May 7, 2010

Dear Colleagues and Guests,

Nurturing intellectual curiosity and supporting the creation of new knowledge are at the very core of what we do as a University. The Symposium for Undergraduate Research, Scholarship and Creative Activity at the University of California, Riverside is a celebration of the students’ scholarly work and the mentorship of our faculty. Here, we proudly showcase the diverse array of ideas and innovations emanating from our talented and intellectually curious undergraduates.

The ability to collaborate with peers and mentors, to communicate effectively and to pursue answers and solutions are invaluable skills that students participating in this symposium require. We must offer our students encouragement and the opportunity for academic exploration beyond the classroom so as to prepare them for their next steps beyond graduation from UCR. This symposium illustrates how UCR’s academic culture fosters these essential skills, and how our faculty recognize the value of hands-on learning and academic discovery.

I congratulate the student presenters and their faculty mentors for the work they have done. To our students: may this be only the beginning of your life’s exploration.

Sincerely,

Timothy P. White
Chancellor
May 7, 2010

Welcome to the Fourth Annual Symposium for Undergraduate Research, Scholarship, and Creative Activity.

The creative process can be a lonely one. The researcher toils away, often in isolation, trying to shed new light that enriches our understanding of social or natural phenomena, nourishes our emotions, or enlivens our souls. However, presenting the results of that process to one’s peers and mentors is exhilarating. Here, the key is clarity of communication and openness to comments and criticism. The symposium presentation is how we reveal the product of our toils and improve that product through careful listening.

I commend you on your creative efforts and wish you the best as you present the results of those efforts to the larger UCR community.

With best regards,

David Fairris
Vice Provost for Undergraduate Education
Professor of Economics
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Symposium Objective

To increase the visibility of undergraduate research and the commitment of faculty mentors at UCR by coordinating a professional conference setting in which undergraduate students present their research projects and creative activities.
Schedule of Events

Friday, May 7, 2010, All Sessions in the Highlander Union Building (HUB)

7:30 am – 1:45 pm  Registration for Participants
                  Room 302 South

8:00 am – 9:00 am  Oral Presentations
                  Session A: Room 355
                  Session B: Room 367
                  Session C: Room 379

9:00 am – 10:00 am Oral Presentations
                  Session D: Room 355
                  Session E: Room 367
                  Session F: Room 379

10:00 am – 11:00 am Oral Presentations
                  Session G: Room 355
                  Session H: Room 367
                  Session I: Room 379

11:00 am – 12 noon  Poster Presentations, Room 302 South

12:00 noon – 1:00 pm Oral Presentations
                  Session J: Room 355
                  Session K: Room 367
                  Session L: Room 379

1:00 pm – 2:00 pm  Oral Presentations
                  Session M: Room 355
                  Session N: Room 367
                  Session O: Room 379

2:00 pm – 3:00/3:20 pm Oral Presentations
                  Session P: Room 355
                  Session Q: Room 367
                  Session R: Room 379

3:30 pm – 5:00 pm  Faculty Presentation and Reception, Room 302 North
                  “Bringing Science to the Public,” Professor Jodie Holt, Avatar Consultant
Oral Presentation Sessions

Each oral presentation is allocated 15 minutes and followed by a three to five minute question and answer period. The session is moderated by a UCR faculty member or graduate student. Student participants and guests are asked to adhere to general guidelines of conference etiquette and not enter or leave the room during a presentation.

PowerPoint set-up is from 7:30am-8:00am for all sessions. If you cannot load your presentation at that time, you will have a couple of minutes between sessions.

Oral Presentation Session A – HUB, Room 355, 8:00am - 9:00am

<table>
<thead>
<tr>
<th>Presenter(s)/ Major</th>
<th>Project Title</th>
<th>Faculty Mentor(s)/ Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yuri Daniels</td>
<td>Where to Draw the Line – Israel and Palestine in Film</td>
<td>Erith Jaffe-Berg</td>
</tr>
<tr>
<td>Theater and Creative Writing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amber Qureshi</td>
<td>Making Free Trade Beneficial for Everyone: Globalization, Development Economics and the Woman Migrant Domestic Worker in Asia</td>
<td>Christine Gailey</td>
</tr>
<tr>
<td>Business Administration</td>
<td></td>
<td>Department of Women’s Studies</td>
</tr>
<tr>
<td>Andres Cuervo</td>
<td>The Revitalization of the Inner City: Seismic Retrofitting as a Method of Economic Development</td>
<td>Juliann Allison</td>
</tr>
<tr>
<td>Political Science</td>
<td></td>
<td>Department of Political Science</td>
</tr>
</tbody>
</table>

Oral Presentation Session B – HUB, Room 367, 8:00am - 9:00am

<table>
<thead>
<tr>
<th>Presenter(s)/ Major</th>
<th>Project Title</th>
<th>Faculty Mentor(s)/ Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vincent Cervantes</td>
<td>Boys Are Different Than Girls: Cross-Cultural, Evangelical Understandings of Masculinity</td>
<td>Jonathan L. Walton</td>
</tr>
<tr>
<td>Religious Studies</td>
<td></td>
<td>Sherri F. Johnson</td>
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<tr>
<td></td>
<td></td>
<td>Department of Religious Studies</td>
</tr>
<tr>
<td>Jessica Yamane</td>
<td>Within Her Strength: A Framework for Addressing Sexual Violence in Our Community</td>
<td>Andrea Smith</td>
</tr>
<tr>
<td>Political Science</td>
<td></td>
<td>Setsu Shigematsu</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Department of Media and Cultural Studies</td>
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<tr>
<td></td>
<td></td>
<td>Christine Gailey</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Department of Women’s Studies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and Anthropology</td>
</tr>
<tr>
<td>Alison Adams</td>
<td>Augustan Propaganda in Monumental Artwork</td>
<td>Wendy Raschke</td>
</tr>
<tr>
<td>Classical Studies</td>
<td></td>
<td>Department of Comparative Literature and Foreign Languages</td>
</tr>
</tbody>
</table>
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**Oral Presentation Session C – HUB, Room 379, 8:00am - 9:00am**

<table>
<thead>
<tr>
<th>Presenter(s)/ Major</th>
<th>Project Title</th>
<th>Faculty Mentor(s)/ Department</th>
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</thead>
<tbody>
<tr>
<td>Nancy Bernal-Flores</td>
<td>Fluctuation Induced Forces Between Foreign Objects in a Biological Membrane</td>
<td>Roya Zandi Department of Physics and Astronomy</td>
</tr>
<tr>
<td>Matthew Bruton</td>
<td>Marine Natural Compounds as New Drug against Malaria</td>
<td>Karine Le Roch Department of Cell Biology and Neurosciences</td>
</tr>
<tr>
<td>Nolan Ung</td>
<td>Maintaining Inflorescent Meristem Identity in <em>Arabidopsis</em></td>
<td>Harley Smith Department of Botany and Plant Sciences</td>
</tr>
</tbody>
</table>

**Oral Presentation Session D – HUB, Room 355, 9:00am - 10:00am**

<table>
<thead>
<tr>
<th>Presenter(s)/ Major</th>
<th>Project Title</th>
<th>Faculty Mentor(s)/ Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michelle Morris</td>
<td>Computational Modeling of Population Differences</td>
<td>Curt Burgess Department of Psychology</td>
</tr>
<tr>
<td>Brenda Davila</td>
<td>The Theory of Intersectionality and New Coalitional Strategies Against Violence Against Women</td>
<td>Caroline Tushabe Department of Women’s Studies</td>
</tr>
<tr>
<td>Kevin Alvarez</td>
<td>Gender Divide in Video Games: Gender Equity</td>
<td>Caroline Tushabe Department of Women’s Studies</td>
</tr>
</tbody>
</table>
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**Oral Presentation Session E – HUB, Room 367, 9:00am - 10:00am**

<table>
<thead>
<tr>
<th>Presenter(s)/ Major</th>
<th>Project Title</th>
<th>Faculty Mentor(s)/ Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mushkbar Zaidi</td>
<td>Deciphering the Smoke: The Oriental and Opium Imagination in 19th Century Literature</td>
<td>Susan Zieger, Jennifer Doyle</td>
</tr>
<tr>
<td>English/ Creative Writing</td>
<td></td>
<td>Department of English</td>
</tr>
<tr>
<td>Cheri Veilleux</td>
<td>Race: The Missing Link in Judith Butler’s <em>Gender Trouble</em> and its Significance in the Politics of Gender Subversion</td>
<td>Caroline Tushabe</td>
</tr>
<tr>
<td>English/ Women’s Studies</td>
<td></td>
<td>Department of Women’s Studies</td>
</tr>
<tr>
<td>Adam Toth</td>
<td>Identifying Society’s Vermin: Franz Kafka’s Critique of Modernity in “The Metamorphosis”</td>
<td>Sabine Doran</td>
</tr>
<tr>
<td>Comparative Literature</td>
<td></td>
<td>Department of Comparative Literature</td>
</tr>
</tbody>
</table>

**Oral Presentation Session F – HUB, Room 379, 9:00am - 10:00am**

<table>
<thead>
<tr>
<th>Presenter(s)/ Major</th>
<th>Project Title</th>
<th>Faculty Mentor(s)/ Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aaron Nichols</td>
<td>Application of AESOP in the Analysis of the Interaction between the Epstein-Barr Virus Glycoprotein gp350 and Complement Receptor 2</td>
<td>Dimitrios Morikis</td>
</tr>
<tr>
<td>Bioengineering</td>
<td></td>
<td>Department of Bioengineering</td>
</tr>
<tr>
<td>Jonathan Chang</td>
<td>Correlations between Polymorphisms in ITS with Parthenogenesis in Nematodes</td>
<td>Paul De Ley, James G. Baldwin</td>
</tr>
<tr>
<td>Biological Sciences</td>
<td></td>
<td>Department of Nematology</td>
</tr>
<tr>
<td>Kaila M. Bennett</td>
<td>Electrostatic Contribution of Nanoparticles for Immunization of the Mucosal System</td>
<td>Thejani E. Rajapaksa, David D. Lo</td>
</tr>
<tr>
<td>Bioengineering</td>
<td></td>
<td>Department of Biomedical Sciences, V.G.J. Rodgers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Department of Bioengineering</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Oral Presentation Session G – HUB, Room 355, 10:00am - 11:00am</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Presenter(s)/ Major</strong></td>
</tr>
</tbody>
</table>
| Evan Goldsmith  
Political Science/International Relations | Change We Need: An Examination of the Viability of Initiative Reform in California | Ron Loveridge  
Department of Political Science |
| Kristina I. Asamsama  
Political Science/International Affairs | Assessing Economic Distress in Riverside | Subir Ghosh  
Department of Statistics  
Karthick Ramakrishnan  
Department of Political Science |
| Jacqueline Banks  
Statistics | | |
| Elaine Cheung  
Political Science/International Affairs | | |

<table>
<thead>
<tr>
<th>Oral Presentation Session H – HUB, Room 367, 10:00am - 11:00am</th>
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</thead>
<tbody>
<tr>
<td><strong>Presenter(s)/ Major</strong></td>
</tr>
</tbody>
</table>
| Mayra Bueno  
Sociology | Environmental Justice in the Inland Empire | Ellen Reese  
Department of Sociology |
| Krystal Huff  
Women’s Studies/ African American Studies | From the Oppressed to the Oppressor: The Role Black Males Play in Oppressing Black Females | Caroline Tushabe  
Department of Women’s Studies |
| Caroline Mays  
Creative Writing | Along ‘The Way’ | Michael Jayme  
Andrew Winer  
Department of Creative Writing |
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### Oral Presentation Session I – HUB, Room 379, 10:00am - 11:00am

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<th>Presenter(s)/ Major</th>
<th>Project Title</th>
<th>Faculty Mentor(s)/ Department</th>
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</thead>
<tbody>
<tr>
<td>Adam Behroozian</td>
<td>Competitive interactions between male Anna’s hummingbirds (Calypte anna): understanding the roles of morphology, power margins, and behavior in predicting dominance</td>
<td>Douglas Altshuler</td>
</tr>
<tr>
<td>Interdisciplinary Studies</td>
<td></td>
<td>Department of Biology</td>
</tr>
<tr>
<td>Ashley Wong</td>
<td>Biologically inspired synthesis of nanostructural titanium dioxide for photocatalytic applications</td>
<td>David Kisailus</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td></td>
<td>Department of Chemical and Environmental Engineering</td>
</tr>
</tbody>
</table>

### Oral Presentation Session J – HUB, Room 355, 12:00pm - 1:00pm

<table>
<thead>
<tr>
<th>Presenter(s)/ Major</th>
<th>Project Title</th>
<th>Faculty Mentor(s)/ Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Danny Tsai</td>
<td>Sanctioned Violence: Hazing in Higher Education</td>
<td>Keith Harris</td>
</tr>
<tr>
<td>Political Science/ International Affairs</td>
<td></td>
<td>Department of Media and Cultural Studies</td>
</tr>
<tr>
<td>Ivan Krimker</td>
<td>Impunity in Argentina’s Political Institutions</td>
<td>William T. Barndt</td>
</tr>
<tr>
<td>Political Science</td>
<td></td>
<td>Department of Political Science</td>
</tr>
<tr>
<td>Suzy Taroyan</td>
<td>Lead Regulation: Arresting the Painting Pandemic</td>
<td>Carl Cranor</td>
</tr>
<tr>
<td>Political Science/ Law and Society</td>
<td></td>
<td>Department of Philosophy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Juliann E. Allison</td>
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<tr>
<td></td>
<td></td>
<td>Department of Political Science</td>
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</tbody>
</table>
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### Oral Presentation Session K – HUB, Room 367, 12:00pm - 1:00pm

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<th>Project Title</th>
<th>Faculty Mentor(s)/ Department</th>
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</thead>
<tbody>
<tr>
<td>Carlos Rivas</td>
<td>Spenser’s Use of Structural Patterns in the Landscape of the <em>The Faerie Queene</em></td>
<td>Heidi Brayman Hackel  &lt;br&gt;Department of English</td>
</tr>
<tr>
<td>Art History/Religious Studies/ English</td>
<td></td>
<td>Conrad Rudolph  &lt;br&gt;Department of Art History</td>
</tr>
<tr>
<td>Joshua F. Wiley</td>
<td>Effects of Personality and Occupation on Alcohol Consumption</td>
<td>Howard Friedman  &lt;br&gt;Kate Sweeney  &lt;br&gt;Department of Psychology</td>
</tr>
<tr>
<td>Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phillip Lee</td>
<td>Bills in the Trenches: Politics and the Evolution of Legislation</td>
<td>Juliann E. Allison  &lt;br&gt;Department of Political Science</td>
</tr>
<tr>
<td>Political Science/ Public Policy</td>
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### Oral Presentation Session L – HUB, Room 379, 12:00pm - 1:00pm

<table>
<thead>
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<th>Presenter(s)/ Major</th>
<th>Project Title</th>
<th>Faculty Mentor(s)/ Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>William McLaren</td>
<td>Electrochemical Changes in Soil Caused by Tungsten Adsorption</td>
<td>Christopher Amrhein  &lt;br&gt;Department of Environmental Sciences</td>
</tr>
<tr>
<td>Environmental Science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daniel Wasik</td>
<td>Behavioral adaptations of Houseflies (<em>Musca domestica L.</em>) to avoid the insecticide imidacloprid</td>
<td>Alec Gerry  &lt;br&gt;Department of Entomology</td>
</tr>
<tr>
<td>Environmental Science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Julie Escalera</td>
<td>Using Reclaimed Water for Irrigation</td>
<td>Christopher Amrhein  &lt;br&gt;Department of Environmental Sciences</td>
</tr>
<tr>
<td>Soil Science</td>
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Oral Presentation Sessions

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Oral Presentation Session M – HUB, Room 355, 1:00pm - 2:00pm

<table>
<thead>
<tr>
<th>Presenter(s)/ Major</th>
<th>Project Title</th>
<th>Faculty Mentor(s)/ Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abie Irabor</td>
<td>The Sexualized African American Woman</td>
<td>Caroline Tushabe</td>
</tr>
<tr>
<td>Media and Cultural Studies</td>
<td></td>
<td>Department of Women’s Studies</td>
</tr>
<tr>
<td>Sharon Chan</td>
<td>Cerine: A Young-Adult Novel</td>
<td>Christopher Abani</td>
</tr>
<tr>
<td>Creative Writing</td>
<td></td>
<td>Susan Straight</td>
</tr>
<tr>
<td>Chardae Chou</td>
<td>Saving Riverside Chinatown: Redefining Identity in Asian-American Communities</td>
<td>Scott Fedick</td>
</tr>
<tr>
<td>Media and Cultural Studies</td>
<td></td>
<td>Department of Anthropology</td>
</tr>
<tr>
<td>Christina Hwee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Political Science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kimberly Zarate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anthropology/ Film and Visual Culture</td>
<td></td>
<td></td>
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<tr>
<td>Teresa Tran</td>
<td></td>
<td></td>
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<tr>
<td>English</td>
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Oral Presentation Session N – HUB, Room 367, 1:00pm - 2:00pm

<table>
<thead>
<tr>
<th>Presenter(s)/ Major</th>
<th>Project Title</th>
<th>Faculty Mentor(s)/ Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amanda Vickers</td>
<td>Why Does it Take So Long to Execute a Condemned Inmate on Death Row?</td>
<td>The Honorable Dallas Holmes</td>
</tr>
<tr>
<td>Political Science</td>
<td></td>
<td>John Laursen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Department of Political Science</td>
</tr>
<tr>
<td>Meng Yuan</td>
<td>A Two-Dimensional Analytical Model of Uyghur Separatism</td>
<td>Juliann E. Allison</td>
</tr>
<tr>
<td>Political Science</td>
<td></td>
<td>Yuhki Tajima</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Department of Political Science</td>
</tr>
<tr>
<td>Teresa Yates</td>
<td>Adultery in Athens during the 5th and 4th Centuries B.C.</td>
<td>Thomas Scanlon</td>
</tr>
<tr>
<td>Classical Studies</td>
<td></td>
<td>Wendy Raschke</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Department of Comparative Literature and Foreign Languages</td>
</tr>
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### Oral Presentation Session O – HUB, Room 379, 1:00pm - 2:00pm

<table>
<thead>
<tr>
<th>Presenter(s)/ Major</th>
<th>Project Title</th>
<th>Faculty Mentor(s)/ Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Martha Sosa</td>
<td>Importance of Mass Transfer at the Vascular Endothelium</td>
<td>V.G.J. Rodgers Department of Bioengineering</td>
</tr>
<tr>
<td>Bryan Goldsmith</td>
<td>The Synthesis and Characterization of Ni80Fe20/Cu Multilayer Nanowires</td>
<td>Nosang Myung Department of Chemical Engineering</td>
</tr>
<tr>
<td>Eric Gutierrez</td>
<td>Measuring the Final Rise of Pollution Emitted from a Stationary Point Source</td>
<td>Marko Princevac Department of Mechanical Engineering</td>
</tr>
</tbody>
</table>

### Oral Presentation Session P – HUB, Room 355, 2:00pm - 3:20pm

<table>
<thead>
<tr>
<th>Presenter(s)/ Major</th>
<th>Project Title</th>
<th>Faculty Mentor(s)/ Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jesse Driebusch</td>
<td>Ethics: the Impossible Luxury</td>
<td>Michael Jayme Department of Creative Writing</td>
</tr>
<tr>
<td>Michelle Leal</td>
<td>Mandragora</td>
<td>George Haggerty Department of English</td>
</tr>
<tr>
<td>Amelia Warinner</td>
<td>Men are (Better) Women? Complexities and Concepts in Cross-Cultural Gender Research</td>
<td>Caroline Tushabe Department of Women’s Studies</td>
</tr>
<tr>
<td>Andrew Ojeda</td>
<td>Differential Treatment: The Enforcement of American Sodomy Laws</td>
<td>Molly McGarry Department of History</td>
</tr>
</tbody>
</table>
Each oral presentation is allocated 15 minutes, including a three to five minute question and answer period. The session is moderated by a UCR faculty member or graduate student. Student participants and guests are asked to adhere to general guidelines of conference etiquette and not enter or leave the room during a presentation.

PowerPoint set-up is from 7:30am-8:00am for all sessions. If you cannot load your presentation at that time, you will have a couple of minutes between sessions.

### Oral Presentation Session Q – HUB, Room 367, 2:00pm - 3:00pm

<table>
<thead>
<tr>
<th>Presenter(s)/ Major</th>
<th>Project Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Jennifer Barr</td>
<td>Issues of Drinking Water Quality in India</td>
<td>Sally Ness Department of Anthropology David Cwiertny Department of Environmental Engineering</td>
</tr>
<tr>
<td>Amanda Suplee</td>
<td>Childhood Grief: A Review of Literature and Personal Experiences</td>
<td>Robin DiMatteo Kate Sweeney Department of Psychology</td>
</tr>
<tr>
<td>Brittnee Meitzenheimer</td>
<td>The Mismeasure of Black Men: Shortcomings in Feminist Struggle for Social Transformation</td>
<td>Caroline Tushabe Department of Women’s Studies</td>
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</tbody>
</table>

### Oral Presentation Session R – HUB, Room 367, 2:00pm - 3:20pm

<table>
<thead>
<tr>
<th>Presenter(s)/ Major</th>
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</thead>
<tbody>
<tr>
<td>Danielle Wickman</td>
<td>Variation in swimming performance in relation to sex, sexually selected traits, and reproductive allocation</td>
<td>David Reznick Ted Garland Department of Biology</td>
</tr>
<tr>
<td>Gabriel Lopez</td>
<td>Evolutionary History of Antibiotic Resistance in Bradyrhizobia japonicum</td>
<td>Joel Sachs Department of Biology</td>
</tr>
<tr>
<td>Akshay Patil</td>
<td>Colorimetric and fluorescence detection of volatile organic compounds using electrospun nanofibers</td>
<td>Quan Jason Cheng Department of Chemistry</td>
</tr>
<tr>
<td>Christopher Hare</td>
<td>Evaluation of Estrogenicity of DDT and DDT metabolites in Rainbow Trout (Oncorhynchus mykiss)</td>
<td>Daniel Schlenk Department of Environmental Sciences</td>
</tr>
</tbody>
</table>
## Poster Presentation Session

During the 60-minute poster session, all student presenters stand by their poster displays and are available to discuss their projects and answer questions.

Set-up is from 7:30am-10:45am, **Session Time: 11:00 am – 12:00 noon, Room 302 South**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>BCOE #1</td>
<td>Taysir Awad</td>
<td>Biologically Mediated Synthesis of Zinc Oxide</td>
<td>David Kisailus, Department of Chemical and Environmental Engineering</td>
</tr>
<tr>
<td>BCOE #2</td>
<td>Christian Contreras</td>
<td>Cost Reduction Techniques for Proton Exchange Membrane Fuel Cells</td>
<td>Yushan Yan, Department of Chemical and Environmental Engineering</td>
</tr>
<tr>
<td>BCOE #3</td>
<td>Theodore Ha</td>
<td>Quantitatively Determining the Ion Binding of Bovine Serum Albumin Using the Distribution Method</td>
<td>V. G. J. Rodgers, Department of Bioengineering</td>
</tr>
<tr>
<td>BCOE #4</td>
<td>Christopher Hale</td>
<td>The Effects of Proton Pumping on the Osmotic Pressure of Macromolecular Crowded Environments</td>
<td>V. G. J. Rodgers, Department of Bioengineering</td>
</tr>
<tr>
<td>BCOE #5</td>
<td>Steven Herrera</td>
<td>Geometric Characterization and Structure-Property Relationships in a Heterogeneous Impact-Tolerant Biomineral</td>
<td>David Kisailus, Department of Chemical and Environmental Engineering</td>
</tr>
<tr>
<td>BCOE #6</td>
<td>Parham Javadinajjar</td>
<td>Photochemical Disinfection of Pathogens: Role of Bacterial Extracellular Polymeric Substances (EPS) Coverage</td>
<td>Sharon L. Walker, Department of Chemical and Environmental Engineering</td>
</tr>
<tr>
<td>BCOE #7</td>
<td>Wesley Jones</td>
<td>Evaluation of Estrogenicity of Selected Pesticides, Alkylphenol Polyethoxylates and the Mixture</td>
<td>Daniel Schlenk, Department of Environmental Sciences</td>
</tr>
<tr>
<td>BCOE #8</td>
<td>Pamela Jreij</td>
<td>Significance of Electrostatic Properties of M cells with Respect to Microparticle Uptake</td>
<td>V. G. J. Rodgers, Department of Bioengineering, David Lo, Division of Biomedical Sciences</td>
</tr>
<tr>
<td>CHASS #9</td>
<td>Konstantin Tskhay</td>
<td>Linguistic Accents, Depression, and Anxiety</td>
<td>Angela Minh-Tu Nguyen, Verónica Benet-Martinez, Department of Psychology</td>
</tr>
<tr>
<td>CHASS #10</td>
<td>Mark Anderson</td>
<td>Generation Status and Interracial Marriage Attitudes</td>
<td>Angela-Minh Tu Nguyen, Verónica Benet-Martinez, Department of Psychology</td>
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<tr>
<td>CHASS #11</td>
<td>Alan Carrizo</td>
<td>Conscientiousness and College Class-Level Differences</td>
<td>Angela-Minh Tu Nguyen, Verónica Benet-Martinez</td>
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<tr>
<td>CHASS #12</td>
<td>Margo Gregor</td>
<td>Childhood Trauma, Alexithymia, and Problematic Internet Use in Young Adulthood</td>
<td>Tuppett Yates</td>
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<tr>
<td>CHASS #13</td>
<td>Lanna Ho</td>
<td>Personality as a Determinant of Self-Esteem and Self-Efficacy</td>
<td>Curt Burgess</td>
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<tr>
<td>CHASS #14</td>
<td>Daniel Khafi</td>
<td>The Effects of Caffeine and Nicotine on Learning</td>
<td>Aaron Seitz</td>
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<tr>
<td>CHASS #15</td>
<td>Stacey Acevedo</td>
<td>Using a Computational Model to Assess Personality in Fictional Narrative</td>
<td>Curt Burgess</td>
</tr>
<tr>
<td>CHASS #16</td>
<td>Krystal Tran</td>
<td>A Computational Approach to the Comparative Analysis of Religious Concepts</td>
<td>Curt Burgess</td>
</tr>
<tr>
<td>CNAS #17</td>
<td>Mackenzie Alvarez</td>
<td>A Novel Synthesis of Cannabinoids Allowing Customization of the Side Chain</td>
<td>Michael J. Marsella</td>
</tr>
<tr>
<td>CNAS #18</td>
<td>Tokunbo Ayeni</td>
<td>Using <em>in vivo</em> and <em>in vitro</em> models to identify the consequences of manipulating chemokine and immune response genes during CNS neuroinflammation</td>
<td>Monica J. Carson</td>
</tr>
<tr>
<td>CNAS #19</td>
<td>Kameron Black</td>
<td>The Evolutionary Breakdown of Symbiotic Cooperation between strains of <em>Bradyrhizobium japonicum</em> and their plant hosts</td>
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</table>
| CNAS #20 | Michael Cervantes | High content live cell imaging of *Plasmodium falciparum* using RNA probes for high-throughput antimalarial drug discovery | Karine Le Roch  
Serena Cervantes  
Jacques Prudhomme  
Department of Cell Biology and Neuroscience |
| CNAS #21 | Jorge Garcia | Design and Synthesis of Novel Anandamide and Tetrahydrocannabinol | Michael J. Marsella  
Department of Chemistry |
| CNAS #22 | Janel Gracia | Synthetic Analogs of Anandamide and Tetrahydrocannabinol | Michael J. Marsella  
Department of Chemistry |
| CNAS #23 | Melissa Gray | Synthesis of P$_2^+$ and P$_2^{++}$ Fragments Stabilized by Nitrogen Heterocyclic Carbene (NHC) and Cyclic Alkyl Amino Carbene (CAAC) | Guy Bertrand  
Department of Chemistry |
| CNAS #24 | Magdalene Moy | A Study of Mating Behavior and Inbreeding Avoidance in *Drosophila melanogaster* | Leonard Nunney  
Department of Biology |
| CNAS #25 | Justin Richardson | Soil Respiration along a 3000 m Elevation Gradient | Darrel Jenerette  
Department of Botany and Plant Sciences |
| CNAS #26 | Himelda Rivera | Physician Communication and Patient Outcome: A Meta-Analysis | Robin DiMatteo  
Department of Psychology |
| CNAS #27 | Nicole Tarui | Life Histories of Fish in the Subgenus *Mollenesia* | David Reznick  
Mark Springer  
Department of Biology |
| CNAS #28 | Erik Velez | Determination of the Heparin Binding Affinity of Bacteriophage Qβ through Affinity Capillary Electrophoresis | Cynthia Larive  
Department of Chemistry |
| CNAS #29 | Monique Williams | Conventional and Electronic Cigarettes (E-cigarettes) Have Different Smoking Characteristics | Prue Talbot  
Department of Cell Biology and Neuroscience |
Using a Computational Model to Assess Personality in Fictional Narrative

Stacey Acevedo, Psychology
Krystle Tran, Psychology
Michelle Morris, Anthropology
Mentor: Curt Burgess
Department of Psychology

Religious texts have, at times, provided a source of conflict due to the ambiguity in the narrative or inherently conflicting information. For example, hate groups have used passages in the Christian Bible as a justification of their racist positions. Inconsistent positions have been taken on the proper role of women in culture. This research investigated a novel use of a computational model of semantic memory to assess if the personality characteristics of characters in a *Twilight* novel that were generated by the model, were consistent with those of expert human raters. The Hyperspace Analogue to Language (HAL) is a computational model of semantics that can learn what words mean by the regularities of their use in language. The model can compute a measure of similarity between words. These similarity metrics can also be used to compute semantic neighborhoods for concepts. The model was used to provide a clear operational definition for what words mean and how context contributes to the learning. The study consisted of comparing the semantic distances between a character’s name and personality characteristics that were judged to be congruent. These results will be discussed in the context of what personality is from a cognitive psychological perspective.

Augustan Propaganda in Monumental Artwork

Alison Adams, Classical Studies
Mentor: Wendy Raschke
Department of Comparative Literature

Following a period of political unrest, around 27 BC, the adoptive son of Julius Caesar altered the structure of power within the Roman government. With the titles, *princeps* and *imperator* granted to him, this man, Octavian or Augustus as he was later known was able to establish a system of sole rulership or the *Principate*. Despite this power, it was necessary for Augustus to be cautious of embodying it, since it was a period of transition from the Republic to the rule of an emperor. He also mastered the usage of political propaganda for the benefit of supporting his right to rule through lineage, glorifying his victories, and justifying his appointed status. This paper examines several pieces of monumental artwork from the Augustan Empire, including the Augustan Forum, *Ara Pacis*, and the Augustus of Prima Porta. Through an analysis of these three works within their historical context it is apparent that Augustus was a master of political propaganda, especially when using art as public display of his justified power. Specifically, the Augustus of Prima Porta, a statue of the emperor, embodies this notion. It exemplifies his lineage and war victories creating an overall sense of his right to rule, and is a key piece of art in his building program that supported his political agenda concerning *pietas*, which is, respect for the fatherland, family and gods.

Synthesis and Design of Anandamide Analogs
(Cancelled)

Beheya Ahmed, Interdisciplinary Studies
Mentor: Michael J. Marsella
Department of Chemistry

The cannabinoid receptors CB1 and CB2 are a class of G-Protein coupled receptors present in the brain and immune system, respectively. CB1 and CB2 receptors posses various physiological roles in modulating neurotransmission, and their ligands (cannabinoids and endocannabinoids) have proven pharmacological benefits. The potency of the cannabinoids/endo-cannabinoids is dependant on their affinity and selectivity to the receptor. Tetrahydrocannabinol (THC), a cannabinoid which acts as a CB1 receptor agonist, produces analgesic and anti-
emetic responses. It has been shown that THC mimics some of the pharmacological actions of anandamide, an endogenous cannabinoid neurotransmitter. Unlike THC, the pharmacological effects of anandamide are short-lived. Anandamide remains active only for 30 minutes before it is degraded by the fatty acid amide hydrolase (FAAH) enzyme, which causes anandamide to have poor affinity for its receptor. To further investigate the pharmaceutical application of anandamide, the development of a potent and stable analog is necessary. We are currently designing metabolically stable anandamide analogs that will result in increased affinity to the cannabinoid receptor and potentiate the effects of naturally occurring anandamide. Our goal of developing a stable anandamide analog will provide insight about the structure-activity relationship (SAR) of cannabinoid receptor ligands which can be used in future studies, in order to further investigate the pharmaceutical applications of cannabinoids.

**Gender Divide in Video Games: Gender Equity**

Kevin Alvarez, Women's Studies  
*Mentor: Caroline Tushabe*  
Department of Women’s Studies

The video game industry is one of the fastest growing entertainment industries that specifically target male audience. Recently, however, women have emerged as important consumers as they are introduced to video games at an early age or by their partners. Even so, good role models in video games enforce male power and male generated stereotypes of women as exploited sex symbols. Women characters are not incorporated into many titles and are shown as lacking to play, thus, used as “side characters” and considered unimportant as is evident in *Crackdown 2*. Playable female characters are often unrealistic and most do not make it to the final version of the game. *GameInformer* Magazine claims that many female characters often do not make it as playable characters because of cost, the “complexity” of making female characters, and the lack of knowledge of female anatomy. Most video game companies are male dominated and have minimal amount of female programmers. Consequently, women are excluded from the science and technology of video games because of gender expectations and the traditional occupations associated with gender. This paper will demonstrate the sexism and sexual symbolim involved in the video game industry and the industry’s marketing of the female body only as inferior supporting characters compared to their male counterparts. I will argue for the presence and knowledge of women programmers in the video game industry to increase the quality of female characters and to create gender equity in realistic gaming experience.

**A Novel Synthesis of Cannabinoids Allowing Customization of the Side Chain**

Mackenzie Alvarez, Biological Sciences  
*Mentor: Michael J. Marsella*  
Department of Chemistry

The alkyl side chain of cannabinoids is known to be crucial to the potency and effect of bioactive cannabinoids such as THC. Structure activity relationship experiments have been performed, but due to the difficulty of effectively modifying the side chain, very few of these studies have been performed and the results are often contradictory. Here we report a novel synthesis of cannabinoids in which the side chain is added at a later step in the reaction. The advantage of this approach is that starting materials are readily available, or can be easily synthesized. The synthetic methodology applies to both THC (a psychoactive cannabinoid) as well as CBC, a cannabinoid with activity against MRSA (Methicillin-resistant Staphylococcus aureus).
**Generation Status and Interracial Marriage Attitudes**

Mark Steven Anderson, Psychology  
*Mentors:* Angela-Minh Tu Nguyen  
Verónica Benet-Martinez  
Department of Psychology

This study is aimed at further understanding attitudes towards interracial marriages, and its relationship with generation status and propinquity. Our hypothesis is that successive generations will be positively related to positive attitudes towards interracial marriages and that increased propinquity to other Vietnamese Americans will be associated with positive attitudes towards same-ethnic marriages. Participants were 248 Vietnamese-American undergraduate students. They completed a survey packet with questions about their attitudes towards interracial marriage, generation status, and community composition. Results show that successive generations have more positive attitudes towards interracial marriages, whereas higher propinquity to other Vietnamese Americans relates to more positive attitudes towards same-ethnic marriages. As ethnic minorities spend more time in the U.S., interracial relationships are inevitable. Positive attitudes of young individuals are important as they may predict future mate selection. Also, attitudes predicting same-ethnic marriages and interracial marriages might be influenced by different factors.

**Assessing Economic Distress in Riverside**

Kristina I. Asamsama, Political Science/International Affairs  
Jacqueline Banks, Statistics  
Elaine Cheung, Political Science/International Affairs  
*Mentors:* Subir Ghosh, Department of Statistics  
Karthick Ramakrishnan, Department of Political Science

The current economic crisis has had a significant toll on the community in Riverside, CA, but it is hard to determine the extent to which the community has suffered, economically, because of the lack of a systematic database to compare the level of economic distress in Riverside over time and compared to other counties. Our research aims to analyze what we believe to be indicators of economic distress: Homelessness and unemployment rates. Also, we want to look deeper into the services that the community provides. Thus our research questions are: What are some quantitative variables that are indicative of economic distress in the Riverside Community? How do the services provided by the First Congregational Church; including Project Food, KID, and SRHC; compare to the previous findings about the economic state of Riverside. Furthermore, How can these services be better documented to improve our assessment of the state of economic distress in the community? In our research we will attempt to create a systematic way of collecting data from the services provided by the First Congregational Church and we will use this data as representative of the services provided by the community to aid those suffering from economic distress. This project is a collaborative, interdisciplinary endeavor; therefore it will be approached from both a political and a statistical perspective.

**Biologically Mediated Synthesis of Zinc Oxide**

Taysir Awad, Biological Sciences  
*Contributor:* Mandeep Kular  
*Mentor:* David Kisaillus, Department of Chemical and Environmental Engineering

Biological organisms have evolved in a way to allow them to naturally synthesize intricate skeletal materials at low temperature and under benign conditions. This finely tuned process is orchestrated through precise organic-inorganic interactions that facilitate nucleation and growth of nanoscaled mineral. We are currently utilizing similar processes in order to produce nanostructured materials with controlled size, shape and phase. Our project is broken into two main facets: (1) heterogeneous nucleation of Zinc Oxide (ZnO) on a gold (Au) in order to better understand the crystal nucleation process of ZnO, and (2) homogenous precipitation, in which we control the nucleation and growth processes by using biomediated control. The first
aspect of the process involves developing synthesis conditions for ZnO and the in-situ monitoring (via atomic force microscopy) of ZnO synthesized on a Au wafer (1) at low temperatures and under neutral solution conditions. The second aspect involves synthesizing ZnO (1) in the presence of amino acids with different “R” groups (hydrophilic, hydrophobic, acidic and basic), (2) at low temperatures, and (3) a range of pH’s in order to exert kinetic control of the crystal growth process. Initial results show that L-Histidine and L-Cysteine have significant effects on crystal morphology and are subsequently studied. This research will help us further utilize the mineral-specific interactions that occur in nature so that we can synthesize advanced functional materials in a more cost efficient and environmentally friendly way.

**Using *in vivo* and *in vitro* models to identify the consequences of manipulating chemokine and immune response genes during CNS neuroinflammation**

Tokunbo Ayeni, Biology
Amelia Lipscomb, Neuroscience
*Contributors*: Joe Elsissy, Angie Garcia
*Mentor*: Monica J. Carson
Division of Biomedical Sciences

Interactions between the central nervous system (CNS) and the immune system are essential to maintain optimal brain function during health and after injury or infection by pathogens. Chronic and/or dysregulated interactions between the CNS are hypothesized to contribute to the onset and progression of multiple neurologic disorders including Alzheimer’s disease. In our lab, we are focusing on the role of two molecules: 1) CCL21, a chemoattractant molecule that recruits and retains T cells and dendritic cells in the CNS, and 2) Tmem176b, a tetraspan membrane protein that is expressed by macrophages in the CNS during acute neuro-inflammatory conditions that successfully resolve. Our hypothesis is that failure to express sufficient Tmem176b may contribute to the transition of beneficial acute inflammation to detrimental chronic inflammation. We can test whether Tmem176b expression is correlative or causative in the resolution of neuroinflammation by testing *in vitro* if Tmem176b alters macrophage activation and by testing *in vivo*. *In vitro*, we have cultured two types of macrophage cell lines. RAW cells which are immortalized peripheral macrophage cells and BV-2 cells which are immortalized microglia. Microglia are a type of macrophage that is specific to the CNS. We have prepared maxipreps of Tmem176b expression plasmids that when transfected into RAW and BV-2 cells results in the over expression of Tmem176b. Because the plasmid also contains the reporter molecule, green-fluorescent protein (GFP), we can detect the cells which were successfully transfected. Using this tools, we have discovered that over-expression of Tmem176b promotes apoptosis of both macrophage and microglia-like cells. We can also test the function of Tmem176b *in vivo* by overexpressing Tmem176b in mouse models where we selectively promote inflammation by transgenically manipulating expression of CCL21. For this purpose we are breeding and genotyping four types of mice: a) wild-type expression of CCL21 throughout the body, b) lack expression of CCL21 (plt/plt CCL21 knock-out mice), c) selective expression in the pancreas (Ins-CCL21 transgenic mice), and d) selective expression in the brain (GFAP-CCL21 transgenic). As part of this portion of our studies, we have learned to use PCR based methodologies to determine the presence or absence of specific endogenous genes (CCL21) or transgenes (Ins-CCL21 and GFAP-CCL21).

**Issues of Drinking Water Quality in India**

Jennifer Barr, Anthropology/Creative Writing
*Mentors*: Sally Ness, Department of Anthropology
David Cwiertny, Department of Environmental Engineering

Around 37.7 million Indians are afflicted with waterborne diseases each year. Thirty percent (30%) of urban households and 90% of rural households in India rely entirely on untreated drinking water, depending on surface and ground water sources contaminated by the results of poor sanitation and waste disposal. Poor water quality has had far-reaching
consequences and causes in Indian society, not only in the areas of health, but social inequality, politics, economics, religion and education. Studying the issue from a cultural angle gives insight to the ways in which people interact with water and thus acquire waterborne diseases: the way they cook with it, bathe in it, how much they drink, and individuals’ differential access to it. A wide variety of factors lead to different exposures to different sorts of pollutants and a population’s tolerance or resistance to them. Solutions for water quality issues in the developing world, to be practical, must be cheap, available, and effective for the water quality issues present in the area. This project is a multi-disciplinary research paper that seeks to combine a range of disciplinary approaches to better understand causes, effects, and solutions involved with drinking water quality issues in India. In particular, it emphasizes the importance of interdisciplinary approaches in designing and implementing effective water treatment.

Competitive interactions between male Anna’s hummingbirds (Calypte anna):
understanding the roles of morphology, power margins, and behavior in predicting dominance

Adam Behroozian, Interdisciplinary Studies
Mentor: Douglas Altshuler
Department of Biology

Anna’s hummingbirds (Calypte anna) exhibit extreme levels of aggression, often displayed during competitive bouts between males defending territories. Very little is known about how these aerial dogfights play out or what characteristics successfully predict the victor of these competitions. Evidence suggests that factors such as morphology (ie: wing length, wing area, body mass), available power levels, and maneuverability may play a role in determining the outcome of these competitions. We are also largely unsure of how competitive interactions change over the course of single long bouts or multiple bouts across many days. In order to understand the interface between dominance and morphology, power margins, and maneuverability we staged a series of competitive interactions between two pairs of male Calypte anna hummingbirds. The trials were conducted in a 10’x10’x5’ cage with restricted access to a single feeder. Each pair was tested during four consecutive days. Morphological measurements were made with an instrumented perch and photos were taken to determine the morphology of the bird’s wing. Loadlifting trials were performed to determine minimum, maximum, and excess power outputs of each bird. Maneuverability was tracked by a multi camera tracking system in three axial and two torsional ranges of motion. We recorded the intensity of the competitive interactions, evaluated the overall intensity of the two hour trial, and identified the dominant bird.

Electrostatic Contribution of Nanoparticles for Immunization of the Mucosal System

Kaila M. Bennett, Bioengineering
Mentors: Thejani E. Rajapaksa, David D. Lo
Department of Biomedical Sciences
V.G.J. Rodgers
Department of Bioengineering

The mucosal immune system acts as a protective barrier against invading pathogens. Within the epithelium, specialized M-cells recognize and capture viruses and bacteria and transport them across the barrier to underlying immune cells, to induce protective immunity. In order to combat mucosal infections, vaccine therapeutics must be targeted to M-cells, so that effective immunity can be generated. Recent studies have focused on investigation of polymer-based nanoparticles as possible needle-free vaccines for the mucosal immune system, however little attention has been focused on understanding their intrinsic electrostatic properties. The analysis presented here will give insight into the modulation of the electrostatic properties of poly (lactic-co-glycolic) acid (PLGA) to increase uptake by mucosal M-cells. Zeta potentials were measured in order to help quantify electrostatic contributions of various bacterial strains and PLGA nanoparticles loaded with our recombinant protein at a range of ionic strength and pH. Results showed that PLGA nanoparticle had highest zeta potentials and highest electrostatic potential at low ionic strength conditions, and at physiological pH.
Bacterial strain surface charge was only slightly affected by ionic strength, and low pH conditions. Results more importantly helped to show that PLGA nanoparticle surface charge could be modulated to mimic bacterial surface charge to ultimately increase uptake by M-cells. Studying the electrostatic properties of nanoparticles can give a better understanding of functionality of M-cells to ultimately aid in designing efficient and effective mucosal vaccine vehicles.

**Fluctuation Induced Forces Between Foreign Objects in a Biological Membrane**

Nancy Bernal-Flores, Physics  
Co-authors: Eugina Olivas, Chemistry/Physics  
Hector Garcia, Physics  
Kriti Dube, Mathematics  
Dong Gui, Physics  
Hsiang Ku-Lin, Physics  
Contributors: Umar Mohideen, Leonid Pryadko  
Mentor: Roya Zandi  
Department of Physics and Astronomy

The biological lipid bilayer membrane provides the stage for vital surface cellular processes, such as endocytosis and vesiculation. A number of recent simulations indicate the presence of attractive forces between inclusions embedded in a lipid membrane. The focus of these simulations has been on the forces associated with the elastic energies; in particular, on the forces mediated by the membrane curvature (Benidict J. Reynwar et al, 2007). The goal of our research is to show that the interaction between membrane inclusions is a consequence of the thermal fluctuations of the lipid membrane. We examine the trajectories and interaction of glass and polystyrene microspheres over a free standing bilayer membrane using fluorescence-interferometry methods. These observations provide information for analysis of relevant physical factors such as membrane curvature, electrostatic and Casimir forces, Brownian motion, and thermal lipid bilayer perturbation interactions. Results suggest that fluctuation induced forces may lead to a microsphere bound-system formation and microsphere aggregation. Future experiments are under development to test interactions between foreign objects such as viruses and various kinds of proteins embedded in the surface of lipid membranes.

**The Evolutionary Breakdown of Symbiotic Cooperation between strains of Bradyrhizobium japonicum and their plant hosts**

Kameron Black, Neuroscience  
Mentor: Joel Sachs  
Department of Biology

Symbiotic relationships among plants and many other living organisms serve as necessary roles in human life. Many of them benefit us in digesting foods and processing key nutrients, while others aid in the success of major cash crops. Yet a significant amount of these beneficial ties have been found to transform into uncooperative and even pathogenic bacterial strains. These evolutionary transitions can have devastating effects on symbiont-dependent activities. Such effects can include harmful crop yield reductions and emergent human pathogenesis. The evolutionary origins and genetic causes of these harmful transitions have not yet been discovered and therefore my work will involve investigating questions such as: “With what frequency do these transitions occur in nature?”, “Are there specific parts of the bacterial ‘evolutionary tree’ in which strains lose their symbiotic ability?”, and “What conditions allow for these transitions to occur?” The methods for investigating these questions involve attaining a sufficient model for the observations. This has been found in the strain Bradyrhizobium japonicum and its interaction with a bean plant host, Lotus Strigosus. Upon acquisition of a number of wild strains of the bacteria, the genomes of the strains will be sequenced through methods of archiving, extraction and replication of the DNA. After the data has been collected, analysis of the information should correlate with certain expected outcomes such as a degradation or loss of the bacterial symbiosis loci. In addition, an in vitro analysis of the bacterial response to living conditions absent from a plant host will be carried out. The targeted outcome of these tests is to observe whether the bacterial symbiosis
gene, when the bacteria are supplied with a sufficient amount of resources thereby lacking the need to receive nutrients from a symbiotic plant host, will lose function or undergo degradation. The results from this experiment, will add to the overall understanding of symbiotic relationships and their ability to make harmful evolutionary transitions toward parasitic relationships. Do these transitions commonly occur in nature? What are the conditions under which this occurs? Is it only in certain parts of the bacterial ‘evolutionary tree’ where strains are losing this ability?

Marine Natural Compounds as New Drug against Malaria

Matthew Bruton, Biological Sciences  
**Mentor:** Karine Le Roch  
Department of Cell Biology and Neurosciences

The Malaria parasite infects 500 million people per year, averaging 1 million mortalities a year, predominantly children in sub-Saharan countries. The parasite, Plasmodium falciparum, has developed resistance to most available drugs, discovering new antimalarial is therefore crucial. So far, the best anti-malarial drugs have been natural derivatives as their usefulness has outlived most synthetic compounds. Exploration of natural products will most likely yield more of these potent anti-malarial capabilities. To identify new active compounds against P. falciparum, we screened a library of over 700 samples collected from the waters surrounding the Fiji Islands. We first did an initial screen using a 96-well plate assay developed in the lab. Parasite proliferation assays were measured using the DNA fluorescent dye, SYBR Green. We quantified the increase of parasite DNA in infected human red blood cells after 72 hours of incubation with our microbial extracts. The plates were frozen overnight followed by thawing and addition of lysis buffer. SYBR Green was then dispensed into each of the wells and incubated at 37°C in the dark for six hours. The plates were read with the Molecular Devices SpectraMax Gemini EM. Products that show good activity were fractionated, further screened and compared to the to IC50 curves of known anti-malarial drugs. Here we have developed a robust, cost effective and simple technique to discover new antimalarial. When combined with a similar mammalian screen, we should be able to identify parasite specific compounds.

Environmental Justice in the Inland Empire

Mayra Bueno, Sociology  
**Mentor:** Ellen Reese  
Department of Sociology

Research shows that environmental hazards tend to exist in cities, regions, states, and countries where the poor, especially poor people of color, live. This pattern is the result of “environmental racism.” The Center for Community Action and Environmental Justice (CCAEJ) has a long history of working with the community of Mira Loma, California, a predominantly Hispanic community, in the fight against environmental pollution. In collaboration with CCAEJ staff and interns, I helped to organize the following three major events/programs: (1) the second annual Environmental Justice Summit for college students, (2) the first annual Environmental Justice Summit for professors, (3) the SALTA youth program for high school students. The goals of these events are to educate the community and promote empowerment and engagement among local residents to put a stop to continued environmental racism. In preparing these events, I utilized a combination of library and internet research, along with archival materials from CCAEJ. I plan to assess the outcomes of these events through participant observation of CCAEJ and discussions with the participants, interns, and staff. By spreading awareness of environmental issues in the community, and providing opportunities for members to take action, I have collaborated in the fight for environmental justice.
Conscientiousness and College Class-Level Differences

Alan F. Carrizo, Psychology  
*Mentors*: Angela Minh-Tu Nguyen  
Verónica Benet-Martínez  
Department of Psychology

The conscientiousness personality trait can be defined as being responsible, deliberate, and organized. Many of the characteristics that shape a conscientious person are, in most cases, needed for college success. It is suggested that colleges will encourage and increase their students’ levels of conscientiousness as a response to the academic challenges presented. We hypothesize that upper-division students (juniors and seniors) will report higher levels of conscientiousness than lower-division students (freshmen and sophomores). We asked 248 college students to complete the Big-Five Inventory, which measures conscientiousness, as well as to provide the number of years they have been students at the current institution. We found that upper-division students had marginally significantly higher levels of conscientiousness than lower-division students. In other words, upper-division students are more conscientious than lower-division students. Further research is needed to understand the reasons for this difference and the role that the college education and experience may play in it.

Boys Are Different Than Girls: Cross-Cultural, Evangelical Understandings of Masculinity

Vincent Cervantes, Religious Studies  
*Mentors*: Jonathan L. Walton  
Sherri F. Johnson  
Department of Religious Studies

Within the sphere of Christianity, the Evangelical Right seeks to bring about the re-separation of gender spheres and encourage adherents to ignore societal changes regarding sex and gender roles. With its roots embedded in the historical ideologies of “Muscular Christianity” and influenced by the New Right, the Evangelical Christian Right bases masculinity on being the total separation of men from women. Drawing on the historical ideologies of the “Muscular Christianity” movement, I examine the renewed emphasis on masculinity within contemporary Evangelical religion and culture and explore the degree to which stereotypical masculine themes, roles, and ideas are expressed by evangelical media and organizations. Furthermore, I examine how this movement began as a White-male dominated movement, yet has emerged into being a cross-cultural movement in response to “White” masculinity. Based on an analysis of popular male-oriented, evangelical media (including sermons, conferences, books, magazines, etc.), I explore how a common model of “hegemonic masculinity” emerges within evangelical Christianity among Whites, African Americans, and Latinos.

High content live cell imaging of *Plasmodium falciparum* using RNA probes for high-throughput antimalarial drug discovery

Michael Cervantes, Biological Sciences  
*Mentors*: Karine Le Roch, Serena Cervantes  
Jacques Prudhomme  
Department of Cell Biology and Neuroscience

Malaria remains a major health issue in developing nations and causes more than one million deaths per year. *Plasmodium falciparum* is the most lethal strain of malaria and is responsible for up to 90% of fatalities. Drug resistant strains to common therapies exist worldwide, and Cambodia recently reported resistance to artemisinin-combination-based therapy-- the preferred and last existing effective therapy. It is imperative to obtain novel antimalarial drugs. Our collaborators purified compounds derived from Fijian red alga and we examined the compound’s antimalarial properties. We employed the Pathway HT, an inverted high-throughput confocal microscope; to analyze parasites infected red blood cells in 96-well plates. To view live parasites and examine changes in their morphology with drug exposure we used RNA binding dye 132A. Images were taken at the ring, trophozoite, and schizont stage to further understand the compound’s mode of action at each stage of the parasite’s erythrocytic life cycle. After
screening 27 compounds at varying concentrations, we found seven compounds that were effective at relatively low concentrations, displayed minimal cytotoxic effects, and arrested the parasite’s cell cycle when introduced at the trophozoite stage. This newly developed high content live cell assay further advances our field and makes screening for potential antimalarial drugs more time and labor efficient.

Cerine: A Young-Adult Novel
Sharon Chan, Creative Writing
Mentors: Susan Straight, Chris Abani
Department of Creative Writing

Cerine is a young-adult fantasy novel that I began working on for an advanced fiction workshop. I liked the idea so much that I decided to continue working on it for my Honors Thesis. The story is a coming-of-age tale about a thirteen-year old girl born into a family of female super-powered humans. The idea came out of my curiosity about the female partners of superheroes like Superman and Spider-Man. Before writing the story, I did some research into the world of superheroes and comics. Movies that focused on the way super-powered beings grappled with the outside world, such as Pixar’s The Incredibles and the recent Spider-Man films have had an influence on this story. My story follows Cerine as she learns she has abilities, and discovers the dark secrets of her family, who have had a tradition of oppressing the males in favor of the females. For this story I experimented with an omniscient third-person narrator, following the thoughts and feelings of Cerine, her Uncle Tel, and her Aunt Sylvia, who are caught up in the family’s complex hierarchy as well as the emotional damage caused by the death of Cerine’s mother, who died when she was a baby. I chose to make this a young-adult novel, as I believe this genre can cross generations, appealing to children, teens, and adults in the manner of recent Pixar films and the Harry Potter novels.

Correlations between Polymorphisms in ITS with Parthenogenesis in Nematodes
Jonathan Chang, Biological Sciences
Mentors: Paul De Ley, James G. Baldwin
Department of Nematology

Parthenogenesis is a form of asexual reproduction found in females where development of an embryo from a female gamete occurs without the contribution of a male gamete. Since parthenogenetic females produce eggs that contain full sets of chromosomes, they do not require further genetic material from males to restore ploidy. The biological consequences of parthenogenesis have been compared to sexual reproduction. While parthenogens possess the advantage of fast reproductive rates, their genetic uniformity make parthenogenetic populations more susceptible to deleterious mutations which cannot be removed or recombined in the absence of sexual reproduction. Thus, understanding parthenogenesis as a reproductive mode essentially contributes to disciplines of ecology, population genetics and evolution. However, the mechanisms which regulate parthenogenesis are not fully understood in nematodes. This project utilizes the internal transcribed spacer (ITS) region, a non-coding piece of ribosomal DNA situated between structural ribosomal RNA genes, and attempts to correlate polymorphisms in ITS with the occurrence of parthenogenetic nematodes. DNA was extracted from parthenogenetic and non-parthenogenetic nematodes. Nematode DNA was amplified using polymerase chain reaction (PCR) and appropriate primers. PCR products were purified and sequenced. Sequencing reactions were analyzed for the presence of polymorphisms. Our results indicate that ITS alone cannot determine the fate of parthenogenesis in nematodes.
Saving Riverside Chinatown: Redefining Identity in Asian-American Communities

Chardae Chou, Media and Cultural Studies
Christina Hwee, Political Science
Kimberly Zarate, Anthropology/Film and Visual Culture
Teresa Tran, English
Donna Arkee, Anthropology
Mentor: Scott Fedick
Department of Anthropology

The First Transcontinental Railroad often stands as the “most” recognized historical contribution of the Chinese in America during the nineteenth century. As migration by these Chinese laborers increased, intensified ethnic discrimination of Chinese resulted in the institution of the Chinese Exclusion Act. This act relocated thousands of Chinese, forcing them to construct Chinatowns that collectively concentrated small groups of Chinese within larger communities—including Riverside, California. Although there are currently many educational opportunities in Riverside dedicated to Riverside’s local history, preservation of the Chinatown site will ensure that future generations will have a more complete and visible perspective of early Riverside heritage and the historical contributions of the Chinese in Riverside. In 2008, the Save Our Chinatown Committee (SOCC), a grassroots community organization, formed to oppose construction of a medical building on this local heritage site. Alongside this community organization, five SOCC student researchers worked in the areas of historical research, preservation research, public relations and community outreach. These interconnected arenas allow student communities and public organizations/entities to collaborate to preserve one of the last remaining archaeological Chinatown sites in the United States. Through experiential research, the students witnessed effects of community organizing among diverse groups and addressed movements to reclaim history and redefine identity in the Asian-American community. This presentation will address how community organizing among Asian-Americans indicates a social need for increased acknowledgment of Asian contributions in local history in order to propel the larger Asian Pacific Islander awareness movement forward.

Cost Reduction Techniques for Proton Exchange Membrane Fuel Cells

Christian Contreras, Chemical and Environmental Engineering
Mentor: Yushan Yan
Department of Chemical and Environmental Engineering

Proton Exchange Membrane Fuel Cells (PEMFCs) have proven to be an alternative power source with little to no environmental repercussions. Unfortunately PEMFCs are commercially limited by the high cost of the components needed, including the catalyst. After implementing three separate projects, our laboratory developed three techniques to generate a better performing fuel cell. By improving the fabrication techniques for PEMFC’s one can improve its performance and decrease its cost. Through the use of an air brush technique, one can reduce the amount of catalyst on the Anode. Additionally by supporting Platinum on Multi-walled Carbon Nanotubes, and applying the same airbrush technique, one can reduce the amount of catalyst on the Cathode. Initial results show that decreasing the amount of catalyst used on the Anode by 90 percent produces similar results to a standard Anode, while the Carbon nanotubes increase the Mass Activity of the Cathode by 800 percent. Combining these two techniques with a pretreatment of the Membrane Electrode Assembly with an Argon feed generates Nafion™ fibers (confirmed via SEM), increasing the performance by 25 percent. Each technique is aimed at improving the performance of a fuel cell and can be used in conjunction with one another. The results of these techniques show that the performance of a PEM Fuel Cell is increased while the cost of the catalyst required is decreased by 85 percent.
The Revitalization of the Inner City: Seismic Retrofitting as a Method of Economic Development

Andres Cuervo, Political Science  
*Mentor:* Juliann E. Allison  
Department of Political Science

During the past 30 years metropolitan areas have become vital components of the U.S. economy. It is estimated that over three quarters of the population now live in cities. This has largely contributed to a staggering rise in the economy’s professional and business services, from 16.9% to 23.2% percent. With the onset of the recent economic recession however, cities are now facing severe budget revenue shortfalls and struggling to maintain essential services for their residents. California’s situation, unlike the most of the country, is exacerbated by the constant threat of catastrophic seismic shifts. Los Angeles and San Francisco alone are expected to suffer a 7.0 magnitude earthquake by 2020. I draw on current research linking methods of downtown urban development and seismic retrofitting case study data to argue that municipal investment in earthquake retrofitting programs, with the help of a more flexible state building seismic retrofitting regulation, leads to local economic revitalization.

Where to Draw the Line – Israel and Palestine in Film

Yuri Daniels, Theater/Creative Writing  
*Mentor:* Erith Jaffe-Berg  
Department of Theater

Through the films *Walk on Water* by Eytan Fox and *Paradise Now* by Abu-Assaad, Yuri Daniels analyzes the increasingly complex reality of the soldier as an integral part of the reality in the Middle East. Daniels begins by illustrating the influence of Zionism and its recreation of Jewish masculinity before addressing Palestine’s response to that encroachment and territorialism. Daniels notes how both filmmakers suggest the implicit stance that peaceful relations between Israel and Palestine depend upon the hope of personal transformation; however, there exists a blur between psychological trauma and brutal political realities, which complicate the overriding ideal to obtain peace in the Middle East. The soldiers in *Walk on Water* and *Paradise Now* are pawns of its respective ideologies and earnestly oppose the beliefs of the other, whilst using violence to justify those beliefs to overthrow; creating a catch twenty-two where both countries feel victimized. However, where does one draw the line to make both countries happy? Neither filmmaker believes their film will change anything, but rather, serve to grant international understanding to such a complicated reality.

The Theory of Intersectionality and New Coalitional Strategies Against Violence Against Women

Brenda Davila, Women’s Studies  
*Mentor:* Caroline Tushabe  
Department of Women’s Studies

In this paper I examine women’s representation in communities and social services such as shelters and hotlines to show how the legal language that is male centered and raced spills over to social services and impedes efforts to end violence against women and derails women’s coalitional organizing. For decades the women’s movement has been committed to ending violence against women through an array of strategies of which one is the legal approach. Kimberly Crenshaw uses the theory of intersectionality to show ways in which the legal language still operates on the binaries of social identities. In other words, legal language is still raced white, gendered male and nationalized American. Crenshaw argues that intersecting experiences of race, sex, gender, class and immigration ought to be simultaneously incorporated at all levels of analysis and legal language formulations to appropriately represent women of color, immigrant women and women in the legal system, social services and communities. With transformed views of women in their communities, better understanding of the interlocking social identities and inherent values of those identities could help transform legal language formulations will ameliorate demands on women to conform to gender norms. This paper will highlight the effects of gender
conformity on violence against women through social services and the language of law. I argue for different coalition strategies among women to rid their services of language that is sometimes raced, gendered and hence exclusive of some women in the fight against violence against women.

**Ethics: The Impossible Luxury**

Jesse Driebusch, Creative Writing  
*Mentor:* Michael Jayme  
Department of Creative Writing

My project is a series of three fiction short stories. For the first, sexuality is the theme. Three middle-aged men go fishing at a remote desert lake. Berry is married but has a crush on Dale. Hugh is also married and is having an affair with a minor. Dale isn’t married, albeit the only true heterosexual. The trio is altogether self-absorbed and oblivious to one another’s emotional standpoints. The second, individual-ism is the theme. This story centers around a mid-twenties male, residing in the Bay Area, who attempts to redefine his humble past by weaving a sophisticated exterior. He builds relationships in order to substantiate this identity, and fails in any real emotional understanding. And for the third, class is the theme. The setting is rural. This is the chance meeting of three individuals, just trying to survive. An elderly yet wealthy man recently divorced, a homeless girl, and a fugitive teenage boy. The boy and girl, sucked into the problematic nature of low socio-economics, find hope in one another. Survival is the necessity, and the man offering means, breaks their union. The stories’ inclusive theme is identity. My intention is to show truth through fiction. Likewise, this is a commentary on society, wherein ethics is a luxury, and motivation is either sexual or economic; both survival mechanisms. For the Symposium, I will read a strong scene from one of these stories.

**Using Reclaimed Water for Irrigation**

Julie Escalera, Soil Science  
*Mentor:* Christopher Amrhein  
Department of Environmental Science

Drought and water shortages are becoming an unavoidable crisis in arid regions. As a result, cities are considering switching agricultural irrigation over to reclaimed water to free up good quality ground water for municipal uses. However, reclaimed water can decrease hydraulic conductivity in the soil because it contains a high concentration of dissolved salts and sodium. Sodium reduces hydraulic conductivity by dispersing clay particles in the soil thus reducing the amount of pore space available. Reduced water infiltration may cause ponding, root rot and damage to crops. The purpose of this experiment is to determine whether reclaimed water will reduce hydraulic conductivity in soils from Riverside. Soil with horizons of clay accumulation are expected to show a greater reduction in hydraulic conductivity. Soil was collected from a Riverside orange grove and varying depths were evaluated. Three depths located between 0-20 cm, 20-40 cm and 40-60 cm were used for the experiment. Soil from each horizon was oven dried, 2 mm sieved and 200 g packed into 15 cm PVC columns. Reclaimed water and a mix of reclaimed water with high quality groundwater were used for infiltration. Water was applied in 100 ml increments with drying cycles of 24 hours between applications to simulated field conditions. Hydraulic conductivity was determined using Darcy’s Law with a constant head model. Preliminary results show that reclaimed water can significantly decrease hydraulic conductivity on soil found in Riverside orange orchards. This suggests that farmers might have to change their irrigation practices if they are forced to use reclaimed water for irrigation.
Design and Synthesis of Novel Anandamide and Tetrahydrocannabinol

Jorge Garcia, Neuroscience
Contributor: Robert Carp
Mentor: Michael J. Marsella
Department of Chemistry

Anandamide and Δ²-THC are known to have an affinity for C₃₁ and C₃₂ receptors (C₃ = cannabinoid receptor). Anandamide is an endogenous neurotransmitter and tetrahydrocannabinol (THC) is an exogenous ligand isolated from Cannabis sativa. C₃₁ and C₃₂ receptor ligands are currently being targeted as potential drugs in the treatment of a wide range of medical conditions such as neuropathic pain, nausea and vomiting related with cancer chemotherapy, and spasticity associated with multiple sclerosis. These characteristics bring promise for future medical treatment of Schizophrenia, Alzheimer’s, and other hallucinogenic diseases. This report will focus on the design and synthesis of C₃₁ agonists and antagonists, with the goal of inducing desired therapeutic properties of endocannabinoids while minimizing the undesired psychotropic effects. The first-generation analogs will be synthesized from diones. The reaction of interest involves taking a systematic approach in order to isolate a Δ⁹-tetrahydrocannabinol analog made from R-citronellal, dimethyl acetylene decarboxylate, and other reagents. Results to date will be reported.

The Synthesis and Characterization of Ni₈₀Fe₂₀/Cu Multilayer Nanowires

Bryan Goldsmith, Chemical Engineering
Mentor: Nosang Myung
Department of Chemical Engineering

Studying the change in giant magnetoresistance by altering the structure and composition of single multilayer nanowires is critical for developing new advanced materials for future data storage and logic devices. The objective of the research was to synthesize and characterize multilayered Permalloy/Copper (Py/Cu) nanowires to measure its usefulness for possible spintronic and magnetoresistive random access memory applications. First, a single Py/Cu sulfate bath was developed for the hard-template directed electrodeposition of 200nm diameter wires. Results indicated an increase in Fe content with increasing Fe²⁺ concentration in the bath, applied potential, and length along the nanowire. Afterwards, a single electrolyte bath containing both Py and Cu was developed to deposit multilayerd Py/Cu nanowires. Structural characterization indicated a polycrystalline material with good interfacial adherence at the Py/Cu boundaries. Single Py/Cu multilayer nanowires were connected onto gold-patterned silicon wafers by an AC electrical alignment technique and subsequently had their magnetic properties measured by a Vibrating Sample Magnetometer.

Change We Need: An Examination of the Viability of Initiative Reform in California

Evan Goldsmith, Political Science/International Relations
Mentor: Ron Loveridge
Department of Political Science

California, the eighth-largest economy in the world, is on the brink of bankruptcy. It faces a massive budget deficit that seems impossible to close without reducing or eliminating social services to its nearly 37 million residents. Even if the budget deficit is closed this year, economists predict that the same problem is likely to reoccur the following year due to the perverse laws which govern the state and control its institutions. Without significant changes made quickly, the state is destined for a near total financial collapse. Are people as willing to see California undergo the reforms necessary to save the state? I draw on a variety of political theories regarding the conditions required for reform to argue that people in the state of California are not yet ready to see the much needed reforms. I create and use a dataset consisting of various beliefs held by Californian voters regarding the current economic situation to answer specific hypotheses derived from this argument. My analysis suggests that no level of reform has enough political support to be a viable option for saving the state. These findings indicate that California is likely to collapse economically in the near future.
Synthetic Analogs of Anandamide and Tetrahydrocannabinol

Janel Gracia, Biochemistry
Mentor: Michael J. Marsella
Department of Chemistry

Tetrahydrocannabinol (THC) is the main psychoactive component of *cannabis sativa* (marijuana), and an exogenous ligand that mimics endogenous anandamide (the “bliss molecule”). THC is used for its pharmaceutical effects, such as its use in Marinol® where it acts as an anti-emetic; it is also targeted for CNS disorders and pain management. The binding of THC (a CB₁/CB₂ ligand) to its receptor is key to its function. Here, the objective is to synthesize analogs of these compounds, with the goal of developing lead compounds for treatment of depression, anxiety, schizophrenia, certain dementias, and other CNS disorders. These targets include CB₁ agonists/antagonists that mimic the desirable properties of endocannabinoids without inducing unwanted psychotropic effects. The key challenge is to synthesize a common core from which many different analogs can be produced. The present strategy is a conversion of a CBC analog to THC. Results to date will be presented.

Synthesis of P₂⁺⁺ and P₂⁺⁺⁺ Fragments Stabilized by Nitrogen Heterocyclic Carbone (NHC) and Cyclic Alkyl Amino Carbone (CAAC)

Mellissa Gray, Chemistry
Contributor: Olivier Back
Mentor: Guy Bertrand
Department of Chemistry

Very recently carbenes have been used to stabilize highly reactive transient species based on main group elements. Indeed, once stabilized, conventional analysis can be used to gain more insight into their structure, but very few examples of stabilized cationic or radical fragments are known. Recently, P₂ carbone adducts containing two very electron rich phosphorous atoms have been made by using NHC and CAAC and are then prone to oxidation. Our focus is to oxidize these compounds in order to generate highly reactive and unknown P₂⁺⁺ and P₂⁺⁺⁺ fragments stabilized by carbenes and characterize them. We first synthesized the imidazolium (NHC, HCl) precursor of the free carbene according to the literature. We then checked the product by ^13^C and ^1H Nuclear Magnetic Resonance (NMR). We generated the free NHC by deprotonation of NHC, HCl with KOTBu and reacted it with PCl₃ to form a NHC-PCl₃ adduct which was then reduced using KC₈ to make NHC- P₂⁻ NHC, characterized by ^1H, ^13C and ^31P NMR. The Cyclic Voltammetry of the compound showed that it can undergo two one electron reversible oxidations. According to this analysis we will chemically carry out a one electron oxidation to generate the corresponding radical cation [NHC- P₂⁻ NHC]^⁺⁺ which will be characterized by a EPR and x-ray diffraction study. We will then oxidize NHC-P₂⁻NHC twice to get the diamagnetic dication [NHC- P₂⁻ NHC]^⁺⁺ which will be characterized by ^31P, ^13C and ^1H NMR and x-ray diffraction. Finally we will study the reactivity of this dication which is predicted to contain a highly reactive diphosphene moiety.

Childhood Trauma, Alexithymia, and Problematic Internet Use in Young Adulthood

Margo Gregor, Psychology
Mentor: Tuppertt Yates
Department of Psychology

Over the past several years, technological advances have rendered the internet increasingly accessible. This growth in internet accessibility, however, has surpassed our understanding of its developmental effects, particularly with respect to the potential for problematic or addictive use. This study builds on a small literature base, which has primarily evaluated correlates of problematic internet use (PIU). Previous research has linked maladaptive internet use to increased levels of loneliness, self-consciousness, anxiety, depression, impulsivity,
and school problems (e.g., Cao, Su, Liu, & Gao, 2007; Kubey, Lavin, & Barrows, 2001). In a few studies, however, the possible developmental pathways leading to PIU have been explored. The goals of this study were to a) examine patterns of internet use in a large college student sample, b) explore the phenomenology and development correlates of PIU, and c) test a developmental pathway model of PIU in which childhood adversity was expected to lead to increased PIU via alexithymia. Alexithymia is a specific form of emotion dysregulation that is characterized by difficulties identifying and describing feelings, differentiating feelings from bodily sensations, and engaging in creative or introspective thinking (De Berardis et al., 2009). The present study evaluated the hypothesis that childhood trauma would be related to alexithymia because trauma overwhelms developing capacities to regulate emotion and, in turn, that alexithymia would be related to an over reliance on less emotionally challenging interactions through the internet.

**Measuring the Final Rise of Pollution Emitted from a Stationary Point Source**

Eric Gutierrez, Mechanical Engineering  
*Mentor:* Marko Princevac  
Department of Mechanical Engineering

There is a need for a more in-depth understanding of the relationship between the parameters governing pollutants from a stationary point source and the ground level concentration pertaining to this pollution. If one wants to make an accurate prediction of how much pollution will reside on the ground, it is essential to have knowledge on the final vertical height (final plume rise) of the gas departing from the source. There are several factors that can influence final plume rise and, therefore, need to be taken into account in a laboratory. They are: 1) the velocity in which the gas leaves the point source (momentum rise), 2) the density difference between the gas and the ambient air (buoyancy rise), 3) the velocity of the ambient air, and 4) the turbulence intensity of the gas particles. To investigate the behavior of final plume rise under combination of these four parameters, a plume point source has been modeled in a water channel. Visualization of the pollution exhaust is conducted by using fluorescent dye. Turbulent flow is modified by altering the roughness of the ground. Plume buoyancy is achieved by mixing dye with alcohol. It was found that as the flow rate of the gas increases, final plume rise increases logarithmically. Hence, ground level concentration subsides as momentum rise increases. On the other hand, as the ambient air velocity increases, final plume rise decreases linearly; hence, ground level concentration increases. The relationship between all four factors relative to one another will be presented.

**Quantitatively Determining the Ion Binding of Bovine Serum Albumin Using the Distribution Method**

Theodore Ha, Bioengineering  
*Contributor:* Devin W. McBride  
*Mentor:* V. G. J. Rodgers  
Department of Bioengineering

The interactions between proteins and small ions have become increasingly important for biochemistry and biophysics. In biological systems, proteins have been known to combine with various molecules, such as salts, sulfonamides, dyes, alkyl sulfates, fatty acids, and aromatic compounds. These interactions are especially important for the thermodynamics of cellular systems, such as regulating cellular osmotic pressure. The binding of ions to proteins also affects the function and structure of proteins, such as the binding of calcium to calmodulin in signaling pathways. In previous studies, we have shown the significance of ion binding on the osmotic pressure of crowded protein environments. It was shown that a slight change in the number of bound ions greatly affects the osmotic pressure. The purpose of this study is to quantify the binding of ions to bovine serum albumin (BSA). To quantify the ion binding of BSA, the distribution method will be utilized. The system studied was BSA and sodium chloride. All concentrations and pH were chosen to mimic a biological system; the protein concentration range was 0-450g/L. Sodium chloride concentration was 0.15M. The pH range was 4.5 to 7.4. The ion binding dependence of pH and protein concentration was
evaluated. The ion binding of BSA was compared to ion binding values of BSA through modeling and in silico methods.

The Effects of Proton Pumping on the Osmotic Pressure of Macromolecular Crowded Environments

Chris Hale, Bioengineering
Contributor: Devin W. McBride
Mentor: V. G. J. Rodgers
Department of Bioengineering

Macromolecular crowding are solutions that contain high concentrations of proteins. These crowded protein solutions are observed in cellular systems and the concentration of total proteins range from 50-400g/L. The thermodynamics of cellular systems is extremely complex and thus, difficult to model and understand the mechanisms. However, studying the thermodynamics of crowded protein solutions in vitro can shed light onto the mechanisms. The osmotic pressure of crowded protein systems have been studied for a few proteins and it behaves non-ideally near-saturation. We developed the free solvent model which is able to predict the crowded protein osmotic pressure using only measurable parameters. The free solvent model is able to accurately predict the osmotic pressure using the protein-ion binding and protein hydration. To more accurately model the thermodynamics of cellular systems, we began to study non-equilibrium situations, such as proton and ion pumping. Proton pumping occurs in cellular systems during many processes, two of which are ATP production during cellular respiration and photosynthesis. To understand how proton pumping affects the cellular system, we study the crowded protein osmotic pressure while varying the pH. To further mimic the cellular system, we rapidly alter the pH of the solvent stream using physiological pHs; 4.5, 5.4, and 7.4. In our studies, bovine serum albumin (BSA) is the protein of interest due to the extensive literature about the physiochemical properties, ion binding, and hydration of BSA.

Colorimetric and fluorescence detection of volatile organic compounds using electrospun nanofibers

Christopher Hare, Chemistry
Co-author: Bryce Davis, Chemistry
Mentor: Quan Jason Cheng
Department of Chemistry

The development of efficient sensors for the detection of volatile organic compounds has gained attention. Conventional approaches can be time consuming, costly, and do not always result in accumulation of useful data. A quantitative approach using color and fluorescence differentiation of common volatile organic solvents has been developed. A polydiacetylene (PDA)-embedded electrospun fiber mat, prepared with 10,12 pentacosadiynoic acid-derived diacetylene monomer, displays an array of solvent sensitive color transitions when exposed to common organic solvents. The color transitions can also be measured quantitatively using fluorescence spectroscopy. The fluorescence data can be used to differentiate between solvent samples. Arrays of PDA-embedded nanofibers have been constructed by electrospinning poly(ethylene oxide) solutions containing a specific ratio of the diacetylene monomer. Unique color patterns were developed when the conjugated polydiacetylene-embedded fiber mats were exposed to vaporized organic solvents in a manner which enabled direct colorimetric differentiation of the tested solvents.

Geometric Characterization and Structure-Property Relationships in a Heterogeneous Impact-Tolerant Biominal

Steven Herrera, Chemical Engineering
Contributors: Garrett Milliron, James Weaver, Ali Miserez, Elaine DiMasi, Javier Garay, Hsiao-Yun Milliron
Mentor: David Kisailus, Department of Chemical and Environmental Engineering

Hierarchically structured biominerals are made from common and mechanically unimpressive constituents, but the spatial distribution of these elements combine to form ultrastructures which
display extraordinary mechanical properties. In the case of stomatopods, they have evolved a dactyl club capable of delivering high velocity impacts in order to break through the hard exteriors of their heavily armored prey (mollusks and crustaceans). Stomatopod dactyl clubs represent a unique biomineral that displays regional as well as multiscale ordering. By performing structural and property measurements on the mineralized dactyl club we can begin to identify structure-function relationships which can be modeled and synthesized. We have performed many measurements including SEM, EDS, RAMAN, Synchrotron X-ray diffraction, polarized light microscopy, and nanoindentation. We have begun modeling (FEM) the structures observed, and developing synthesis techniques which can recreate the observed geometries in order to create new impact-tolerant materials.

**Personality as a Determinant of Self-Esteem and Self-Efficacy**

Lannah Ho, Business Administration  
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Department of Psychology

Self-efficacy and self-esteem have been used somewhat interchangeably, where self-efficacy is the belief that one is competent enough to attain goals and self-esteem is the self evaluation of one’s self worth. However, it is more productive to think as self-efficacy as the foundation on which self-esteem builds and where personality can be a determinant of self-esteem and self-efficacy. The purpose of this study is to investigate how the personality traits of openness and agreeableness can interact in determining self-esteem and self-efficacy. Participants (384) from the University of California, Riverside completed several online tests. The analyses consisted of two- 2X2 analyses of variance. It was hypothesized and then rejected that there is an effect of agreeableness on self-esteem and self-efficacy, but there is an effect of openness. There is also an interaction such that people who are open and agreeable scored higher on self-esteem and self-efficacy. Prior research indicates personality as changeable. This research suggests who may most benefit from social skills training.

**From the Oppressed to the Oppressor: The Role Black Males Play in Oppressing Black Females**

Krystal Huff, Women’s Studies/African American Studies  
*Mentor: Caroline Tushabe*  
Department of Women’s Studies

In her article, “Heterosexualism and the Colonial/ Modern Gender System”, Maria Lugones calls into question the complicity of men of color in upholding the patriarchal system. Oyéronke Oyéwumi’s *Invention of Women* challenges gender thinking and calls for de-colonizing relations among colonized males and females. Systems of colonization and slavery drastically shifted power relations between and social status of males and females of African descent constructing them as men and women under a patriarchal system. African males and females have historically, in varied degrees, resisted violence against them consequent of the imposed colonial gender system. However, with colonial “enticements” colonized males or black men embody the assigned masculinities that have assumed infliction of violence against colonized females or black women. War, poverty, inadequate of education opportunities and lack of access to healthcare for African Americans position African Americans in ways that may seem to motivate some sense of unified critical resistance to violence. However, that is not the case, and it leaves one to ask: “why have the African American males been so largely receptive of the violent masculine roles in the patriarchal system? Why do they participate in the oppression of half of their people? This paper argues for new masculinities that defy violence against black women, based on the historical understanding that African slaves came from parts of Africa where there was no gendered system that organized relations or social roles, and in fact, during slavery enslaved males and females were treated as things and property without gender.
The Sexualized African American Woman

Abie Irabor, Media and Cultural Studies
Mentor: Caroline Tushabe
Department of Women’s Studies

This paper examines how the over sexualization of African American women in the media further marginalizes them in society. African American women have been portrayed in music videos, movies and even advertisement magazines as sexual beasts and women without sexual control. Given the historical construction of African American bodies, African American communities and individuals have, since the Civil Rights Movement, made great strides in society to create a positive image of their communities, individual selves and work ethics. However, there are persistent negative images of African American women which lead one to ask: “How much voice and decision-making power do African American women who participate in the industry have about their images in the entertainment industry?” What factors or what steps can African American women in the entertainment industry deploy to put an end to the negative portrayal of African American women’s bodies as sex objects? What analytical and theoretical processes can bring the African American woman out of invisibility within society’s margins to that of self-making, power, and free persons? Does the responsibility lie with only African American women or community, or the whole of society? My goal is to analyze rap music videos, movies and magazines to illuminate the relations between mainstream conditions of conformity to masculinity and femininity and the sexual exploitation of African American women in the media and their marginalization in society.

Photochemical Disinfection of Pathogens: Role of Bacterial Extracellular Polymeric Substances (EPS) Coverage

Parham Javadinajjar, Chemical Engineering
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Mentor: Sharon L. Walker, Department of Chemical and Environmental Engineering

This project is intended to determine the effects of natural constituents present in agricultural run-off waters and the effect of extracellular polymeric substances (EPS) found on E. coli on sunlit photochemical disinfection of waterborne pathogens, which can have health and environmental risks. A series of batch scale experiments were completed or still in progress to validate the effect of nitrate as reactive oxygen species (ROS) producer, specifically hydroxyl radicals (•OH), and the role of EPS. E. coli in mid-exponential growth phase with varying levels of EPS, removed by ultra sonication, were then placed in either a dark environment or under a solar simulator (450 W xenon lamp and 305nm cut-on filter), which allows wavelength over 305nm to penetrate in the solutions with several different concentrations of nitrate. The survival rate of the bacteria was determined microscopically every 15 minutes using a Live/Dead BacLight Bacterial Viability kit. Time versus survival rate was plotted for each experiment. Current results from bacteria with different EPS level in dark and light control, and in nitrate solutions, suggested that both nitrate and disruption of EPS increase the rate of disinfection. Cells which have been exposed to more intense sonication have a larger proportion of EPS removed which corresponds to a higher rate of die off in the presence of nitrate. Conversely, the slower rate of die-off in the presence of more EPS suggests that it protects the bacteria from ROS or have scavenging ability. More experiment will be conducted in the presence of dissolved organic matter (DOM) solution in the future, and it is anticipated that more visible light will be absorbed with DOM but less ROS formed than in the presence nitrate. The influence of EPS level on the bactericidal activity and their interactions with other ROS (such as O₂, H₂O₂, O₂•-) will also be investigated.
Evaluation of Estrogenicity of Selected Pesticides, Alkylphenol Polyethoxylates and the Mixture

Wesley Jones, Mechanical Engineering
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Department of Environmental Sciences

In 2007, water samples from agriculturally-impacted waterways in the Central Valley of California showed high levels of EEQs with only select pesticides and alkylphenols present in the fractions having estrogenic activity. In order to investigate the cause of the EEQs, estrogenic activities of a mixture of the five pesticides observed in the fractions (simazine, diuron, atrazine, desisopropylatrazine, and hydroxyatrazine), selected alkylphenols (AP) and alkylphenol polyethoxylates (APEOs) and the mixture of the AP/APEOs with the pesticides were evaluated by *in vitro* bioassays using rainbow trout hepatocytes (*Oncorhynchus mykiss*) and *in vivo* studies with Japanese medaka (*Oryzias latipes*). In the *in vitro* bioassays, hepatocytes exposed to the pesticide mixture alone, simazine (7.2 ng/L), diuron (7.0 ng/L), atrazine (0.5 ng/L), desisopropylatrazine (4.3 ng/L) and hydroxyatrazine (5.7 ng/L), for 24 hours did not show estrogenic activity. Only the highest concentration of the AP/APEOs (32.38 mg/L; octylphenol 0.80%, octylphenol polyethoxylates 1.61%, nonylphenol 46.32% and nonylphenol polyethoxylates 51.27%) showed a 2-fold increase of vitellogenin (VTG) mRNA with respect to control. Environmentally relevant concentrations of AP/APEOs did not show a response. Mixtures of the highest concentration of AP/APEOs and pesticide mixture caused a 5-fold increase in estrogenicity. In the *in vivo* bioassays, medaka exposed to mixtures of the high concentration AP/APEOs and pesticide mixture in a 7-day static exposure caused a 450-fold increase in VTG. These results showed that mixtures of these herbicides and AP/APEOs at relatively high concentrations may cause a greater than additive estrogenic response than each group of compounds alone. In a 2008 follow up study, water samples from the Sacramento River Delta had *in vivo* estrogenic activity but not *in vitro* activity. Chemical analysis only detected (bifenthrin, diuron) and the same AP/APEOs. Hepatocytes exposed to the pesticide mixture alone, bifenthrin (972 ng/L) and diuron (24 ng/L), for 24 hours did not show estrogenicity. The AP/APEOs (18.8 ug/L; octylphenol 1.64%, octylphenol polyethoxylates 10.59%, nonylphenol 11.34% and nonylphenol polyethoxylates 76.42%) also showed no response. In this case, the high dose and the mixtures of AP/APEOs and pesticides did not show any estrogenicity suggesting a unique interaction between herbicides and surfactants, and the occurrence of unknown estrogenic agents in drainage waters of the San Francisco Bay.

Significance of Electrostatic Properties of M cells with Respect to Microparticle Uptake

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Department of Bioengineering
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Foreign antigens in our body need to cross epithelial surfaces in order to initiate an immune response. The transepithelial transport and presentation of antigens to the underlying immune system can be achieved through the activity of M cells. In fact, M cells provide surveillance for the mucosal system as they lack a brush border on their surface. Although they present a favorable site for pathogenic viruses and bacteria, the mechanisms behind their interactions remain unknown. While regulating the uptake by the M cells of encapsulated vaccination remains critical for the success of oral mucosal immunization, recent studies have shown that the electrostatic properties of PLGA nanoparticles play a significant role in the uptake process. In our study, we investigated the processes lying behind the interactions between the surface of the M cells and the invading pathogens. The characterization of electrostatic properties of the M cells layers was done through the quantification of their zeta potential. A device was designed to measure the streaming potential across M cell layers under pressure variations between 0 and 50 kPa.
Helmholtz-Smoluchowski relation was then used to determine the zeta potential. The experiments were done under different ionic strength across targeted and non-targeted M cells. The results were correlated to uptake studies of PLGA nanoparticles and were used to elucidate the significance of M cell electrostatic properties on microparticle uptake for mucosal vaccine therapies.

**The Effects of Caffeine and Nicotine on Learning**

Daniel Khafi, Psychology  
*Mentor: Aaron Seitz*  
Department of Psychology

The vast majority of the population indulges in either caffeine or nicotine intake. However, so far there is little research regarding the effects of such drugs on learning. The current study aims to understand how what people drink or smoke in-between learning and recall can impact their consolidation of learning. A previous study by Mednick et al., (2008) suggested a counter intuitive role of caffeine in the consolidation of learning, where a moderate dose of caffeine impairs declarative verbal memory and motor sequence learning, but simultaneously increases perceptual learning. This counter intuitive effect of caffeine directly challenges the widely held belief that caffeine enhances cognitive performance. Mednick et al., (2008) suggested that the primary action of caffeine on consolidation was via acetylcholine processes in the brain. Our hypothesis is that acetylcholine differentially impacts consolidation of hippocampus dependant and neocortical dependant learning processes, and that caffeine and nicotine, which impact different aspects of the acetylcholine system, will differentially impact learning in each of these brain regions. This hypothesis is being tested by training subjects on a word-pair associate task, learning of which is known to be hippocampus dependant, and a visual texture discrimination task, learning of which is known to be dependant on visual cortex. Following the training subjects will be given either nicotine, caffeine, placebo or nothing and their retention of learning is tested on the following day. We will present the preliminary results of this research and discuss the relevance of these results.

**Impunity in Argentina’s Political Institutions**

Ivan Krimker, Political Science  
*Mentor: William T. Barndt*  
Department of Political Science

In Argentina’s democratic system there is a relatively free press, justice system, and free and fair elections. However, instances of blatant corruption at high levels of office have undermined the strength of the institutions and tested citizens’ tolerance for abuse of power. Some individuals have been able to act with total impunity and still remain relevant in the political arena, as in the case of Carlos Saul Menem, the former president of Argentina. Others have paid a high price, as did Menem’s Secretary of Environmental Issues, Maria Julia Alsogaray. Why is this the case? What differentiates one case from the other? And what facilitates impunity and what does not? Can we design a system that can prevent it from happening in the future? By isolating several cases of impunity and comparing them to instances where accountability was present, this research will attempt to draw some general conclusions about impunity. Ultimately, impunity in Argentina is not the result of merely cultural undertones in the psyche of the average Argentine citizen. Instead, it is the result of a slow and inefficient legal system and the complicity of high level officials who benefit from loose rules and weak institutions. Establishing a system of horizontal checks and balances can avert uncontrolled corruption. A focus on a *de facto* and not just a *de jure* separation of the government branches and, more importantly, the strengthening of the legal system can provide a strong deterrence to all officials seeking impunity, regardless of their rank.
Mandragora

Michelle Leal, Creative Writing
*Mentor:* George Haggerty
Department of English

According to legend, Cereth used to be The Kingdom of White Flowers. The story now survives merely as a play which is the feature performance every year during Cereth’s spring carnival. With her grandfather owning theaters all over the province, Elysia has grown with fantasy playing a major role in her life and a special attachment to the legend. After her grandfather suffers an injury, Elysia’s cousins step in to help with preparations for the carnival. As soon as they arrive, however, a number of strange occurrences begin taking place and Elysia is haunted by visions too similar to those of the carnival’s feature play. She suspects her cousins are involved in the dark arts, but voicing her fears to her grandfather proves useless. To her dismay, he grants her cousins custody over her until he recovers, and sends her to live with them. Elysia will learn that there is more to the legend than the play reveals, and that part of the kingdom still survives. The conception she had of her family will be rattled as she learns more of her family’s involvement with the kingdom, its legacy, and its curse. Called upon by forces beyond her comprehension, she will have to decide whether or not she will help restore The Kingdom of White Flowers while at the same time finding her place in her accursed family.

Bills in the Trenches: Politics and the Evolution of Legislation

Phillip Lee, Political Science/Public Policy
*Mentor:* Juliann E. Allison
Department of Political Science

Conflict has always been an inherit part of American politics, from the path to the creation of a bill, to the final vote on a proposed policy, multiple interest groups and politicians strive to gain benefits for their own interests. Many bills and laws are sent into the assembly, yet very rarely does the resulting bill represent completely the original interests of its creators. Utilizing legislative data from government sites, information from California Senate employees, and access to the LCMS (Legislative Constituency Management System), this project will seek to analyze and compare and contrast the result from the original intent of the bill; as well as to analyze the various ploys which lead to the alterations of the original bill. Such ploys include factors such as rumors, political experience, and partisan behavior, which impact legislation, as well as external factors from the public, lobbyists, and the media. In this project, legislation enacted by the California legislature is the main focus of the study. Such ideal focus of research will be bills such as (ex. AB 2557 2005-2006 Transportation), and some others from the California Legislature. This project will also analyze a number of failed bills chosen due to the amount of debate involved, with attention on the matter the bills are killed or shelved

Evolutionary History of Antibiotic Resistance in *Bradyrhizobia japonicum*

Gabriel Lopez, Biological Sciences
Akshay Patil, Biology
*Mentor:* Joel Sachs
Department of Biology

In recent decades multiple antibiotic resistant bacteria have emerged both in hospital and community settings. These highly virulent strains have significant implications on public health. Understanding how antibiotic resistance evolves in bacterial populations is a critical area of evolutionary and medical research. In natural populations bacteria evolve resistance through a combination of vertical and horizontal transmission. Inheriting genomic information by traditional Mendelian inheritance occurs when traits are passed from parent to offspring, known as vertical transmission. In contrast, bacteria can also uptake genomic fragments of unrelated bacteria, which occurs through horizontal gene transfer. Our research, which examines natural populations of the symbiotic soil bacterium *Bradyrhizobium japonicum*, will examine the evolution of multiple antibiotic resistance traits under natural conditions. In our experiment, we surveyed antibiotic resistance in 58 related wild strains of *B. japonicum* by culturing these
diverse isolates on media that contained various types of concentrations of antibiotics. Antibiotics used for this portion of the experiment included ampicillin, carbenicillin, chloramphenicol, hygromycin, kanamycin, spectinomycin, streptomycin and their respective controls to test for resistance. After replica plating, we recorded the data by taking pictures of all of the plates to see if the strains of Bradyrhizobia were sensitive or resistant to the antibiotics. In the analysis, antibiotic resistance, in evolutionary terms, can be considered as a shared derived characteristic of closely related strains. Analyzing the antibiotic resistance traits in the context of the phylogenetic relationships of the strains, their sampling location as the microhabitat in which they were isolated is crucial for possibly revealing a correlation between evolutionary related strains and antibiotic resistance.

Electrochemical Changes in Soil Caused by Tungsten Adsorption

William McLaren, Environmental Science
Myles Davis, Environmental Sciences
Mentor: Christopher Amrhein
Department of Environmental Sciences

Millions of pounds of lead used in hunting and fishing sports end up in the environment each year and can threaten or kill wildlife. Numerous studies have documented the adverse effects to wildlife from ingested lead shot, specifically waterfowl and scavenger species (i.e. coyotes, hawks, reptiles) even endangered species such as the California Condor. As an alternative to lead, tungsten (W) has been proposed as an “environmentally friendly” metal alternative for hunting. However, recent concerns about the fate and transport of tungsten in the soil environment have been raised. We have previously shown W-pellets incubated in moist soil can rapidly oxidize to produce greater than 2000 mg kg\(^{-1}\) of plant available tungstate. Tungstate, depending on the soil type, either strongly adsorb to soil minerals or becomes highly mobile. This study has evaluated the electrical and chemical properties of two soils (Grangeville and Holland) and two soil minerals (goethite and gibbsite), with and without tungstate adsorbed. The point of zero charge (PZC) or the pH at which the soil or mineral has no net charge, was measured using two different methods. Our research has shown a lowering of the PZC due to W-adsorption, which indicates that tungstate chemisorbs to the clay minerals thus changing the net particle charge. Changes in PZC may have notable environmental implications, including changes in phosphate and molybdate availability to plants, especially in soils contaminated with W-pellets.

Along “The Way”

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Department of Creative Writing

The three stories of “Along ‘The Way’” center around martial arts and dojo culture; there is very little literature that takes place in this setting, which is part of the reason why the author decided to write about it. Although martial arts is the common thread of these stories, they actually focus on ennui and violence, loss and dedication, and love as a feeling vs. love as a choice. These ideas are explored through relationships and internal struggle; also explored is the trust, respect, and physicality present in the martial arts. As a possible solution to their problems, the author suggests that they find a purpose, be sensible, and, of course, train in karate.
The Mismeasure of Black Men: Shortcomings in Feminist Struggle for Social Transformation

Brittnee Meitzenheimer, Sociology/ Women’s Studies
Mentor: Caroline Tushabe
Department Women’s Studies

Black feminist scholars, activists, and theorists such as Audre Lorde who takes a critical look at the second wave feminist movement in her essay “The Master’s Tools Will Never Dismantle the Mater’s House”; Angela Davis who theorizes the prison-industrial complex; and Alice Walker who writes from the intersection of race and gender in her award winning book The Color Purple, have all made significant contributions to both the feminist movement and more poignantly the Black feminist movement. It appears, however, that theories on the Black community and the racist, heterosexist, hegemonist masculine culture that prevails in society, have overlooked Black men. While the aforementioned women have provided literary and philosophical theories and epistemological thought in relation to the feminist movement, we have yet to fully research and develop theories that stretch beyond, challenge and include Black men in alternative gender strategies to social transformation. One scholar who has come close to such an approach is bell hooks whose contributions to both feminist thought with her work “Ain’t I Woman” and to black gender in “We Real Cool: Black Men and Masculinity” highlight important strategies for studying “the other” Black women. However, bell hooks does not boldly call for the inclusion of Black men in the Black feminist movement in order to avoid turning Black men into a new “other.” Drawing on Black feminists this paper will propose alternative theories that are grounded in Black culture while simultaneously challenging the exclusion of Black men from feminist struggle for social transformation in Black communities.

Computational Modeling of Population Differences

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Department of Psychology

The computational modeling of population differences in psychology is a nascent field. The present study utilizes the HAL computational model of semantics to mimic differences in Asian and Hispanic cognitive semantic systems by using language samples obtained from LiveJournal blogs. HAL operates by exploiting statistical regularities in these two language samples to learn semantic representations that reside in a high-dimensional memory matrix. Phase one of this research demonstrated basic concept learning with both language samples and that related concepts are closer in the model. For example, HE and SHE are closer in the memory space than MEXICO and SHE. The current quantity of language was sufficient to produce ethnicity differences with given proper names, but not with ethnicity differences in semantic neighborhoods relating to familial relationships and emotional language. Computer models complement studies with humans by providing a means of complete control over many aspects of the concept acquisition and representation process.

A Study of Mating Behavior and Inbreeding Avoidance in Drosophila melanogaster

Magdalene Moy, Biology
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Department of Biology

This study was part of an investigation into the role of inbreeding in the life history evolution of Drosophila melanogaster. Previous work has suggested that females discriminate against sperm from closely related males. The overall aim of the project was to determine if the negative effects of inbreeding were large enough to promote the evolution of post-mating inbreeding avoidance. This research has two components, first, Laramy Enders, a Ph.D
Application of AESOP in the Analysis of the Interaction between the Epstein-Barr Virus Glycoprotein gp350 and Complement Receptor 2

Aaron A. Nichols, Bioengineering

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Department of Bioengineering

The Epstein-Barr virus achieves infection into B-lymphocytes through the association of its predominant surface glycoprotein, gp350, with complement receptor 2 (CR2). The bound complex of gp350 to CR2 has recently been determined with computational docking of the crystallographic structures of the individual proteins, aided by experimental mutagenesis data. Since both gp350 and CR2 are excessively and oppositely charged (-18e and +10e respectively) it is expected that electrostatics plays a significant role in the association and stability of the protein complex, as has been the case with other CR2 complexes. We present here an application of our computational framework AESOP (Analysis of the Electrostatic Similarity of Proteins), a collection of tools used to systematically study electrostatic interactions between excessively charged proteins. A high throughput computational Alanine scan was used to generate a series of mutants of both proteins, which were subsequently clustered based on calculated Poisson-Boltzmann electrostatic potentials surrounding the proteins. In addition, free energies of association and solvation have been calculated using the electrostatic potential of each mutant and according to a theoretical thermodynamic cycle. We have shown that there exists correlation between calculated solvation free energies values with experimentally derived free energies of association. The results from this preliminary screening greatly contribute to an understanding of the energetics underlying the gp350:CR2 complex formation and will ultimately aid in the design of small molecular inhibitors with the potential to become therapeutic. AESOP is a new tool to guide experimentalists in predicting the effect of specific mutations important for biological function.

Differential Treatment: The Enforcement of American Sodomy Laws

Andrew Ojeda, History/Law and Society
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In this paper, I will argue that twentieth and twenty-first century American sodomy laws have been enforced differentially against minorities. Those targeted were people-of-color, predominately African-Americans. For example, in the State of New York in the 1930s, 21% of those arrested for sodomy were African-Americans; at this time, African-Americans comprised 6% of the population in New York. Differential enforcement also extended to other racial, ethnic, and cultural minorities, depending on the specific region. Yet, other factors such as gender, sexual orientation, class, immigrant, and socioeconomic status also played roles in the enforcement of state sodomy laws. I will also explore how the intersection of identities such as...
race and sexual orientation exacerbated the likelihood of arrest. The Supreme Court cases, *Bowers v. Hardwick* (1986) and *Lawrence v. Texas* (2003), reveal this differential treatment. In *Bowers*, the state of Georgia did not prosecute Michael Hardwick (a Caucasian male) for sodomy when the police found him engaging in oral sex. In *Lawrence*, the state of Texas prosecuted John Geddes Lawrence and Tyron Garner (an interracial “couple”) when they discovered the two having anal sex. I will argue that Georgia did not prosecute Hardwick because he was Caucasian, while in *Lawrence* Texas prosecuted Lawrence and Garner for sodomy because one was Caucasian and the other African-American, which created an enforcement hierarchy on interracial, gay individuals. This differential enforcement of sodomy laws is part of a larger history of policing people-of-color. In such ways, modern American sodomy laws functioned to institutionalize not only homophobia, but also, among other forms of oppression and racism.

**Making Free Trade Beneficial for Everyone: Globalization, Development Economics and the Woman Migrant Domestic Worker in Asia**

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*Mentors:* Christine Gailey  
Department of Women’s Studies  
Sean Jasso  
Anderson Graduate School of Management

This paper focuses on certain adverse effects of globalization on women, with an emphasis on the region of South and Southeast Asia. It delves into the physical and emotional abuse of the migrant domestic service worker, and the trafficking of women as guest workers into substandard living and working conditions in host countries. The racialization and degradation of these women and the ensuing physical, sexual, and emotional abuse forms a sort of involuntary servitude caused largely by a poverty level that makes victims vulnerable to promises of a better life, money, and security. The goal of this research is to posit possible solutions to the flaws in globalization that allow such trespasses against humanity, in order to make free trade and the free flow of labor beneficial for all parties involved. Certain current examples, such as the South African Domestic Workers Union, ensure basic rights of domestic workers and would be excellent models for the Asian region. Insight, through the field of development economics, into the poverty that is the driving factor for a majority of these women is also an essential step towards diminishing abuse. Government regulation is effective, but not entirely since often abuses are committed regardless of their legality. Still, UN regulations such as CEDAW, and organizations such as the ILO, are necessary first steps. Government intervention to decrease dependence of migrant domestic workers on their employers is also necessary, as it is the main source of power that allows abuse of domestic workers by their employers.

**Soil Respiration along a 3000 m Elevation Gradient**

Justin Richardson, Environmental Science  
*Mentor:* Darrel Jenerette  
Department of Botany and Plant Sciences

A drying and rewetting study was conducted to understand how soil microorganisms are distributed in the environment. The ability for microorganisms to remain metabolically active under extreme temperatures is an exclusive adaption but it is unknown if this is an adaption due to the surrounding climate. The metabolic activities of soils along a 3000-m elevation gradient were evaluated by measuring the soil respiration rate in response to temperature variations. The soils ranged from a hyperthermic desert to a mesic coniferous forest. Five replicate samples from three elevations were incubated for 5 d at 25 °C, and then exposed to 6 temperatures (25, 35, 40, 45, 50, and 55 °C). At each temperature, Soil CO₂ efflux was measured to determine the metabolic activities of the soil microbes. The temperature in which soil CO₂ efflux peaked did not differ significantly between the hyperthermic soils and the mesic soils (P>0.05). The temperature at which respiration peaked for the thermic soil was not significantly different from the hyperthermic or mesic soils either (P>0.10). Water and substrate
availability have been demonstrated to alter microbial populations within meters. In this study, water availability did not alter peak CO$_2$ efflux temperatures significantly (P>0.05) for any of the tested sites. The relationship between organic matter content and soil CO$_2$ efflux is unclear as there is no clear pattern. The results suggest that the distribution of thermophilic bacteria is not confined to hyperthermic areas, as they are present in cooler climates and may become active under favorable conditions.

**Spenser’s Use of Structural Patterns in the Landscape of the *The Faerie Queene***

Carlos Rivas, Art History/English  
*Mentors:* Heidi Brayman Hackel  
Department of English  
Conrad Rudolph  
Department of Art History

Although Edmund Spenser is one of the most widely studied English renaissance poets, it was not until the twentieth century that scholars began to discover the numerological and structural patterns present in his work. Moreover, little attention has been paid to the fantasy landscape (Faeryland) he created for his magnum opus, *The Faerie Queene*, a work which remains the longest poem in the English language. This project analyzes the landscape and setting(s) of *The Faerie Queene* in terms of their structural patterns. After a careful charting and visual mapping of Spenser’s landscape, it is clear that Spenser consciously created a meticulously crafted landscape for *The Faerie Queene*. Although early scholars of *The Faerie Queene* failed to find any patterns in the text, and criticized Spenser for a perceived lack of a unified structure in the poem, we know by looking at Spenser’s other works (most notably *Epithalamion*) that he carefully constructed his poetry according to strict patterns that contain numerological, astrological, and religious significance. Keeping this in mind, it can be shown that there are undiscovered or unnoticed patterns in the landscape and layout of *The Faerie Queene*, most notably that a symmetrical pattern exists in the landscape. Such a pattern provides an itinerary for new readings of *The Faerie Queene* to emerge without disrupting previous interpretations. In conjunction with this project, a cartographical reconstruction of what Faeryland looks has been created to visually demonstrate these patterns on a practical level.

**Physician Communication and Patient Outcome: A Meta-Analysis**

Himelda Rivera, Biology  
*Contributor:* Juliet Beni  
*Mentor:* Robin DiMatteo  
Department of Psychology

Recent research has demonstrated the importance of health communication in predicting patient outcomes (DiMatteo, M.R. 2001). The purpose of this work is to conduct a meta-analysis measuring the relationship between physicians’ communication skills and patients’ satisfaction with medical care, objective and self-rated health, and psychological outcomes by comparison of their r effect size. In this study, a meta-analysis of over 200 articles (published 1968-2010) collected from two literature databases (PsycINFO and PubMed), was conducted. We extracted strong, generalizable random effects model statistics from which we carried out detailed moderator analysis by examining specific characteristics of the articles’ diverse methodologies. From this analysis we have determined that there is a significant relationship between physician-patient communication and patient satisfaction, patient objective and self-reported health, and patient psychological outcome. Our preliminary moderator coding analyses have focused on health disparities in communications, specifically whether the magnitude of the effect between physician communication and patient outcome is influenced by factors such as ethnicity, nationality, gender, and language. We propose an in-depth analysis of this data and report of the findings. Future research should focus on the causes of these disparities and potential implications for training physicians in communication.
Evaluation of Estrogenicity of DDT and DDT metabolites in Rainbow Trout (*Oncorhynchus mykiss*)

Uziel I. Sauceda, Biological Sciences  
*Contributor:* Ramon Lavado  
*Mentor:* Daniel Schlenk  
Department of Environmental Sciences

Persistent organochlorines such as DDT and its metabolites can bioaccumulate in fish and cause endocrine disruption, which could be detrimental to animal populations. The estrogenicity of two DDT metabolites (DDA ((2,2-bis[p-chlorophenyl] acetic acid) and DDMU (1-chloro-2,2-bis[p-chlorophenyl] ethene)) as well as 2,4-DDT and 4,4-DDT was evaluated by using *in vivo* measurements of vitellogenin (VTG) in juvenile rainbow trout (*Oncorhynchus mykiss*). Two types of studies were conducted: 7 day bioassays and 42 day exposures. For the 7 day studies, two doses (0.2 and 1 mg/kg w.w.) were injected intraperitoneally on day 0 and 3 and animals evaluated on day 7. For 42 day studies, 3 different doses (5, 15, and 30 mg/kg) were injected on days 0, 14 and 28. VTG protein in plasma was measured by Enzyme linked Immunosorbent Assay (ELISA) at the conclusion of exposure. 4,4-DDT did not cause any vitellogenesis while 2,4-DDT did cause statistically significant vitellogenesis (at the dose of 30 mg/kg w.w.) when compared to control. None of the doses of DDMU nor DDA caused statistically significant increases in vitellogenesis compared to controls. These results indicate that only the 2,4 isomer of DDT is estrogenic and that the 4,4 isomer and metabolites are not estrogenic in fish at the concentrations tested.

**Importance of Mass Transfer at the Vascular Endothelium**

Martha Sosa, Bioengineering  
*Contributors:* Karishma Jadeja  
Prashanthi Vandrangi  
*Mentor:* V. G. J. Rodgers  
Department of Bioengineering

In the endothelium, various signaling pathways regulate vascular homeostasis. Vascular homeostasis, as a consequence of ever changing blood flow dynamics, is regulated and maintained by various endothelial signaling pathways. The regulation of these signaling pathways has been credited to mechanical transducers on the endothelium. Mechanical transducers have been presumed to convert mechanical forces to chemical signaling pathways where as mass transfer has been defined as the transport of chemical species into the underlying system. However, the mechanisms behind the working of these signaling pathways are not clearly known. Researchers have previously eliminated the importance of mass transfer in these signaling processes by interpreting results from *in-vitro* studies as being due to mechanical transduction. We hypothesize that mass transfer between species in the blood and the endothelium might explain the mechanism underlying the working of signaling pathways. In order to study the importance of mass transfer, the effect of vascular flow parameters will be simulated. The experiments proposed will reflect the mechanism underlying the signaling pathways in the endothelium. The results of this work will help further elucidate the importance of mass transfer in signaling pathways associated with the mechanism of vascular homeostasis.

**Childhood Grief: A Review of Literature and Personal Experiences**

Amanda Suplee, Psychology  
*Mentors:* Robin DiMatteo, Kate Sweeny  
Department of Psychology

Grief is an inevitable process of life and it can come in many forms and for many different reasons. When children are bereaved, each child grieves differently. For a child bereavement group volunteer, many personal encounters and experiences with grieving can be supported and helped by applying the research literature in this area. The purpose of this paper is to review and examine published literature on childhood grief and to connect these findings to real life experiences. The topics covered in this paper are children’s concept of death, impacts of suicide, psychological tasks and the impacts of grief, support groups for grief work, play therapy, art...
and music therapy, school and teacher support for grieving children, and other types of treatment for grief.

**Lead Regulation: Arresting the Painting Pandemic**

Suzy Taroyan, Political Science/Law and Society
*Mentors: Carl Cranor*
Department of Philosophy
Juliann E. Allison
Department of Political Science

Lead poisoning has become a global issue threatening the lives of innocent children and adults even at relatively low amounts of exposure. Lead exposure can cause permanent damage by affecting every organ in the human body. This fatal exposure is occurring in developed countries and acutely occurring in developing countries due to the increased globalization of trade. Lead toxicity remains a major public health issue although its deadly consequences are entirely preventable. Lead poisoning occurs not only in the workplace but also in homes and in the natural environment. With this in mind I ask - what steps have the United States and other nations taken to prevent lead poisoning? What are the primary bases for the development and implementation of environmental laws in the United States as well as abroad? I draw on current research illustrating the harmful adverse affects of lead poisoning and preventative policies to propose that the only approach to reduce and eliminate lead toxicity is through international law. External pressures will oblige developing countries to enforce stringent regulations and bans which will ensure universal uniformity. I then conduct an extensive case study of China as well as sub-case studies of India and Nigeria. I conclude that international laws and organizations such as the OECD Declaration on Lead Risk Reduction will compel developing countries to regulate lead by using sanctions and penalties. By strengthening and enforcing regulations in developing nations, exposure to lead will drastically decrease in the workplace and the environment, saving thousands from premature death and permanent disabilities.

**Life Histories of Fish in the Subgenus Mollenesia**

Nicole Tarui, Biology
*Mentors: David Reznick, Mark Springer*
Department of Biology

As part of a comprehensive study of the evolution of the placenta in the livebearing fish family Poeciliidae, three of the four subgenera of the genus Poecilia, including Limia, Pamphoricthys and Micropoecilia have been observed in the lab to obtain life history data. This life history information that is collected includes age of maturation in both males and females, the number of offspring produced, and the intervals at which this occurs. These factors are all essential to characterize the life history and piece together the association between the evolution of the placenta and other features of the life history. The placenta is a multifaceted organ essential to the development of fetuses in some of these species. As in the other branches of the family Poeciliidae, the placenta has evolved within the genus Poecilia, in the subgenera Micropoecilia and Pamphoricthys. To complete this compilation of life histories to better understand this evolutionary process, we have characterized the life histories of species in Mollienesia, the fourth subgenus of Poecilia. Using a common garden 5-gallon experiment, seven species of the subgenus Mollienesia will be observed to find detailed facts of their life histories. Detailing these patterns are all clues necessary in providing insight into the contributing factors of the evolution of life histories in this genus and the family Poeciliidae.

**Identifying Society's Vermin: Franz Kafka's Critique of Modernity in "The Metamorphosis"**

Adam Toth, Comparative Literature
*Mentor: Sabine Doran*
Department of Comparative Literature

I want to examine Franz Kafka’s “The Metamorphosis” in its original German text to extrapolate exactly what it is Gregor Samsa transformed into. While Gregor Samsa may not
have transformed into a specific insect, I want to examine what it meant to be a “monstrous vermin” in 1915, Prague. Gregor Samsa became three things in the text, each of which represents different literary devices used by Kafka: Das Ungeziefer (the vermin), Der Mistkäfer (the dung beetle), and Die Küchenschabe (the cockroach). Das Ungeziefer represents the juxtaposition of useful and useless figures and the transformation, for Samsa, from the former to the later, and his family’s reverse metamorphosis. Der Mistkäfer is the allusion to Ovid, the Bible, and even Ancient Egyptian myth used to reveal the discord complexity of useful and useless and reprisal Kafka felt regarding the strong surge of Anti-Semitism felt in Europe at that time. Die Küchenschabe represents the existential pathos brought out through unusual syntax. Franz Kafka uses these three identities to make Gregor Samsa a vermin/pariah of the modern state and criticizes modernity with Gregor Samsa’s identity.

A Computational Approach to the Comparative Analysis of Religious Concepts

Krystle Tran, Psychology  
*Contributors*: Stacey Acevedo, Aaron Lorentzen  
*Mentor*: Curt Burgess  
Department of Psychology

Religious texts have, at times, provided a source of conflict due to the ambiguity in the narrative or inherently conflicting information. For example, hate groups have used passages in the Christian Bible as a justification of their racist positions. Inconsistent positions have been taken on the proper role of women in culture. This research uses a computational model of semantics that can learn what words mean and can compute a measure of similarity between words. These metrics can be used to compute semantic neighborhoods for concepts. The model was used to provide a clear operational definition for what words mean and how context contributes to the learning. A psycholinguistic analysis of religious concepts and their inter-relations will be presented.

Sanctioned Violence: Hazing in Higher Education

Danny Tsai, Political Science/International Affairs  
*Mentor*: Keith Harris  
Department of Media and Cultural Studies

Since 1970, there has been at least one hazing-related death on a college campus each year in the United States. This documentary investigates the underground culture of hazing and its inherent influence in student organizations in United States colleges and universities. It discusses the history and origins of hazing in America and illustrates how it has become engrained in American society. I draw on case studies of past instances of hazing crimes and interview new members, an alumnus, and university officials to argue that hazing initiations have no signs of mitigating despite the consequences of anti-hazing statutes. These findings not only highlight the inherent dangers found in hazing initiations, but also demonstrates the urgency for a comprehensive method to address this issue.

Linguistic Accents, Depression, and Anxiety (Cancelled)

Konstantin Tskhay, Psychology  
*Mentors*: Angela Minh-Tu Nguyen, Verónica Benet-Martinez  
Department of Psychology

It has been established in the literature that language proficiency is a major predictor of acculturative stress (Berry & Kim, 1988), which in turn is related to mental health (Constantine, Okazaki, & Utsey, 2004); however, there is almost no research on linguistic accent, a dimension of acculturative stress and a construct relevant to language proficiency. In the present study, we are interested in examining the relationship between linguistic accent and psychological maladjustment. We used two samples (i.e., Vietnamese American and Mexican American) recruited from the psychology department subject pool at the University of California, Riverside. Participants reported their level of concern with having a linguistic accent and completed a measure of
depression and anxiety symptomology. We found that increased concern with an accent significantly relates to increased levels of psychological maladjustment. Because linguistic accent and psychological maladjustment are related, linguistic accent is an important topic to study and deserves greater attention in both research and practice.

Maintaining Inflorescent Meristem Identity in Arabidopsis

Nolan Ung, Botany and Plant Sciences  
*Mentor:* Harley Smith  
Department of Botany and Plant Sciences

In order for a plant to complete its lifecycle, it must transition from a leaf bearing vegetative phase to the flower producing phase. Genomic studies performed in Arabidopsis, demonstrate that the commitment to flowering requires a change in the transcriptome of the shoot apical meristem. During the floral transition, genes that promote vegetative identity must be repressed, while genes that induce flowering must be activated. To date, the molecular mechanisms that orchestrate these changes in gene expression profiles are poorly understood. We recently discovered that the homeobox transcription factor SHOOTMERISTEMLESS (STM), which is essential for meristem maintenance, functions with inflorescence identity MADS-box complex, AGAMOUS-LIKE24 (AGL24) -SURPRESSOR OF OVEREXPRESSION OF CONSTANS1 (SOC1), to initiate flower meristems on the flanks of the SAM. To further understand the interplay between STM and the AGL24-SOC1 the floral transition, we utilized a genetic approach. While mutations in *stm, agl24* and *soc1* maintain inflorescence identity, the *stm soc1* reproductive shoots revert to a vegetative mode of growth after bolting. After undergoing many cycles of inflorescence reversion, the *stm soc1* reproductive shoots will eventually flower. Preliminary studies indicate that the inflorescence reversion phenotype is enhanced in *stm soc1 agl24* triple mutants such that these shoots never flower, producing inflorescences with aerial rosettes. Based on our genetic studies, we propose that STM functions with AGL24-SOC1 to repress vegetative identity during inflorescence development. We are currently determining whether the interplay between STM and AGL24-SOC1 functions to repress vegetative identity genes during inflorescence development.

Race: The Missing Link in Judith Butler’s *Gender Trouble* and Its Significance in the Politics of Gender Subversion

Cheri Veilleux, English/Women’s Studies  
*Mentor:* Caroline Tushabe  
Department of Women’s Studies

Judith Butler’s *Gender Trouble* is one of the milestones in feminist theory, specifically on the concept of gender subversion. In this text Butler focuses on select critical feminists who propose ways to subvert gender. One key argument of Butler’s is in reference to feminist philosopher Monique Wittig’s notion of lesbian subversion of gender woman. Wittig argues that though it is true that every person is sexed, and therefore gendered, lesbian identity defies woman identity because woman identity can only exist in an oppositional relationship to man. Wittig draws a reader’s attention to juridical law and its language in relation to gender identity. Read in this way, on the one hand, Butler finds Wittig to offer lesbian identity as a category that successfully subverts normative woman identity within the politics of gender. On the other hand, Butler views Wittig’s premise as controversial and points out several problematic aspects within Wittig’s argument: Wittig reinforces the universal man and the notion of compulsory heterosexuality as already established under juridical law. Both Butler and Wittig speak of monolithic woman and fail to account for raced women and their politics of gender subversion, a point this paper will argue. Drawing on works by Oyeronke Oyewumi and John Wood, I will offer a different feminist lens through which woman identity can be inclusive of other identities in feminist politics of liberation without privileging sexual identity like lesbian identity.
Determination of the Heparin Binding Affinity of Bacteriophage Qβ through Affinity Capillary Electrophoresis

Erik Velez, Biochemistry
Contributors: Derek Langeslay, Daryl Bulloch, Andrew Udit
Mentor: Cynthia Larive
Department of Chemistry

Heparin is a biopolymer with repeating disaccharide units that vary in both the degree and sites of sulfation. Heparin is routinely used as an anticoagulant during dialysis, open-heart surgery and in the treatment of deep vein thrombosis. Following heparin administration and in cases of heparin overdose it is necessary to neutralize heparin and restore normal clotting function by administering protamine. However, protamine is easily overdosed leading to severe symptoms, while the drug itself displays toxic activity in vivo with some patients suffering severe allergic reactions. Following prior studies, one possible alternative is substituting protamine with engineered bacteriophage Qβ. The Qβ capsid is composed of 180 copies of a 14.1 kDa coat protein; thus, a single point mutation of the coat protein is amplified 180 times following capsid assembly. Affinity capillary electrophoresis is being used to determine the binding affinities of Qβ mutants K16M, T18R, and the wild type capsid. In these experiments, the protein is injected into the separation capillary as the concentration of the heparin is varied. Through the calculation of electrophoretic mobility using a neutral marker, the binding constant of Qβ to the intact heparin is determined. As expected, the Qβ capsid composed of the T18R mutant coat protein shows a much greater heparin binding affinity than the wild-type protein due to its increased positive charge.

Why does it take so long to execute a condemned inmate on death row?

Amanda Vickers, Political Science,
Mentors: The Honorable Dallas Holmes
John Laursen
Department of Political Science

Currently there are 677 condemned inmates on California’s Death Row. The last inmate executed was in 2006. This paper seeks to examine the extraordinary delay involved in the resolution of death penalty appeals. It will look at how a capital case progresses through the criminal justice system, explore the history of the Death Penalty in modern America, and then discuss the current problems with the administration of the death penalty in California and several proposed solutions.

Men are (Better) Women? Complexities and Concepts in Cross-Cultural Gender Research

Amelia Warinner, History
Mentor: Caroline Tushabe
Department of Women’s Studies

John C. Wood's *When Men are Women* is a study of gender among the Gabra of East Africa that illustrates some of the complexities of cross cultural research. To better understand the role that gender plays in Gabra society, Wood lived among Gabra as a participant observer for over two years. In his analysis, Wood attempts to incorporate 'structure' into his approach while avoiding essentialist views of gender he believes have marked previous structuralist and post-structuralist schools of thought. Relying on Levi-Strauss' model of concentric dualism, Wood comes to the conclusion that the Gabra gender structure both disproportionately values men and denigrates women through segregated activities, private and public spaces. However Wood's conclusions are contradicted by his own observations and limited by what he failed to investigate, calling into question his methods and analysis. Ultimately, Wood's interpretation of Gabra society and symbology is more reflective of his cultural gender structure and academic background than of the Gabra people.
Moreover, Wood missed critical opportunities to refine and challenge his understanding of the role that gender plays cross-culturally. I will examine Wood’s assumptions while arguing that, by failing to take a critical approach to his cultural biases and academic framework, Wood reproduces the gender essentialism he sought to avoid. By expanding the scope of his inquiries into Gabra society and offering alternative interpretations of what he observed, I will demonstrate how Wood’s imposition of ‘gender structure’ on Gabra society does not capture Gabra life or thought.

**Behavioral Adaptations of Houseflies (**Musca domestica L.)** to Avoid the Insecticide Imidacloprid

Daniel Wasik, Environmental Science  
**Mentor:** Alec Gerry  
Department of Entomology

Two populations of houseflies (*Musca domestica* L.) were starved for 24 hours and subjected to a choice feeding assay. The resistant colony was captured in 2008 at a field site in southern California and is shown to be resistant to the insecticide imidacloprid. The susceptible colony is a laboratory strain that has never been introduced to imidacloprid. Using an enclosed arena with imidacloprid insecticide-treated and untreated sucrose provided as food, fly behavior was monitored using video cameras to determine if resistant flies showed an increased detection and avoidance of the treated food source relative to the susceptible flies. Both colonies exhibited no preference to landing on one food dish over the other (p > 0.05). Both the colonies disengaged the treated dish more often than the untreated dish but the resistant colony disengaged significantly more often than the susceptible colony (P=0.024). The susceptible colony fed on both treated and untreated equally (P=.25) but the resistant colony almost solely fed on the untreated dish and not the treated dish. (P=.0078). Imidacloprid acts as a contact irritant causing locomotion stimulation in both colonies but the stimulation is significantly stronger in the resistant colony.

**Variation in swimming performance in relation to sex, sexually selected traits, and reproductive allocation**

Danielle Wickman, Biology  
**Contributor:** Christopher E. Oufiero  
**Mentors:** David Reznick, Ted Garland  
Department of Biology

My project is an Upper Division Honors Thesis that is focused on determining what influences locomotor performance (sprint speed and endurance) between both sexes within three species of *Xiphophorus* fish that vary in sword length and reproductive allocation. The three species examined were *X. nigrensis*, *X. helleri*, and *X. variatus*. We used intraspecific variation among each of the species to determine what traits might account for variation in swimming performance. It was predicted that sword length will have a negative effect on performance, but other traits such as tail, heart, or gill mass may have a positive effect, compensating for the length of the sword. In females, locomotor performance may be affected by their amount of reproductive allocation. Bigger broods, bigger offspring or a combination may negatively affect performance. Also, similar to males, tail, heart, or gill mass may compensate. Sprint Speed was measured by chasing a fish down a racetrack lined with twelve pairs of photocells that recorded maximum velocity. Endurance was measured by examining critical swimming speed, which is a ramped velocity test. Organs were initially dissected out after being preserved for several months, blotted dry, weighed, and recorded for investigation. We found significant differences among the three species for endurance and sprint speed, with the medium length sworded species (*X. nigrensis*) having the lowest endurance and highest sprint speed after controlling for body size. *X. nigrensis* was also the only species to exhibit differences in swimming performance between the sexes. Path analysis models were used to determine the effects of a single trait controlling other variables intraspecifically in each of the three species. It was found that sword length does not affect performance, but rather that ovary mass, or the extent of reproductive allocation does...
have a negative effect. Our results suggest that the cost of reproduction seems to be greater than the cost of the sexually selected trait on locomotor performance in these species.

Effects of Personality and Occupation on Alcohol Consumption

Joshua F. Wiley, Psychology
*Mentors:* Howard Friedman, Kate Sweeney
Department of Psychology

This study examines the relationship between adult personality traits and alcohol use a decade later and between occupation and concurrent alcohol use. Participants were approximately 700 males from the Terman Life Cycle Study started in 1921 (Terman, 1926). Research assistants coded occupations using the Standard Occupational Classification (U.S. Bureau of Labor Statistics, 2000). Agreeableness and conscientiousness correlated negatively to alcohol consumption while extraversion and neuroticism correlated positively with alcohol consumption. Art and Entertainment occupations significantly predicted alcohol consumption initially, but failed to reach significance once personality was controlled for using logistic regression. Professional occupations predicted lower alcohol consumption even after controlling for personality. These results suggest personality and occupation play unique roles in alcohol use, but also partially overlap.

Conventional and Electronic Cigarettes (E-cigarettes) Have Different Smoking Characteristics

Monique Williams, Neuroscience
*Contributor:* Anna Trtchounian
*Mentor:* Prue Talbot
Department of Cell Biology & Neuroscience

Electronic cigarettes are a new nicotine delivery device that manufacturers are claiming to be a safe and alternate way to smoke, even though there has been little research done on their smoking properties. In this study, we compared the smoking properties of both electronic cigarettes and conventional cigarettes by examining the amount of vacuum required to produce smoke and the density of the smoke. We designed a smoking apparatus equipped with a water manometer to measure the amount of vacuum required to smoke the electronic cigarettes. Then, smoke density was measured using a spectrophotometer. The electronic cigarettes were subjected to smoke out experiments until the cartridges were exhausted. We found that the amount of vacuum required to smoke the conventional cigarettes varied among the different brands, but the smoke density was relatively stable. For electronic cigarettes, the vacuum required was only constant during the first 10 puffs, and smoke density levels were not consistent among the different brands. The electronic cigarette smoke density decreased over time, and there was a need for an increase of vacuum. Overall, the conventional cigarettes were uniform in their smoking properties, but there was much variation between the electronic cigarettes. In conclusion, electronic cigarettes required a stronger vacuum to smoke than the conventional cigarette. The amount of smoke density from the electronic cigarettes decreased during smoking and required an increase in vacuum strength. The decreased amount of smoke density produced from the electronic cigarettes questions the effectiveness of nicotine delivery.

Biologically inspired synthesis of nanostructural titanium dioxide for photocatalytic applications

Ashley Wong, Chemical Engineering
*Contributors:* Nichola M. Kinsinger, Fabian Villalobos, Dongsheng Li, Luke Turalitsch, Ian Miller
*Mentor:* David Kisailus, Department of Chemical and Environmental Engineering

There is a rapid increase in emerging contaminants from both industrial and pharmaceutical sources causing concern over water quality and its affect on public health and safety. A number of processes have been developed to treat our water, one of which is using photocatalysts that accelerate organic degradation. TiO$_2$, as a photocatalytic material, shows great potential for being able to
completely mineralize a wide variety of compounds. TiO$_2$ can also be used in many different applications such as photovoltaics and photocatalysts, as well as applications in cosmetics, sunscreens, and paints. Many of the synthesis methods used to TiO$_2$ require high temperatures or extreme pH’s to achieve the desired phase, shape, and size of the material. However mineralizing biological systems demonstrate how nature can produce elegant structures at room temperature through controlled organic-mineral interactions. These organics exist as either soluble forms or as insoluble scaffolds that are often used to control size, shape, and orientation of mineral. We are using biologically-inspired scaffolds to template the nucleation and growth of inorganic materials such as TiO$_2$. These ligands (modeled after specific mineral functionalities identified in biomineral systems) interact with minerals during nucleation and growth can be help to control the size, shape, and phase of these particles and ultimately, their properties. Understanding the fundamental nucleation and growth mechanism is critical to control the microstructure and therefore function. Nanosized rutile and anatase particles were synthesized using a biologically inspired method at relatively low temperatures and mild pH conditions. The effects of reaction conditions on phase and grain size were investigated and discussed from coordination chemistry and coarsening mechanisms. We demonstrate the control over the size and phase of the TiO$_2$ nanostructures which resulted in enhanced photocatalytic degradation of an organic dye.

**Within Her Strength: A Framework for Addressing Sexual Violence in Our Community**

Jessica Yamane, Political Science/ Women’s Studies Concentration  
*Mentors:* Andrea Smith, Setsu Shigematsu  
Department of Media and Cultural Studies  
Christine Gailey, Department of Women’s Studies and Anthropology

Scholars note that the persistent characterization of women (particularly poor women of color) as “deviant” preserves a “rape culture” that condones sexual terrorism as a method of social control. Many anti-violence programs in the United States have been established to address the perpetration of interpersonal acts of violence such as domestic violence or sexual abuse. Yet the amount of violence against women has continued to rise in recent decades. I argue that the ineffectiveness of these anti-violence programs is due to their lack of engagement with the mechanisms by which violence operates structurally. Thus, my presentation outlines the development and activities of Within Her Strength (WHS), an organization that I designed in response to my critique of anti-violence movements. WHS is a self-defense program that utilizes American Kenpo Karate in program curriculum. Yet we concurrently delve further into systemic issues of violence by incorporating relational boundary setting exercises and engaging in discussions about the political systems that maintain violence within our communities. Working in partnership with women in the Riverside community who are experiencing violence first hand, we draw on feminist epistemologies, dialogical pedagogy, and restorative justice models to generate solutions resonant to the problems identified by the women directly affected. We aim to activate individual citizen’s sense of responsibility for their community’s wellbeing and to support their efforts to eradicate systemic cycles of violence via collective organizing techniques.

**Adultery in Athens during the 5th and 4th Centuries BC**

Teresa Yates, Classical Studies  
*Mentors:* Thomas Scanlon, Wendy Raschke  
Department of Comparative Literature and Foreign Languages

Adultery has been a problem since the beginning of relationships. In ancient Athens, it was seen as harmful not only to the person suffering from having an adulterous partner, but also to society. Since the only extant sources regarding adultery are literature, historians must accept that some sources present adulterous circumstances in an
exaggerated or slightly skewed manner. Thus it is important to compare the portrayal of adultery in different works and try to find commonalities that may show how adultery was viewed and punished. Euripides’ Medea, a tragedy where the adultery is inverted, and Lysias’ On the Murder of Eratosthenes, a defense speech written for a man who killed his wife’s lover, are used in this analysis. In the defense speech, the law is cited and therefore shows the morals upon which Athens was founded. In Medea, Euripides portrays a social situation that focuses on the emotional and moral viewpoints that the Athenians might have had regarding adultery. By combining these two types of literature, a more comprehensive picture of the general Athenian attitude toward adultery can be seen.

A Two-Dimensional Analytical Model of Uyghur Separatism

Meng Yuan, Political Science
Mentors: Juliann Allison, Yuhki Tajima
Department of Political Science

Uyghur people are a Turkic-speaking ethnic minority living in the northwest of China, mainly in Xinjiang province; they account for a large percentage of the overall Chinese Muslim population. Uyghur separatism waxes and wanes but never completely ceases. Prior researchers primarily focused on analyzing the causes of Uyghur separatism, but this paper seeks to explain why the Uyghur separatist movements vary from small-scale protests to large and violent rebellions, through the establishment of a two-dimensional model incorporating both international and domestic factors. This paper analyzes three historical periods when the Uyghurs gained temporary but successful independence: the Yaqub Beg Rebellion, and the founding of the first and second East Turkestan Republics. The author comes to the conclusion that it is the variations in the support international lobby actors’ support and the strength of the Chinese government that determine how Uyghur separatist movements develop. The author also predicts that non-state actors will play more important roles in the development of Uyghur separatism in the future.

Deciphering the Smoke: The Oriental and Opium Imagination in 19th Century Literature

Mushkbar Zaidi, English/ Creative Writing
Mentors: Susan Zieger, Jennifer Doyle
Department of English

This paper examines how Victorian and American literature structures Said’s notion of the Orient facilitated by drug use. Chopin’s An Egyptian Cigarette constructs gender roles in an imperial/oriental framework which is enabled by a foreign contaminant; women’s roles are maintained by imperial ideology that characterizes the male other as Oriental. Additionally, two prominent detective narratives (Collin’s The Moonstone, Doyle’s The Man With The Twisted Lip) also provoke a sense of the Orient through the advent of the detective story: drugs, crime and the nature of the Orient as something that must be “solved.”
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