any correlations between their mental health and eating habits. In addition, the physical activity levels of the participants were evaluated for correlation with their mental health. METHODS: 44 college students, 20.2 ±1.3 years, completed three-day diet records which were analyzed in Food Processor software for nutrient intake and food groups. Mental health was analyzed by questionnaires including the Beck Depression Inventory, Profile on Mood States (POMS) short version, Zung Self-Rating Anxiety Scale, Eating Disorder Examination Questionnaire, Kessler K10 Scale of Psychological Distress, and the International Physical Activity Questionnaire (IPAQ). RESULTS: Omega-3’s were significantly correlated to depression (r = -0.337, p = 0.025). Zinc (r = -0.302, p = 0.047) and protein (r = -0.342, p = 0.023) were significantly correlated to mood. Dietary restraint was significantly correlated to anxiety (r = 0.444, p = 0.003). Physical activity did not correlate to mental health. CONCLUSIONS: Omega-3’s are associated with less depressive symptoms. Zinc and protein were associated with better mood. Dietary restraint was associated with more anxiety. Among college students there is a correlation between diet and mental health. Further research is needed to correlate physical activity and the mental health of college students.

The Metaverse and its Impact on the Economics of the Film & TV Industry
Dominic Lauro

After gaining mainstream popularity in 2021, the idea of a metaverse became the focus of practically every Fortune 500 CEO with announcements coming daily about a new investment in the metaverse. The Film and Television industry was not insulated from this trend, with countless claims of potential metaverse applications in the industry. Rather than attempt to give a meritless prediction at the chances of the metaverse being integrated into this industry, this research aims to understand how that integration would impact the economics of the industry. This study achieves this by looking at “the big six” studios that comprise the MPA and answering three main questions: what is the metaverse, what is the economics of the Film & TV industry, and how will the metaverse impact the economics of the Film & TV industry? The latter question is approached from two perspectives: a consumer focused metaverse and a producer focused metaverse. Both perspectives provide a lot of questions and uncertainty for stakeholders in the Film and TV industry that are brought to light in this paper, which the author attempts to answer and shed light on.

The Potential Relationship Between Culture and Attachment Styles
Gianella Martinez-Gugliotta

Attachment styles have a significant impact on the way that individuals form relationships with others. The purpose of this study is to determine if the culture in which an individual grew up had some effect on the attachment style they now have as an adult. To conduct this study, several articles were read and analyzed to gather information on past research study results, along with conducting a set of 8
qualitative interviews with participants from a variety of cultural backgrounds. Questions asked included
#1: What cultural background are you from? #2: What was it like for you growing up in that
environment? #3: Would you say it was a more positive or negative experience? #4: Do you notice a
difference between how things are with your family versus friends from separate cultures? #5: How has
your experience been with forming relationships with other people? #6: Do you know what your
attachment style is? The results of these interviews are currently in the review process for further analysis.
Still, previous findings lead researchers to believe there is value in exploring the potential connection
among adult relationships, attachment styles, and cultural backgrounds.

The Role of Migrants at Early Bronze Age Tel Beth Yerah
Caidan Anderson

A notable characteristic of the Near Eastern Early Bronze Age (3300-2100 BCE) was the presence of two
seemingly contrasting lifestyles: sedentism and pastoralism. In this paper, I investigate material evidence
from the Levantine site of Tel Beth Yerah, an exceptional settlement that, in its later years, appears to
have been shared by peoples of two distinct material cultures. One of these peoples, identified with
‘Khirbet Kerak’ material culture, displays clear origins in a pastoral setting far removed from their later
home. While ancient texts and some modern scholarship assert distinct identities and the separation
between sedentary and non-sedentary populations, the archaeological record at Tel Beth Yerah is
indicative of extensive cultural contact and perhaps mirrors a greater pattern of sedentary and nomadic
interaction that is not related in texts. I begin my investigation by tracing the development of the
settlement from its origins in the Early Bronze I to its distinctly heterogeneous character in the Early
Bronze III in order to emphasize how this community complicates traditional notions of linear
development. Further, by analyzing the site’s material evidence in the context of scholarly works both
centered on the settlement and pastoral peoples across the wider Early Bronze Near East, I argue the
nomadic roots of ‘Khirbet Kerak’ material culture are made evident. I conclude that the coexistence of
these distinct traditions at Tel Beth Yerah implies a greater degree of interaction between sedentary and
pastoral peoples in the many other developing urban centers of the Early Bronze Age Levant.

The Science of Race and Skin Pigmentation in Biomedical Research of Pulse Oximetry
Daisy Huerta

Developed in the 1970s, pulse oximetry entered the clinical domain in the 1980s and became routinely
used for measuring oxygen saturation in the blood. The COVID-19 pandemic exacerbated pulse
oximeter usages in clinical and home settings to monitor blood oxygen saturation. A commentary on
pulse oximetry published by Sjoding et al. (2020) highlighted racial inequities in health. This project is an
analysis of how scientists have conceptualized and studied both race and skin pigmentation in the
accuracy of pulse oximetry. Methods: Texts were gathered utilizing qualitative research methods through
Google Scholar and Pubmed. Principles of thematic content analysis were conducted on these texts.
Results: Race is both highlighted and underemphasized in favor of skin pigmentation. Before 2020, skin
pigmentation, rather than race, is discussed because of its clear impact on pulse oximeter signal quality.
After that year, more scientists began to racialize the topic. Discussion: This is an interesting case study
that focuses on the processes of racialization in biotechnology, specifically in pulse oximetry.
Sociologists typically find that race in biotechnology is emphasized even without clear reasonings, but
this research provides a slightly different depiction. There is a potential uneasy relationship that some
biomedical researchers may have with race.
The Shi Arrangement and Pointed Partitions
Alex Abrams

A hyperplane poset of a hyperplane arrangement encodes important information about how these planes intersect. The characteristic polynomial of a poset keeps track of combinatorial aspects of the poset. When two posets have the same characteristic polynomial, it suggests an underlying relationship between these posets. The Shi arrangement is a well-known hyperplane arrangement that arises from modern algebra. Its intersection poset shares its characteristic polynomial with another well-known poset, the pointed partition poset, which arises from operad theory.

We set out to explain the relationship between these two posets. We employed a modern combinatorial method for posets called a quotient. This method involves identifying elements to form a new poset called a quotient poset. We intended to show that the pointed partition poset is a quotient of the Shi intersection poset.

In order to show that the pointed partition is a quotient of the Shi intersection poset, we came up with a way to encode elements of the Shi arrangement as directed graphs. We proved results about these graphs using graph theoretic techniques. These new insights allowed us to prove that a quotient poset of the Shi intersection poset was structurally the same as the pointed partition poset. This gave us a better understanding of both posets and shed light on the connection between hyperplane arrangements and operad theory.

The Silenced Rebellion: Recontextualizing Revolutionary Haiti
Jennifer Valentine

Despite the acknowledgement of Haiti gaining independence from France in 1804, there is little information taught about how this victory occurred. When discussing the only successful slave revolt, the abuse that the nation has suffered under colonial forces has been ignored. The residual trauma and neocolonial impacts of France that have irrevocably damaged their economic state are rarely discussed. This study seeks to bring the systemically neglected truths of this relationship to light and further investigate the events that led to the fabrication of a colonial narrative. I offer a close textual analysis of primary and secondary documents spanning from the beginning of France’s occupation of Haiti to their current manipulation of the nation’s politics and economics. I implement a more critical lens to my approach, reading to uncover gruesome truths about slave brutality and abuse, slave retaliation, and the formation of toxic, neocolonial political relationships within Haiti. My analysis of these documents yields that white, colonial narratives about Haiti have greatly impacted the nation’s perception, as the white elite have spread misinformation and silenced the impact of the neocolonial intervention from France. Haiti is often blamed for being disadvantaged, while France is never held accountable for their detrimental involvement in the nation’s affairs. This study offers critiques that can be used to examine other neocolonial damage to colonized countries, as Haiti’s history is shared with many nations. This project contributes to future research on the impacts of colonialism as well as combatting neocolonial influence.
The yeast [2Fe-2S] mitochondrial protein Aim32 supports multiple key processes within the organelle.
Kayleigh Bhatt, Roger Ratnam, Joshua Poura, James A. Wohlschlegel, and Deepa V. Dabir

Aim32, a thioredoxin-like ferredoxin mitochondrial protein has an underlying role in the redox regulation of proteins. To identify redox-specific substrates of Aim32, we previously employed a FLAG-immunoprecipitation strategy coupled with mass spectrometry analysis. We identified Mitochondrial Processing Peptidase (MPP) and several proteins of the electron transport chain (ETC) as potential interactors. MPP is integral in precursor processing and consequently, mitochondrial homeostasis. Mitochondria produce energy through oxidative phosphorylation; ETC complexes: II, III & IV oxidize substrates and transfer electrons to oxygen, generating a gradient that allows phosphorylation of ADP to ATP by the ATP synthase. Disruptions to this critical mitochondrial energy generating process impacts overall cellular function. We observed altered redox state of essential MPP subunits, Mas1 and Mas2 in mitochondria depleted for AIM32 (Δaim32). Increased precursor accumulation in Δaim32 strain suggests a direct regulation of MPP function by Aim32 via redox. To understand Aim32’s impact on ETC, we examined the organization and activity of the respiratory supercomplexes (RSCs) in the absence of AIM32. CII activity was severely reduced and free CIV monomer was increased, indicating CIV remodeling. Additional BN-PAGE analyses revealed a clear prevalence of the smaller RSC (III2IV > III2IV2) in Δaim32 mitochondria and the pool of dimeric CIII was increased. Collectively, these observations suggest that the steady-state level of CIV is perhaps limiting when AIM32 is nonfunctional. Aim32 may potentially be a novel regulator of Complex IV biogenesis and consequently, affects energy transduction. Our research highlights the mechanistic importance of Aim32 to organelar homeostasis.

Towards a Brief Case: Automated Summarization of Court Transcripts
Maya Epps

Transcripts of court trials can be extremely long, stretching across thousands of pages and requiring many hours to read through. Additionally, court tedium can bloat transcripts and obscure important information. For organizations such as the Loyola Project for the Innocent, a clinic for the exoneration of the wrongfully incarcerated dedicated to the Los Angeles area, stretched person-power and the length of these transcripts can be prohibitive to the number of cases in their queue they are able to process per year. Therefore, the ability to summarize important aspects of these transcripts can help reduce the amount of time it takes to understand the transcript and the case. One approach includes utilizing the abilities of pre-trained Large Language Models (LLMs) to automatically summarize the court examinations that make up large portions of trial transcripts. However, LLMs have known pitfalls: it is challenging for these LLMs to summarize examination text that is different from their majority Web-scraped training data, and they are known to have problems with factual accuracy and the preservation of relevant details in summaries. In our work, we try several preprocessing techniques to manipulate the examination text into a format more similar to the model’s training data before using the model BART to summarize the preprocessed text. We found that some of these preprocessing techniques on examinations improved both the factuality and completeness of the resultant summaries according to human reviewers. Interactions of automated summarization with accessory court transcript analyzers are discussed.
Tree Swallows of the Ballona Wetlands

Ivana Small, Isabella Lopez

Wetlands contribute many beneficial services including providing habitat for wildlife, maintaining water quality, and mediating flood risk. One of the last wetlands in Los Angeles County is the Ballona Freshwater Marsh and adjoining Riparian Corridor. These are a restored coastal wetland site near Marina Del Rey, California. Another wetland site located in Southern California is the San Joaquin Marsh Wildlife Sanctuary in Irvine, California which is managed by the Sea and Sage Audubon Society. Both of these sites are home to Tree Swallow (Tachycineta bicolor) populations. The purpose of this study is to understand the health of the new and growing Tree Swallow population at the Ballona Wetlands by comparing nestling growth measurements to the existing population at San Joaquin Marsh. Due to the management practices at the Ballona Wetlands, it is hypothesized that the nestling growth rate will be slower than the nestling growth rate at the San Joaquin Marsh. From March through July 2022, we monitored all 53 nest boxes and collected data on when eggs were laid and hatched. For each the 20 total nests, we measured mass and flat wing length for all nestlings on days 6, 9, 12, and 15 post-hatch to quantify nestling growth. Preliminary findings show that on average, the mass and flat wing length is greater for nestlings at the San Joaquin Marsh than those at the Ballona Wetlands. Full statistical analysis and conclusions will be presented at the Symposium.

Understanding Alkane Emissions From the La Brea Tar Pits

Lily Bagheri, Natnael Alem Hagos

The La Brea Tar Pits are a major source of geological seepage, emitting 570 million metric tons of methane into the atmosphere annually. We aimed to quantify total geological seepage from the pits, more specifically, our goal is to build off of a previous study that found iso-/n- pentane and butane ratios exceeding 5-10 (which did not match the literature value of 0.1-1.5) to see if this stayed consistent for heavier alkanes. Alkane composition from samples was determined using gas chromatography-mass spectrometry (GCMS) and gas chromatography (GC) instruments. N- and iso-alkane standards were utilized to identify the different peaks from the asphalt chromatogram. Initial trials revealed contamination and reproducibility would be obstacles in peak identification, so finding the best instrument settings for the standards became a primary goal. We determined the best instrument settings for n- and iso-alkane standards through trial and error. These settings are crucial for analyzing and quantifying future asphalt samples. The n-alkane standard was determined using GC and confirmed with GCMS for higher accuracy, allowing retention times for nC8-nC20 to be known. The iso-standard was set only using GCMS, as it generated peaks closer to the manufacturer’s description and allowed us to determine 56 of the iso-alkanes’ retention times. The asphalt from the tar pits is very challenging to work with because it is very sticky and could potentially stick to the instruments’ columns, so we have designed a rolling and freezing method to work with the samples without the risk of instrument damage.

Understanding the Nuances of Maternal Mental Health: Identifying Distinct Clusters of Mental Health Status and Treatment-Seeking Behaviors

Evan Yu, Owen Hunger, Hetanshee Shah, Mandy Korpusik, Alexandra Sturm

Maternal mental health prior to, during, and following pregnancy can significantly impact health outcomes for both a mother and the infant. However, little research has examined how different mental health concerns may collectively manifest during pregnancy. The present study utilized machine learning techniques to evaluate how different maternal mental health conditions (i.e., depression, anxiety, ADHD,
OCD, Panic Disorder) cluster in a large sample (N=7,790) of first-time mothers. Twelve indices of mental health pre-, during-, and post-pregnancy were included. Data was analyzed using Python (Pandas, scikit). K-Means clustering was used to cluster individuals based on the 12 mental health indices. Originally clustered at six, clusters were not descriptive ultimately, leading to results indicating that eight clusters best fit the data. Clusters with the most participants included (1) individuals who experienced no significant mental health-related symptoms, and (2) individuals who self-reported high anxiety and/or depression and did not seek treatment. The smallest clusters included individuals with significant mental health who sought treatment either before or during pregnancy. By identifying distinct subgroups based on mental health status and treatment-seeking behaviors, we can better understand how maternal mental health markers can affect mothers.

Using DNA barcoding to track seafood mislabeling in Los Angeles restaurants

Kelli Andrade

Mislabeling is a persistent challenge throughout the seafood industry. This is especially true at the latter stages of the supply chain, including in sushi restaurants. For example, a four-year survey of common sushi types sold in 26 restaurants in Los Angeles revealed a consistently high percentage of mislabeling (47%; 151 of 323) based on US Food & Drug Administration (FDA) guidelines (Willette et al. 2017). Surprisingly, however, mislabeling was not homogenous across species with some species having rates of 100% mislabeling, and others with very low rates. Here, using the same sampling, laboratory, and data analysis methods from Willette et al. (2017), we surveyed eight of the same restaurants to quantify current mislabeling rates to see if these rates have increased, decreased, or stayed the same. A total of 120 sushi samples of eight common sushi types were purchased from 10 restaurants in 2021 and 2022 and sequenced. We determined a sushi sample was mislabeled if the menu name, the identified species name (based on DNA barcode sequencing), and the FDA Acceptable Market name did not match. We hypothesize that given increased media attention and industry-academia initiatives to reduce seafood mislabeling in Los Angeles, we will observe a low incidence of seafood mislabeling in the sampling years of 2022 & 2023 versus the original study a decade ago from 2012-2015.

Using eDNA to detect the presence of the endangered horseshoe crab in Yucatan, Mexico to help make octopus fisheries more sustainable

Lauren Quesada

In Yucatán, Mexico, some fishermen are using an endangered horseshoe crab species (*Limulus polyphemus*) as bait for hunting octopus. *Limulus polyphemus* is on the Mexico Endangered, Threatened, and Protected species list due to declining population size. Horseshoe crabs perform important ecological roles as part of a complex food web and bioturbation of marine sediments; and are of lucrative importance to the pharmaceutical industry, as their unique blood can be used to detect the presence of endotoxins in intravenous drugs and implantable medical devices. The combined harvesting pressures on horseshoe crabs are causing the species decline globally and may result in local extinction where local harvest is high. In collaboration with COBI Mexico, a non-profit organization that works with local fishermen to adopt more sustainable fishing practices, we conducted a pilot study to screen for the presence of *L. polyphemus* in fishermen’s bait supplies. The use of *L. polyphemus* as bait is illegal in Mexico, yet visual inspection for the species is time-consuming and difficult. Using environmental DNA or eDNA metabarcoding methods developed in our lab, we screened 18 water samples from six fishing ports along Yucatan. The advantage of eDNA-based monitoring is that it does not require seeing the species, rather it can identify a species presence from the DNA molecules left behind in the water.
Results indicate *L. polyphemus* was present in several bait samples. These findings are being shared with COBI collaborators and suggest eDNA-based monitoring could be a potent tool for reaching more sustainable fisheries.

**Various Psychological Factors Affected by Increased Alcohol Consumption Among College Students**  
*Oliver Hatch*

Chronic and sustained alcohol abuse is known to impact numerous areas of functioning. The aim of the present study was to assess various effects increased alcohol consumption on a non-clinical population of healthy college students. Increased alcohol consumption was shown to have significant effects on impulsivity, consummatory experiences of pleasure, and perceived workload on cognitive tasks. We found a significant association between the frequency of alcohol consumption in the last month and the Barratt motor impulsiveness subscale. We found another group difference indicating that binge drinking college students had a significantly higher score compared to non-binge drinking students on the consummatory subscale of The Temporal Experience of Pleasure Scale. Although the data from our test battery showed no significant relationship between alcohol consumption and performance on neurocognitive tests, we found a positive association between number of days spent drinking per week and total workload in a test of attention and processing speed. These findings are of interest considering the population examined are young and otherwise healthy college students, suggesting fairly mild but acute effects of alcohol consumption.

**Viva La Patria: The Political Behavior of Cuban Americans**  
*Olivia Sabates*

*Viva La Patria: The Political Behavior of Cuban Americans*

The Cuban American population significantly impacts the electoral system in the United States because of their political beliefs and high voting rates. Their strong affiliation with the Republican Party originally stemmed from the anti-communist sentiment heavily influenced by Cuban politics. However, the growing Cuban American population in the United States promulgates the question of how the younger generation of Cuban Americans will influence future elections. In this study, I will examine Cuban American political preferences to determine whether their voting behavior will continue to follow a conservative pattern. Additionally, the study will either confirm or deny their behavior pattern due to anti-communist rhetoric or geared towards more present political issues. To explore these topics, I will analyze the historical context for Cuban migration to the states and highlight its implications on the political sphere in Miami, Florida, and the nation. Through survey data and personal interviews with Cuban Americans, I find that the policy preferences of second and third-generation Cuban Americans will temporarily align with past generations in coming elections. This is exemplified in recent election outcomes and can partly be due to environmental factors and family socialization. However, these voters will shift away from strict loyalty to the Republican base as more pressing issues in the United States emerge for future generations of Cuban Americans.

**Voter Fraud or Voter Suppression? How the Media Affects Public Opinion About Voting Laws in the U.S.**  
*Elizabeth Iribarren*

Voter suppression involves legal and obstacles to voting, such as voter ID laws, restrictions in voting by absentee ballot, and voter disinformation. While some argue that these regulations unjustly target
marginalized communities’ ability to vote, others see them as necessary to combat the issue of voter fraud. Existing literature that focuses on public opinion about voter suppression in the U.S. predominantly analyzes partisan differences in views. The effects of media framing on public opinion about voter ID laws, however, needs to be further investigated. This study extends existing voting scholarship by investigating how media portrayals of voter fraud versus portrayals of voter suppression of marginalized groups impact Americans’ views about voter ID laws. Through an original survey experiment conducted among 503 participants, I find that media framing affects participants’ views on voter ID laws. The results indicate that when media frames ID laws as crucial to combating voter fraud, respondents are statistically more likely to support them compared to when voter ID laws are framed as a tool to assist voter suppression. The study’s results indicate that information or misinformation disseminated through media channels have significant implications for public opinion on the issues of voter fraud and voter suppression.

We Should All Be Terrorists: A Study of Surveillance and Their Consequences on Arab American Behavior and Community
Andrea Younes

This project explores the impact of surveillance and rhetoric on Arab American communities. Using political and feminist theory, I identify how positionality to terror produces secondary marginalization. Arab Americans are marked as subjects of observation through the state’s emphasis on identity through citizenship and their practices of domestic security. This emphasis and practice claim to prevent harm towards the production of the American nuclear family. The study explores political and cultural impacts of ‘terrorist’ ideation and language, and fills gaps in the literature about self-surveillance within Arab American communities. I ask: “What was the response of Arab American communities towards the events of 9/11?” and, “How has surveillance contributed towards secondary marginalization within Arab American communities?” By turning to historical collaboration between criminalization, heteropatriarchy, and categorization regarding self-surveillance, I show how the queer Arab American is constructed as a taboo subject as a means of preventing the perpetuation of ‘deviant’ identity, as noted by Jasbir Puar. I examine “terrorist” as a theoretically powerful marking, asking if individuals interested in liberation from state observation should aim to disrupt the nuclear family, or become terrorists in a different sense than used by the state. Through archival analysis and oral interview, I document categorical uncertainty regarding Arab and queer Arab Americans naturally threatening systems of white supremacy and heteronormativity. As a result, readers will better understand the impact of criminalizing descriptors within already villainized identities and the potentiality of reclaiming these terms to disrupt these systems of racialized and sexualized punishment.

What is Your Gender?: A Qualitative Study on the Instability of Gender Categorization at Loyola Marymount University
Claire Shepard, Maria McGlone, Sage Boyd

The present study explores sites of gender categorization at Loyola Marymount University (LMU) that expose the instability of both gender and gender categories. This project stemmed from analyzing Los Angeles public opinion surveys conducted by the Center for the Study of Los Angeles (CSLA) at LMU. It centralizes on how participants are asked to disclose their gender and how gender was categorized in the demographics section of each CSLA survey. This research centers around “the gender question” (i.e. what is your gender?) and asks: when does LMU categorize gender and what can this classification tell us about the instability of these categories? A close reading of convenience-sampled "gender questions"
asked at LMU reveals that gender is unstable in the incongruent ways it is discursively constructed. This data shows how gender categorization in LMU surveys exists on a spectrum, and despite an emphasis on the gender binary system, there is not a consistent way to categorize or classify gender. The project concludes with interpretive, anonymous submissions from LMU students describing their gender in unstable ways.

**Why Didn’t We Ask?**

*Mason Cooney*

As a student, one of the number one pieces of career advice I have been given is to talk to people. Whether it be through informational interviews, networking events, or guest speakers, I have been encouraged to learn from the experiences of others. By doing this, I have avoided learning many lessons the hard way and ultimately made much better-informed career decisions.

This research project is a quest to learn from the experiences of others not just about careers but about life. I interviewed a diverse group of people — including a barista, a CEO, a record executive, and a hairdresser — to see what I could learn from them. The result is a collection of quotes, photos, and my thoughts to share what I took away. “Why Didn’t We Ask?” is a broader attempt to learn from the people around me. It changed my life and set me on a philosophy of learning more from those around me. This project shares the wisdom that each interviewee brought to the table, and I hope that it can encourage others to see what they can learn from those around them if they ask.

**Why Do They Not Listen to Us?: Political Violence Inconsistencies in Liberation Movements**

*Julia Lemmon*

Political violence is seldom viewed as an appropriate means to achieving a goal. Despite extensive studies produced on the reasons for political violence usage, the scholarly world fails to consider exploration into why some groups choose violence while their counterparts do not. Why is violence adopted in some movements, but others prefer to utilize strategic nonviolent resistance? Via case study methodology, I compare and cross analyze four independence or liberation movements to examine what impacts the adoption of their strategies, either violence or nonviolence, in pursuit of their independence goal. This study investigates and compares the Algerian Independence War with India’s nonviolent independence movement and the bloody West Papuan independence movement with the strategic nonviolence used by East Timor’s liberation struggle. The goal is to understand what explains the differences in adoption of violent or nonviolent resistance. Previous literature has explored the importance of and impact that international allies have on these liberation movements. However, what they do not explore is how the type of international allies affect the strategies these movements adopt. It is concluded via this study that cases utilizing political violence either had no international allies or had allies that were non-influential: impoverished nations, largely located in the global south, that have no substantial impact in the international realm. In contrast, the nonviolent cases were able to garner international support from the global north: nations that have sizable influence on international politics and the ability to positively impact the liberation movement and its goal.

**Women in the Viking World: A Tracing of Female Power in Viking Age Scandinavia and Iceland**

*Natalie Riddick*

The popular memory of the Viking Age is one characterized by male warrior behavior. Due to Viking societies’ patriarchal nature and the modern scholars who publicized these historical narratives, the
The presence of Viking women is disproportionately lacking. Yet, recent scholarship is discovering that the history of Viking women is present in the written and archeological records. It was intentionally sidelined due to the influence of 19th and 20th-century gender biases of scholars who projected their societies' norms on Viking societies. Over time, the diversity of scholars and scholarship has led to uncovering the pieces to the puzzle of women's lives in the Viking age. Through an analysis of diverse textual and material sources on Viking women, this paper seeks to understand the evolution of the ways in which women were able to hold power in Viking societies in Scandinavia and abroad in the settlement of Iceland. This paper will emphasize the importance of religion in creating societal norms that allowed women to lose or gain avenues to power through the Vikings' transition from Old Norse religion to Christianity. In Norse religious culture, women were not only allowed to hold prominent roles in religious culture and ceremonies but also were depicted as influential mythological figures in the religion itself. Yet, it is evident in the archeological and runological evidence that, at the time of conversion, many women saw the potential for new social freedoms in Christianity and were active in the conversion process.

World on Fire: The Influence of Social Media On Public Opinion On Climate Change
Nathalie Yacoub

Climate change is a global issue that is receiving increasing attention. Research has demonstrated that Americans of all ages are engaged with political content online. What are the effects of social media on the American public’s opinion on climate change? Specifically, how can social media influence the American public in supporting environmental legislation to curb climate change disasters? I argue that social media posts that depict the harsh effects of climate change can influence the level of importance that Americans place on this issue. This study uses experimental methods to examine how social media posts about climate change can influence public opinion among 600 Americans between 18 and 85. Using data from Prolific, an online survey database, I conduct an experiment that explores how people respond to online images based on whether or not they perceive the issue to be connected to a domestic or global crisis. I examine the effectiveness of different social media posts to which the respondents are exposed using qualitative and quantitative data. Findings include heterogeneous treatment effects by age. Young people are more likely to receive political information online; therefore, they are more influenced by social media posts than older people.
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