## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biography of Barbara Peterson Ruhlman ’54</td>
<td>1</td>
</tr>
<tr>
<td>The Ruhlman Conference 2017</td>
<td>2</td>
</tr>
<tr>
<td>A History of the Conference</td>
<td>3</td>
</tr>
<tr>
<td><em>By Lee Cuba and Adele Wolfson</em></td>
<td></td>
</tr>
<tr>
<td>Conference at a Glance</td>
<td>4</td>
</tr>
<tr>
<td>Conference Schedule</td>
<td>6</td>
</tr>
<tr>
<td>Frequent Sources of Support for Student/Faculty Research</td>
<td>20</td>
</tr>
<tr>
<td>Conference Planner</td>
<td>21</td>
</tr>
<tr>
<td>Abstracts</td>
<td>22</td>
</tr>
<tr>
<td>Student Index</td>
<td>63</td>
</tr>
<tr>
<td>Faculty Index</td>
<td>65</td>
</tr>
</tbody>
</table>
Barbara Ann Peterson was born to Thomas and Ethel Peterson in 1932 in Worcester, Massachusetts, and lived there for her first nine years. The family moved to Shaker Heights, Ohio, where Barbara graduated from Laurel School before enrolling at Wellesley in the class of 1954. A psychology major, Barbara lived in Homestead and Severance before spending her junior and senior years in Claflin Hall.

Of her time at Wellesley, Barbara wrote in 2004, “Fifty-four years ago when I entered Wellesley, it was a dream come true…Four years at Wellesley were wonderful, rewarding, but not without their ups and downs, and much hard work, which helped me become a stronger, more confident person.”

Barbara deployed her psychology degree as a hospital social worker before marrying former Air Force lieutenant Jon Ruhlman in 1955. Jon was a graduate of Purdue University with a graduate degree from the University of Colorado. Together, Jon and Barbara raised two sons, Robert and Randall, while Jon pursued a career in business. Barbara took on numerous volunteer leadership roles in the arts, education, health care, and more in her community. Barbara and Jon avidly pursued their loves of sailing, global travel, and spending time with their two grandchildren together. Sadly, Jon passed away in 2004.

To this day, Barbara remains closely connected to Wellesley College through her philanthropy, her volunteer service, and her participation in class reunions and mini-reunions, of which she has written, “I have enjoyed reconnecting with classmates I knew years ago and meeting some for the first time…I treasure my new friends, and those I have had for many years, as they provide a great source of strength and stability.”
It gives us great pleasure to welcome you to the 2017 Ruhlman Conference. Made possible by the Barbara Peterson Ruhlman Fund for Interdisciplinary Study, the Ruhlman Conference is intended to foster collaboration among students and faculty across the disciplines and to enhance the intellectual life of the College. The event provides an opportunity for students, faculty, staff, friends, family, and alumnae to come together in celebration of student achievement.

The Ruhlman Conference celebrates intellectual life by sponsoring a communal, public event where students have an opportunity to present their work to an unusually wide audience. By providing an opportunity for public presentation of what is often a private, isolated activity, the conference demonstrates that research can be part of the ongoing conversation in a community of scholars.

Attentive to the diversity of student interests and accomplishments, the Ruhlman Conference includes a variety of formats for the presentation of student work: papers, panels, posters, exhibitions, musical and theatrical performances, interactive teaching presentations, and readings of original work. Representing the work of nearly 350 Wellesley students, the Ruhlman Conference is organized around three major themes: Humanities, Science and Technology, and Social Sciences.

We invite you to celebrate the 21st annual Ruhlman Conference by experiencing the scope and richness of student achievement at this year’s conference. We wish to express our thanks and congratulations to all students and alumnae, near and far, for their participation in this special event.

The 2017 Ruhlman Conference Committee Members

Scott Gunther  
French Department

Joanne Murray ’81  
Albright Institute for Global Affairs

Andrew Shennan  
Office of the Provost

David Hawkins  
Geosciences Department

Anthony Pires  
Composers Conference Residential

Yuichiro Suzuki  
Biological Sciences Department

Margaret Keane  
Psychology Department

Christina Pong  
Communications & Public Affairs

Sophia Temkin  
Class of 2017

Jessica May  
Office for Resources

Elizabeth Robichaud  
Albright Institute for Global Affairs

Sally Theran  
Psychology Department

Andy Mowbray  
Art Department

Orit Shaer  
Computer Science Department

Sierra Weingartner  
Class of 2017
The first Ruhlman Conference was held on the afternoon of May 1, 1997. Looking back on that day, the 150 students who volunteered to participate in the inaugural conference—and the more than 50 faculty who served as their advisors—were creating a new Wellesley tradition. In the months preceding the conference, members of the program committee had worried that it might be difficult to recruit students to participate in this ambitious communal experiment. Indeed, that was the question on Barbara Ruhlman’s mind throughout much of the year. Once the day of the conference arrived, however, a new question came to occupy their minds: What if no one attended? The conference had been organized into concurrent sessions scheduled from 3 p.m. to 7 p.m. and, because no change to the class schedule was made that day, late-afternoon classes overlapped with the first block of conference presentations. At a place already over-populated with lectures, performances, and other community events, who would be interested in attending yet another optional event?

Many were. The student, faculty, and staff turnout that afternoon was respectable, if not large, and faculty and staff outnumbered students in most sessions. Of greater significance, participants and attendees of the first conference left with the impression that they had participated in something special, urging those in charge of planning the conference to find ways to increase involvement among all constituencies of the College. The following year the conference was scheduled for a day on which no classes would be held, the number of blocks of concurrent sessions was increased, and a community-wide lunch was added. The number of students presenting at the conference rose to 250, and the number of faculty and staff advisors doubled (to 100), as did the number of sessions. In the years to follow, the conference would consistently attract between 250 and 300 student participants sponsored by well over 100 faculty and staff, representing virtually every academic department and program of the College.

Why was the Ruhlman Conference such a success? A student on the first program committee provided insight into the answer when she suggested that “Wellesley was a very academic place, but it wasn’t as intellectual as it might be.” By that, we believe she meant that Wellesley students set high academic standards for themselves and their peers, that they worked hard to achieve those standards—but that they spent more time talking about how hard they worked than about what they were working on. Although the Ruhlman Conference provided a venue to applaud and celebrate the hard work necessary to produce excellent projects, its focus was on the results of that hard work—the knowledge, understanding, and joy that comes through serious intellectual engagement.

As we celebrate the 21st annual Ruhlman Conference, it is hard to imagine Wellesley without it. The conference is built into our calendar and our consciousness. Students look forward to their presentations as they plan their research projects. Faculty mark the years by remembering which students participated in a Ruhlman panel or poster session. Deans describe the conference to candidates for faculty positions as one of the great selling points of the institution. Other colleges planning student research conferences look admiringly at the structure we have built. Part of the joy of the day is the way in which traditional divisions are broken down. Science talks happen in Pendleton, poetry readings in the Science Center. Panels are created that cross disciplines and make new connections; their audiences are filled with staff, faculty, and students interacting with the presenters and with one another in new ways. And part of the joy comes from Barbara Ruhlman’s obvious delight in her creation. The gratitude that flows back and forth between her and the students adds to the special nature of the day and is a manifestation of the connections among generations of Wellesley alumnae. It is not difficult to see why the Ruhlman Conference has become such a valued Wellesley tradition.

Lee Cuba is professor of sociology and former dean of the College. While associate dean, he worked with Barbara Ruhlman to develop the plan for the Ruhlman Conference and chaired the program committee from 1997–1999. Adele Wolfson is the Nan Walsh Schow ’54 and Howard B. Schow Professor in the Physical and Natural Sciences. She was associate dean of the College from 2004–2010 and chaired the program committee.
## Conference at a Glance

<table>
<thead>
<tr>
<th>Themes</th>
<th>9:15–10:25 a.m.</th>
<th>10:45–11:55 a.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Science and Technology</strong></td>
<td>Women Who Will Farm: A Proposal to Cultivate a Sustainable Food System at Wellesley (Pre-formed Panel Discussion) SCI-277 Exploring the Landscape of an Ancient Supercontinent Using Microscopic Grains of “Sand” (Interactive Teaching Presentation) SCI-278 Chemistry’s Next Top (Computational) Model: Optimize Your Way to the Top! (Pre-formed Panel Discussion) FND-225 Biomolecular Damage and Bacterial Interactions: A Sampling of Biochemistry Research (Pre-formed Panel Discussion) SCI-396 Brainy Science (Talk) SCI-392 Sleep and (Altered) Consciousness (Talk) FND-207 Data and Learning (Talk) SCI-E-111 Cells that Make Bread and Beer (Talk) SCI-E-211</td>
<td>Exploring the Relationship Between the Innate Immune System and Adult Neurogenesis in the Brains of Procambarid Crayfish (Pre-formed Panel Discussion) SCI-256 Does Developmental Pollen Stress Affect the Performance of Inspector Honey Bees? (Pre-formed Panel Discussion) SCI-E-211 Masses of Gases: Using Inorganic Gas Tracers to Examine Oceanic Processes (Pre-formed Panel Discussion) SCI-268 The Haines Lab: Applications of Organic Chemistry to the Development of Novel Therapeutics (Pre-formed Panel Discussion) SCI-264 Climate Change and Collateral Damage (Talk) SCI-277 Mighty Microbes (Talk) FND-207 Shining Light on Dark Matter (Talk) SCI-278 Chemistry at Different Scales (Talk) SCI-E-111</td>
</tr>
</tbody>
</table>

**Key:**
- **FND**—Founders Hall
- **PNE**—Pendleton East
- **PNW**—Pendleton West
- **SCI**—Science Center

---

WELLESLEY COLLEGE RUHLMAN CONFERENCE 2017
<table>
<thead>
<tr>
<th>Lunch*</th>
<th>1:30–2:40 p.m.</th>
<th>3:00–4:10 p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>“To Till and Keep”: Creating Environmental Paradigms of Dominion and Sustainability from Genesis (Interactive Teaching Presentation)</td>
<td>The Selfie in American Life (Pre-formed Panel Discussion) FND-128</td>
<td></td>
</tr>
<tr>
<td>Together, Restoring Their Names: Humanizing Women’s Experiences from the Holocaust (Pre-formed Panel Discussion) FND-120</td>
<td>Exploration of the Book from Manuscript to Print (On-Location Presentation) Clapp Library Special Collections, 4th Floor</td>
<td></td>
</tr>
<tr>
<td>The ascenDance Experience: Dance at Wellesley and Student-Run Dance (Long Performance) PNW-201</td>
<td>Beyond Simba and Hakuna Matata: A Great Journey in Tanzania (Pre-formed Panel Discussion) FND-120</td>
<td></td>
</tr>
<tr>
<td>Looking Across the Globe (Talk) SCI-396</td>
<td>The Usual Suspects, Unusual Influences (Talk) PNW-001</td>
<td></td>
</tr>
<tr>
<td>Two Halves Make a Whole? (Talk) SCI-264</td>
<td>Bank and Metal (Pre-formed Panel Discussion) FND-102</td>
<td></td>
</tr>
</tbody>
</table>
| Snapchat @ Wellesley (Pre-formed Panel Discussion) SCI-277 | **Key:**
| | FND—Founders Hall |
| | PNE—Pendleton East |
| | PNW—Pendleton West |
| | SCI—Science Center |

*All members of the Wellesley College community are invited to enjoy lunch on the Wang Campus Center lawn. In the event of inclement weather, the lunch will remain in the same tented service location with the Campus Center and Alumnae Hall as indoor rain locations. Lunchtime entertainment will be provided by the Blue Notes, the Tupelos, and the Wellesley Widows, in the vicinity of the lunch tent.
# Conference Schedule

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:45–9:15 a.m.</td>
<td>Refreshments served in the Science Center Leonie Faroll Focus</td>
<td></td>
</tr>
<tr>
<td>9:15–10:25 a.m.</td>
<td>Lighting a Candle for Hemingway in His Sacred Landscapes:</td>
<td>Houghton Chapel</td>
</tr>
<tr>
<td></td>
<td>A Pamela Daniels Fellow Project</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forbidden Love and Conservative Romanticism:</td>
<td>PNW-201</td>
</tr>
<tr>
<td></td>
<td>Brahms’ Piano Quintet in F Minor (Long Performance)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Julia F. Wells ‘17, Physics; Sharon S. Kim ‘18, Computer Science; Alice Z. Xu ‘17, Economics; Ya Hui (Yuna) Gan ‘20, Undeclared; Yuriko A. Fukumura ‘19, Neuroscience</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Artist and the Craftsman (On-Location Presentation)</td>
<td>Green Beach</td>
</tr>
<tr>
<td></td>
<td>Videnda: An Exploration of Visual Storytelling (Exhibition)</td>
<td>Knapp Media Center</td>
</tr>
<tr>
<td></td>
<td>Tell Me a Story (Talk)</td>
<td>FND-102</td>
</tr>
<tr>
<td></td>
<td>“Ovid, God, and Gilgamesh Walk Into a Bar...”: On the Comparison of Mythological Literatures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Austen N. Aquino ’17, Classical Civilization/Comparative Literature</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cuando se te esponja el arroz: Tradition, Modernity, and the Identity of Mexican Women</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Johana C. Mata ’17, French/International Relations-History</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Child’s Play?: Researching and Writing a Children’s Novel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Isabelle A. Chen ’17, English/French</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accessing Myth in the Modern Day: The Odyssey and YA Magical Realism</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Allyson F. Larcom ’17, Classical Civilization/English and Creative Writing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Saving History, Recording Our Presence (Talk, Fowler Presentation)</td>
<td>PNE-239</td>
</tr>
<tr>
<td></td>
<td>The Values of Architecture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Angela M. Sun ’17, Architecture/Philosophy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Creating a Photographic Memory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Doris Li ’20, Undeclared</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guns and Grits: Black Womanhood and Radical Self-Preservation in the Black Panther</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Free Breakfast Program</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meredith J. Wade ’17, Environmental Studies/History</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Classical Antiquities at Wellesley College</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Margaret A. Jutus ’17, Art History/Classical Civilization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Value Systems Time After Time (Talk)</td>
<td>FND-120</td>
</tr>
<tr>
<td></td>
<td>Medical Ethics in Islam: Theory and Practice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Julide E. Iye ’18, Middle Eastern Studies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Degraded Regimes in Plato's Republic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Peiying (Peggy) Zhu ’17, Philosophy</td>
<td></td>
</tr>
</tbody>
</table>
Unstable Warps: Contested Visions of Empire in Agostino Brunias’ Market Scenes
Rebecca E. Selch ’17, Art History/Sociology

Science and Technology

Women Who Will Farm: A Proposal to Cultivate a Sustainable Food System at Wellesley
(Pre-formed Panel Discussion)
Sarah H. Koenig ’17, Environmental Studies; Clara (Clare) C. Sachse DS, Environmental Studies; Heike H. Jacob ’17, Architecture/Environmental Studies; Alysha E. Crou ’17, Environmental Studies; Leila-Anne B. Brusseau DS, Environmental Studies

Exploring the Landscape of an Ancient Supercontinent Using Microscopic Grains of “Sand”
(Interactive Teaching Presentation)
Disha C. Okhai ’17, Geosciences

Chemistry’s Next Top (Computational) Model: Optimize Your Way to the Top!
(Pre-formed Panel Discussion)
Shi Hui (Fiona) Ng ’17, Biological Sciences; Carla P. Perez ’18, Chemistry; Rachel Kim ’19, Undeclared; Alexandria Guo ’19, Undeclared

Biomolecular Damage and Bacterial Interactions: A Sampling of Biochemistry Research
(Pre-formed Panel Discussion)
Leah M. Furman ’17, Chemistry/French; Lucia J. Ortega ’17, Spanish; Dania M. Figueroa ’17, Biochemistry; Margaret (Maggie) A. Klureza ’17, Chemistry

Brainy Science (Talk)
Conductive Polymer Fiber Mats for Both Stimulating and Measuring Oligodendrocyte Progenitor Cell Differentiation
Alexis L. Lowe ’17, Neuroscience

Breeding for the Brain: A Look into Huntington’s Disease, Decision Making, and Selective Mouse Models
Ruth H. Vorder Bruegge ’18, Neuroscience; Serena K. Bourque ’19, Undeclared

The Effect of Glutamate Transporter Deletions on Receptor Distribution in the Caenorhabditis elegans Synapse
Andrea M. Bejar ’19, Undeclared

Glutamate Transporters in Caenorhabditis elegans: The Implications of Transporter Deletions on Behavior, Learning, and Memory
Moriah R. Harling ’17, Chinese Language & Culture/Neuroscience

Sleep and (Altered) Consciousness (Talk)
Dissecting the Origins of the Primary Somatosensory System (S1) Resting State Functional Connectivity (RSFC) in the Rat Brain
Jiyoung J. Lee ’17, Neuroscience

Psychiatric History and Problematic Cannabis Use
Emily Nip ’18, Neuroscience

The Neuroscience of Consciousness: Can We Have Attention Without Consciousness?
Shivani A. Dayal ’18, Neuroscience

Automatic Detection of Sleep Spindles in Simultaneously Acquired EEG-fMRI Data
Kanupriya Gupta ’18, Neuroscience
**Data and Learning (Talk)**

**Improving Dynamic Data Race Detection with Reprivatization Analysis**  
Samuila (Sam) Y. Mincheva ’17, Computer Science

**Predicting Churn in Massive Open Online Courses**  
Nancy Ho ’18, Computer Science/Mathematics

**Singing in the Brain: The Contribution of New Neurons to Behavioral Plasticity in the Zebra Finch Brain**  
Rebecca B. Jennings ’17, Biological Sciences

**Introducing Mobile App Development to Youth in Burundi**  
Belyse Inamahoro ’19, Media Arts and Sciences

**Cells that Make Bread and Beer (Talk)**

**Using Atomic Force Microscopy to Characterize *S. pombe* Cell Wall Synthase-Deficient Cells**  
Kathryn M. Barth ’17, Biochemistry

**Characterizing Protein Interactions Responsible for the Spatial and Temporal Regulation of Cytokinesis in Fission Yeast**  
Ruby Ye ’17, Biochemistry

**Evaluating the Localization Interdependence of Blt1p, Gef2p, and Rng2p in *S. pombe***  
Alexis D. Crayton ’17, Biological Sciences/Chinese Language & Culture

**Social Sciences**

**Perspectives from the Freedom Project I: Geopolitics After Trump (Pre-formed Panel Discussion)**  
Kaila L. Webb ’20, Undeclared; Cassandra M. Allen ’18, International Relations-Economics; Sabrina Liang ’19, Political Science

**The Economics of Gender and the Family (Pre-formed Panel Discussion)**  
Leah A Plachinski ’17, Economics; Clio B. Flikkema ’17, Economics/Russian Area Studies; Madeline E. Stern ’17, Economics/Mathematics

Tanveer Varma ’18, Economics; Linda W. Zhou ’18, Chinese Language & Culture/Political Science; Cordelia Zong ’17, Psychology; Rian K. Tang ’19, Computer Science/Political Science; Diana Lam ’20, Undeclared; Grace R. Ming ’18, Media Arts and Sciences; Heng (Amber) Qin ’18, Political Science; Jennifer Mou ’18, Economics/Psychology; Lydia Guo ’20, Undeclared; Tanvi Kodali ’20, Undeclared

**From Glyphs to Bytes: Ancient Egypt and the Future of Digital Humanities (Pre-formed Panel Discussion)**  
Isabel A. Staccuneddu ’17, Economics/Women’s and Gender Studies; Sarah N. Michelon ’18, Art History/English; Kate E. Kenneally ’18, Computer Science; Paola M. Favela ’19, Anthropology

**Reflecting Backward and Forward: Identity in a Time of Change (Talk)**  
Amy L. Johnson ’17, Sociology/Spanish

**Adulting Is Hard: Anxiety and Insecurity in the Millennial Generation’s Coming-of-Age Process**  
Julia J. Chmyz ’17, Computer Science/Sociology

**African Ancestral Knowledge and the Black Identity**  
Camille C. Stovall-Ceja ’17, Individual-Peace & Justice Studies/Psychology
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:40–9:55 a.m.</td>
<td>A Child’s Mind: Imagination and Intelligence in the Early Years (Talk) SCI-104</td>
</tr>
<tr>
<td></td>
<td>Toy Stories: Children's Use of Gender Stereotypes in Making Social Judgments</td>
</tr>
<tr>
<td></td>
<td>Zichun (Michelle) Wang '18, Psychology</td>
</tr>
<tr>
<td></td>
<td>Pretend Play Diary Study</td>
</tr>
<tr>
<td></td>
<td>Madison M. Flowers '17, American Studies/Psychology</td>
</tr>
<tr>
<td></td>
<td>Benefits of Consensus</td>
</tr>
<tr>
<td></td>
<td>Liliana Mayorga '19, Psychology</td>
</tr>
<tr>
<td></td>
<td>Examining Children’s Conceptualization of Separateness in Imaginary Companions</td>
</tr>
<tr>
<td></td>
<td>Kiera M. Parece '17, Political Science/Psychology</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>Intimate Conversations: Shedding Light on Closed-Door Discussions (Talk) SCI-270</td>
</tr>
<tr>
<td></td>
<td>Young Adults’ Reflections on Abstinence Messages in School</td>
</tr>
<tr>
<td></td>
<td>Lauren I. Mostrom '18, Classical Civilization/Economics</td>
</tr>
<tr>
<td></td>
<td>In Conversation with Donor-Conceived Teenagers</td>
</tr>
<tr>
<td></td>
<td>Jacqueline (Jackie) G. McGrath '17, Women’s and Gender Studies</td>
</tr>
<tr>
<td></td>
<td>The New Muslim Woman</td>
</tr>
<tr>
<td></td>
<td>Amina Ziad '17, Women’s and Gender Studies</td>
</tr>
<tr>
<td>10:25–10:45 a.m.</td>
<td>Break</td>
</tr>
<tr>
<td>10:45–11:55 a.m.</td>
<td>Humanities</td>
</tr>
<tr>
<td></td>
<td>The Danger of a Single Story: Portraits of Immigration (Pre-formed Panel Discussion) FND-126</td>
</tr>
<tr>
<td></td>
<td>Arianna G. Regalado '18, Religion; Emerson S. Goldstein '18, American Studies/Political Science; Esther A. Miller '18, Art Studio; Faiza S. Asham '19, Sociology</td>
</tr>
<tr>
<td></td>
<td>An Artist's Botany, a Botanist's Art: Botanical Watercolors in the Collection of Helen Frances Ayres at Wellesley College (On-Location Presentation) SCI -155</td>
</tr>
<tr>
<td></td>
<td>Ningyi Xi '17, Art History/Classical Civilization</td>
</tr>
<tr>
<td></td>
<td>Od: The Animated Thesis (Film Screening)</td>
</tr>
<tr>
<td></td>
<td>Katherine H. Roche '17, Classics/Media Arts and Sciences</td>
</tr>
<tr>
<td></td>
<td>Dueling Influences (Talk)</td>
</tr>
<tr>
<td></td>
<td>Pirsatical Debauchery, Homesick Sailors, and Nautical Rhythms: Sea Shanties in Classical Music FND-120</td>
</tr>
<tr>
<td></td>
<td>Pallas C. Riedler '17, English and Creative Writing/Music</td>
</tr>
<tr>
<td></td>
<td>&quot;History Has Its Eyes on You&quot;: Lin-Manuel Miranda’s Interpretation of Hip-Hop Culture in Hamilton</td>
</tr>
<tr>
<td></td>
<td>Maleah P. Maxie '18, Cognitive &amp; Linguistic Sciences/Music</td>
</tr>
<tr>
<td></td>
<td>This Isn’t Even My Final Form: Techno-Orientalist Women Who Will</td>
</tr>
<tr>
<td></td>
<td>Claire S. Shin '17, American Studies</td>
</tr>
<tr>
<td></td>
<td>Scholasticism and Clerical Authority in The Canterbury Tales</td>
</tr>
<tr>
<td></td>
<td>Nikita R. Nagras '17, Economics/English</td>
</tr>
<tr>
<td></td>
<td>Out of Sight, But Not Out of Mind: Revealing Hidden Communities (Talk) FND-102</td>
</tr>
<tr>
<td></td>
<td>The Social Worlds of Beijing’s Electronic Underground</td>
</tr>
<tr>
<td></td>
<td>Juliet Y. Liu '17, Anthropology/History</td>
</tr>
</tbody>
</table>
Still Here, Still Queer: Activism in the Postcolonial South Asian Diaspora  
Dharani A. Persaud ’17, International Relations-Political Science

In-Between: Narratives of Identity and Community by Chinese-American Adoptees  
Isabelle L. St. Claire ’17, Peace & Justice Studies

Touching Base: Isolation and Community on Maine’s Islands  
Ruth E. Weschler ’17, Anthropology/Biological Sciences

Who Tells Your Story? Narratives Reclaimed (Talk)  
SCI-396

Voice, Silence, and Testimony: Recovering Feminist Voices in Italian Poetry and Autobiography  
Cat Yoke ’17, Italian Studies/Women’s and Gender Studies

A Study of Female Agency in The Homeric Hymn to Demeter, Accompanied by Lithographic Illustrations  
Virginia G. White ’17, Classical Civilization

Hemingway and Elizabeth  
Edith (Edie) M. Sharon ’17, Chemistry/English

Jet Lag: Narrating a 21st-Century South Asian Experience in the United States and Abroad  
Kanika A. Vaish ’17, English/Political Science

Science and Technology

Exploring the Relationship Between the Innate Immune System and Adult Neurogenesis in the Brains of Procambarid Crayfish (Pre-formed Panel Discussion)  
SCI-256  
Megan E. McNeil ’17, Biochemistry; Anushree Dugar ’18, Neuroscience; Kara M. Banson ’17, Neuroscience

Does Developmental Pollen Stress Affect the Performance of Inspector Honey Bees? (Pre-formed Panel Discussion)  
SCI-E-211  
Anita M. Yau ’17, Biological Sciences; Anne H. Shen ’17, Biological Sciences; Clare Auld-Brokish ’19, Biological Sciences/Chinese Language & Culture

Masses of Gases: Using Inorganic Gas Tracers to Examine Oceanic Processes (Pre-formed Panel Discussion)  
SCI-268  
Alice Zhou ’17, Chemistry; Haley M. Pleskow ’17, Economics; Brenda Y. Ji ’18, Biochemistry; Katherine Chan ’18, Chemical Physics; Helen Alt DS, Chemistry; Charli Klein ’19, Chemistry; Marissa Menzel ’18, Geosciences and Environmental Studies

The Haines Lab: Applications of Organic Chemistry to the Development of Novel Therapeutics (Pre-formed Panel Discussion)  
SCI-264  
Laura M. Bancroft ’17, Chemistry; Lazel M. Pineda ’17, Biochemistry; Guendolyn Tows ’17, English; Christina E. Lepore ’17, Biochemistry; Sana M. Esami ’17, Biochemistry

Climate Change and Collateral Damage (Talk)  
SCI-277

Exploring the Epigenetic Reasons Behind Invasive Species  
Mary Kate Dorrorn ’17, Biological Sciences

Bugs and Biodiversity: How Climate Change Is Affecting Arthropods in Northern Hardwood Forests  
Jennifer (Jenn) E. Harris ’19, Biological Sciences; Emma D. Scalisi ’17, Anthropology/Biological Sciences

Monkeys Need the Forest for the Trees: Assessing the Impact of Deforestation on Bornean Primate Behavior  
Kylie M. Sorenson ’17, Biological Sciences
Mighty Microbes (Talk)  

**Estradiol Differentially Alters Gut Microbiota Response to Diet Change**  
Manjot K. Nagyal ’17, Biochemistry

**Examining the Innate Immune Response to Influenza Virus**  
Sara H. Shin ’19, Undeclared

**Exploring Anaerobic Microbial Communities Capable of Oxidizing Manganese**  
Sophia (Sophie) B. Rowland ’17, Biological Sciences/Classical Civilization

**Characterization of CpClec, a C-Type Lectin of the Parasite Cryptosporidium parvum that Mediates Infection in Vivo**  
Katherine (Olivia) J. Yanes ’17, Biochemistry

Shining Light on Dark Matter (Talk)  

**From Silence to Signal: The Story of :neta:**  
Catherine R. Nicoloff DSp, Physics

**Galactic Halo Model Selection in Directional Dark Matter Detection**  
Louisa Huang Ruixue ’19, Physics

**Lunar Laser Ranging: Testing Gravitation to the Moon and Back**  
Else P. Schlerman ’17, Physics

**Around the Sun We Go!: Modeling the Earth-Moon Distance for Different Theories of Gravitation**  
Sanaea C. Rose ’17, Astrophysics

Chemistry at Different Scales (Talk)  

**A Story in Sediment: Uncovering the History of Walden Pond**  
Melanie (Mel) T. Passaretti ’18, Geosciences

**Regioselective Synthesis of Pyrazole Derivatives**  
Natalie J. Norman ’18, Chemistry; Diane Cheon ’17, Chemistry

**The Role of Low-Energy (<20 eV) Electrons in Astrochemistry**  
Subha Baniya ’19, Biochemistry; Rhoda Kesewaa Tano-Menka ’19, Chemistry

Social Sciences  

**Calderwood Seminars in Public Writing: Engaging Interviews (Pre-formed Panel Discussion, Fowler Presentation)**  
Clio B. Flikkema ’17, Economics/Russian Area Studies; Sarah H. Koenig ’17, Environmental Studies; Zabra K. Pirani ’17, Biological Sciences; Amal W. Cheema ’17, Biochemistry/Political Science

**Mellon Mays Research Imperatives I (Talks)**  

**“That Old Threadbare Lie”: Women, the NAACP, and the Sexual Politics of Lynching 1909–1939**  
Imani McMillan ’17, History/Education Studies

**Examining the Ever-Evolving Intersectional Identities within LGBTQIAP+ Autobiographical Writing(s) in the 21st Century**  
Gabriela Asnaran ’17, Women’s and Gender Studies/American Studies

**Black Women and Perceived Masculinity in the Media**  
Brianna Ruffin ’17, Women’s and Gender Studies
Community College Student Experiences: A Winding Path through Higher Education  
Christina Phelps ’17, Sociology

In Defense of Lucretian Symmetry  
Adele Watkins ’17, Philosophy

Creating from the Margins: Exploring Asian-American Activism and Art  
Ally Ang ’17, Sociology

Economics of Finance (Pre-formed Panel Discussion)  
SCI-392  
Lilian Ma ’17, Computer Science/Economics; Katharine Y. Liang ’17, Economics; Michelle F. Namkoong ’17, Economics; Mingfei Li ’17, Economics

Perspectives from the Freedom Project II: Barriers to Economic and Personal Freedoms in Latin American Authoritarian Regimes (Pre-formed Panel Discussion)  
PNE-139  
Elaina (Ellie) T. Chalphin ’19, Economics/Religion; Samantha Ostensio ’19, Economics; Hannah Jacobs ’19, Biochemistry

Shaping One’s Self: Early Cultural Experiences (Talk)  
SCI-270

Simulating a Third-Culture Kid Experience to Enhance Friendship Prospects in Early Interactions  
Meltem Ozcan ’17, Psychology

Impact of Child-Care Policies on Satellite Babies: Chinese Immigrant Families’ Access to Early Child Care and Education (ECE) Programs in Massachusetts  
Lucia Tu ’19, Music/Psychology

Subjective Social Status in Minority Children: How It Is Understood and How It Affects Their Development  
Michelle M. Wang ’17, Psychology

Changing Minds, Growing Minds (Talk)  
SCI-104

Fairness of Feedback: Psychology Research on Feedback Style  
Jung Hyun Choi ’18, Economics/Psychology; Kariely Reyes ’17, Psychology; Nicole E. Anderson ’18, Psychology

Wellesley AWARE: From University to Liberal Arts College  
Cordelia Zhong ’17, Psychology

Benefits of a Brief, Youth-Directed Growth Mindset Intervention for Family Functioning and Parental Depression  
Manaswi Kashyap ’19, Psychology

12:00–1:30 p.m.  
Lunch  
(Served on Alumnae Hall Lawn)

1:30–2:40 p.m.  
Humanities  
“To Till and Keep”: Creating Environmental Paradigms of Dominion and Sustainability from Genesis (Interactive Teaching Presentation)  
FND-102  
Emma G. Brewer-Wallin ’18, Religion/Individual-Peace & Justice Studies; Ciara L. Gallagher ’17, Individual-Environmental Chemistry
Together, Restoring Their Names: Humanizing Women's Experiences from the Holocaust (Pre-formed Panel Discussion) FND-120
Callie Kim '18, Philosophy; Arianna G. Regalado '18, Religion; Samantha M. Stewart '19, International Relations/Economics

The ascenDance Experience: Dance at Wellesley and Student-Run Dance (Long Performance) PNW-201
Zoe M. Iacovino '17, Political Science; Nhia M. Solari '19, Geosciences/Philosophy; Melanie (Mel) T. Pasaretti '18, Geosciences; Kendra Cui '18, Economics/Theatre Studies

Looking Across the Globe (Talk) SCI-396
Iceland Outfitted: The Impact of Globalization on Reykjavik Fashion
Kaylee (Amelia) A. Rodriguez '19, Undeclared

Retelling the Story of Development: Through an Anthropological Lens
Kavindya Thennakoon '19, Anthropology/Cinema and Media Studies

The Ambassadors of Dreams: Russian Innovation and the Exploration of Humanity and Soul
Laura Zawarski '18, Russian Area Studies

Two Halves Make a Whole? (Talk) SCI-264
Aisha Lovise Maud Bornoe '17, Art History

Cartesian Dualism and Women's Right to Education
Sirui (Chloe) Xiao '17, International Relations-Political Science/Philosophy

Investigating Aristotelian Dualities in Quattrocento Florentine Painting: Woman's Place on the Left-Hand Side of Man
Hannah K. Augst '17, Art History

Examining the Relationship Between Identity Power and Knowledge
Fani Ntavelou-Baoum '17, Philosophy

Snapchat @ Wellesley (Pre-formed Panel Discussion) SCI-277
Rhea Mehta '20, Undeclared; Emily A. Pearson '20, Undeclared; Katie K. Sidhu '20, Undeclared; Aurora (Rory) S. Fernandez '20, Undeclared; Ngozi C. Ogho '19, Economics; Emilia A. Ball '19, Mathematics; Doris Li '20, Undeclared

Science and Technology
Wait, You Made That?: Making and Fabrication at Wellesley College (Exhibition) Knapp Fabrication Lab, 1st Floor Clapp Library
Havannah C. Tran '19, Media Arts and Sciences; Anna M. Pfoertsch '17, Media Arts and Sciences; Kaylie M. Cox '18, Classics; Michelle Lu '18, Media Arts and Sciences; Kamile Lukosiute '19, Physics; Aubrey E. Simonson '19, Undeclared

Investigating Cardiac Potassium Channels in a Heterologous System (Pre-formed Panel Discussion) SCI-268
Medeea C. Popescu '17, Biochemistry; Emily J. Whitehead '18, Biochemistry; Stephanie S. Kim '18, Biochemistry; Myfanwy C. Adams '17, Biochemistry
### Cancer from Different Points of View (Talk)  
**FND-126**

- **Understanding Cancer: From the Woes of NGOs**  
  *Chika D. Egbuzie ’19, International Relations-History*

- **Designing Combination Therapies for Acute Myeloid Leukemia**  
  *Haoling (Holly) Zhu ’18, Mathematics*

- **Analysis of Childhood Cancer Survival Rates in Low- and Middle-Income Countries**  
  *Eliana Marostica ’18, Computer Science*

### Blue Planet and Beyond (Talk)  
**FND-128**

- **Southern Ocean Acidification: Setting the Stage**  
  *Katherine Chan ’18, Chemical Physics*

- **KELT: The Hunt for Exoplanets and the Importance of Ground-Based Exoplanet Surveys**  
  *Casey A. Melton ’19, Undeclared*

- **What Happens in the Thermosphere if the Stratosphere Is Strongly Disturbed?**  
  *Jolene W. Fong ’17, Astrophysics*

### Perspectives on STEM Education (Talk)  
**SCI-E-111**

- **Analysis of First-Year Mentors’ and First-Year Advisors’ Effects on Wellesley College Majors**  
  *Kelly C. Kung ’17, Mathematics/Economics*

- **Learning Progressions from Introductory Chemistry through Biochemistry**  
  *Charlotte R. Reed ’19, Spanish*

- **Effectiveness of Reflection Questions in Establishing Greater Understanding in CS111**  
  *Jessica (Jess) R. Abramson ’19, Computer Science/Psychology; Khonzodakhon (Khonzoda) Umarova ’20, Undeclared*

### Design for Engagement and Inclusion (Talk)  
**FND-307**

- **Understanding and Supporting Web Literacy Skills in the Social Web**  
  *Marisa (Claire) C. Beyette ’19, Computer Science/English; Adrianna L. Tan ’19, Computer Science*

- **Behind the Camera: Inclusivity in Design**  
  *Katharine P. Hyslop ’17, Media Arts and Sciences; Jalena A. Keane-Lee ’17, Cinema and Media Studies/Political Science*

- **HoloMuse: Enhancing Engagement with Archaeological Artifacts through Gesture-Based Interaction with Holograms**  
  *Whitney C. Fahnbulleb ’17, Media Arts and Sciences; Jasmine N. Davis ’17, Media Arts and Sciences*

- **Nanomedicine: Out of the Lab and Into the Body**  
  *Amal W. Cheema ’17, Biochemistry/Political Science*

### Social Sciences  
**Developing Minds Want to Know (Talk, Fowler Presentation)**  
**PNE-239**

- **Creativity as a Route to Attitude Change: Collage-Making and the Elaboration Likelihood Model**  
  *Agnes (Aggie) G. Rieger ’17, Psychology*

- **Let’s Talk About Sex: How Parents’ Conversations with Teens About Sex Change Over Time**  
  *Lisa J. Jenkins ’17, Psychology*
Theories of Intelligence in Early Childhood
Elizabeth A. Rizzoni ’18, Psychology; Alejandra I. Escamilla Saldaña ’18, Psychology

Perspectives from the Freedom Project III: Exploring Threats to Free Elections (Pre-formed Panel Discussion) PNE-139
Samantha (Sam) M. Churchill ’20, Undeclared; Daniela (Danni) Ondraskova ’18, Economics/Russian Area Studies; Ninan S. Pollack ’20, Undeclared

The History and Future of Wellesley’s Asian-American Studies (Pre-formed Panel Discussion) SCI-104
Ha Jin Park ’17, Psychology; Aya N. Ros ’19, American Studies/East Asian Studies; Rebecca T. Leu ’19, Neuroscience; Alice S. Li ’19, Computer Science

Economics of Incentives (Pre-formed Panel Discussion) FND-207
Sheridan L. Rogers ’17, Economics/Mathematics; Isabella Rosenberg ’17, Economics; Evan C. Williams ’17, Economics; Vivien Lee ’17, Economics/Psychology

Mellon Mays Research Imperatives II (Talks) SCI-274
Divided Families and Cubanidad
Tory Roth ’18, American Studies

Understanding Community Building and Identity Formation in Cyber Spaces
Budnampet Ramanudom ’18, Computer Science

The Possession Rite of Erzulie: The Conjuring of Black Womanhood in Renée Stout’s Erzulie’s Mirror
Jordan Mason Mayfield ’18, Art History/Media Arts and Sciences

From Drillinois to Chiraq: The Rise of Drill Music on the South and West Sides of Chicago and Beyond
Serenity Hughes ’18, Africana Studies

Dual Language, Dual Lives? (Talk) FND-225
A Cross-Cultural Comparison of Emotional Conceptual Metaphors: Is Love Translatable?
Xueni (Emily) Jin ’17, Comparative Literature/Psychology

Dual Language Learners: The Perspective of the Teacher
Diana M. Castillo ’17, Sociology/Spanish

English or Nah?: School Choice in Bangladesh and the Role of Language and British Imperial Legacy
Lamisa S. Hosain ’17, Economics/Political Science

The Effects of Early Bilingualism on Asymmetry in the Mental Lexicon: A Pilot Study
Rebecca B. Farkas ’17, Cognitive & Linguistic Sciences

More than Empathy: Responding to Sexual and Gender-Based Violence (Talk) SCI-270
Responding to Reports of Sexual Violence: Victim Service Professionals’ Testimonies on Challenges Faced with the Criminal Justice System, Assessment of Victims’ Needs, and Future Recommendations
Monica M. Naranjo DS, Psychology
Testing for Answers: Examining the Role of Sexual Assault Evidence Collection Among College-Aged Women
Cassandra M. Allen '18, International Relations-Economics

Alternative Paths to Healing from Gender-Based Violence
Ananya M. Ghemawat '17, Political Science/Women’s and Gender Studies

Aging Across Contexts  (Talk)  SCI-278
Vulnerable and Ignored: Exploring the Unique Needs and Ethical Considerations of the Aging U.S. Prison Population
Shreya Thatai '17, Women’s and Gender Studies

The Effect of Social Security on Savings
Rose Burnam '17, Economics

Immigration and the Elderly: How Immigrants Influence the Living Arrangements and Health Care Outcomes of Elderly Individuals in the U.S.
Kelsey C. Moran '17, Economics

Beyond My Mother’s Story: Examining the Quality of Long-Term Care Facilities
Ju (Julie) Y. Kim '17, Political Science

2:40–3:00 p.m. Break
Refreshments served in the Science Center Leonie Faroll Focus

3:00–4:10 p.m.  Humanities
The Selfie in American Life (Pre-formed Panel Discussion)  FND-128
Kayli J. Balin '20, Undeclared; Caroline B. Taylor '20, Undeclared; Sarah A. Yan '20, Undeclared; Imogen Y. Yih '20, Undeclared; Anisa Sonthalia '20, Undeclared; Hunter M. Sessa '20, Undeclared; Megumi Murakami '20, Undeclared; Rhiannon L. Mulligan '20, Undeclared; Rosihi M. Madhu-Sudan '20, Undeclared; Suyoung Choi '20, Undeclared; Kathryn J. Cross '20, Undeclared; Nedda Bozorgmehr '20, Undeclared

Exploration of the Book from Manuscript to Print  Clapp Library Special Collections–4th Floor
(on-Location Presentation)
Sophia O. Tew '18, English/Medieval and Renaissance Studies

Beyond Simba and Hakuna Matata: A Great Journey in Tanzania  FND-120
(Simba and Hakuna Matata as well as Romeo and Juliet)
(Simba and Hakuna Matata as well as Romeo and Juliet)
Sophia S. Abdelrahman '20, Undeclared; Belyse Inamahoro '19, Media Arts and Sciences; Caitlynn Douga '20, Undeclared; Aida El Koben '19, Economics; Monica P. Groth '20, Undeclared; Sandra Obemeng '20, Undeclared

The Usual Suspects, Unusual Influences (Talk)  PNW-001
The Secret Life of Plants: An Exploration of Pattern in Natural Forms
Elle D. Friedberg '17, Art Studio/Chemistry; Some M. Louis '17, Art History/Art Studio

From Chaucer to Shakespeare: An Analysis of the Humanistic Pessimism that Links Chaucer’s Troilus and Criseyde to Shakespeare’s Troilus and Cressida as well as Romeo and Juliet
Juliette C. Mann '17, English

“What Is the Final Product?”: Investigating Process Art and the Individual
Some M. Louis '17, Art History/Art Studio; Elle D. Friedberg '17, Art Studio/Chemistry

Bark and Metal (Pre-formed Panel Discussion)  FND-102
Charlotte Z. Yu ’17, Architecture; Xiaorong (Sharon) Liu ’17, Art History/Mathematics; Virginia G. White ’17, Classical Civilization; Ningyi Xi ’17, Art History/Classical Civilization
<table>
<thead>
<tr>
<th>Science and Technology</th>
<th>Comparative Studies of a Novel Anti-Cancer Agent Targeting Pancreatic Cancer (Pre-formed Panel Discussion)</th>
<th>SCI-E-111</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Milica Markovic ’17, Biochemistry; Elisa J. Wang ’18, Biological Sciences; Emma E. Goodman ’17, Biological Sciences; Jennifer C. Chang ’17, Biochemistry; Martha K. Aywa ’17, Biochemistry</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EcoLab: Studying the Impact of Climate on Ecosystem Feedbacks (Pre-formed Panel Discussion)</th>
<th>SCI-278</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drought, Hurricanes, or Snowmageddon? What Can You Expect from Climate Change?</td>
<td></td>
</tr>
<tr>
<td>Caroline J. Harper ’17, Biological Sciences; Sarah J. Russell ’17, Biological Sciences</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trees as Storytellers: Analyzing Tree Rings to Understand Climate in the Past, Present, and Future</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Emma M. Conrad-Rooney ’20, Undeclared; Irina Chen ’18, Biological Sciences</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wet or Dry: How Soil Respiration Adapts to Precipitation Variation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Amandine M. Fromont ’17, English/Environmental Studies; Prapti Koirala ’19, Undeclared</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seeking Environmental Justice in a Modern Urban Context: All Things Interdisciplinary (Interactive Teaching Presentation)</th>
<th>SCI-104</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lucy A. Wanzer ’19, Geosciences; Hannah L. Oetjen ’17, Geosciences; Sarah M. Smith-Tripp ’19, Geosciences; Thesaly McFall ’19, Geosciences; Brianna N. Love ’19, Architecture; Amanda B. Hernandez ’18, Environmental Studies; Emma X. Jackman ’19, Geosciences; Alexis M. Corcoran ’18, Biological Sciences; Meredith J. Wade ’17, Environmental Studies/History; Kimberly Chia Yan Min ’19, Environmental Studies/South Asian Studies</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Raging Hormones and Mutants (Talk)</th>
<th>SCI-264</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Role of Patellin 1/2 in Vascular Development of Arabidopsis thaliana</td>
<td></td>
</tr>
<tr>
<td>Anna C. Hakes ’17, Biological Sciences</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The Genetic Basis of a Heat Shock Inducible Color Change in the Tobacco Hornworm, Manduca sexta</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Surisadai Aquit ’18, Biological Sciences</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hormonal and Nutritional Regulation of Ecdysteroidogenesis in Manduca sexta</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lily C. Xu ’19, Biological Sciences; Akiho Saito ’17, Biological Sciences</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hormonal Regulation of Insect Reproduction</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Isabella R. McDonald ’17, Anthropology/Biological Sciences</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social Sciences</th>
<th>Give and Take: Compromise in Times of Crisis (Talk, Fowler Presentation)</th>
<th>PNE-239</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stumbling Into Progress: Military Learning in Disaster Relief Operations</td>
<td>C. R. Bechtel ’17, Middle Eastern Studies/Political Science</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stand Down for What: An Assessment of the U.S. Military’s Use of Force During Operation Iraqi Freedom</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lizamaria Arias ’17, International Relations-Political Science</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seize the Window: Targeted Killing’s Uses and Limitations in Counterterrorism Strategy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Jillian L. Kutner ’17, International Relations-Political Science</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Germany’s Recovery from the 2008 Global Financial Crisis: Benefits of a Flexible Labor Market and Strong Export Sector</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Zainab Younus ’17, International Relations-Economics</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perspectives from the Freedom Project IV: Thinking Outside the (Urban) Box (Pre-formed Panel Discussion)</th>
<th>PNE-139</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madeleine H. Collins ’18, Individual-Peace &amp; Justice Studies; Jeane-Yve Z. Daniel ’17, Sociology; Mary R. Meisenzahl ’19, History</td>
<td></td>
</tr>
</tbody>
</table>
Perspectives from the Freedom Project V: Clashing Definitions of Freedom and Their Policy Implications (Pre-formed Panel Discussion)  PNE-127
Cassandra A. Cronin '19, Individual-Peace & Justice Studies/Spanish; Caroline R. George '19, Environmental Studies/Music; Sophia Leung '19, Computer Science/Political Science

Sed Ministrare: Becoming a Teacher at Wellesley (Pre-formed Panel Discussion)  SCI-268
Helen C. Colby '17, Japanese Language & Culture; Charlotte J. Weiss '16, Spanish; Rebecca R. Van Dusen '17, Psychology; Megumi E. Takada '17, Neuroscience; Morgan L. Millon '17, Political Science; Jekia Brockman '17, Psychology; Katharine A. Aoki '17, Religion

China Beyond Its Borders (Talk)  SCI-274
Annie Wang '17, History/Media Arts and Sciences

Effectiveness and Feasibility of a National Emissions Trading Scheme (ETS) in China: Examined through the Lens of the Guangdong Pilot ETS
Karen X. Ni '18, International Relations-Economics

A Poker Face No More: Japan’s New Engagement in the South China Sea
Sabrina Liang '19, Political Science

Understanding How Big Personalities Get to the World Stage (Talk)  SCI-277

When Personalities Dominate, Stability Fails: Great Britain’s Shifting North American Military Strategy, 1768-1775
Anna S. Page '17, History

Entrepreneurial Personality in Early-Stage Ventures: Some Theory and Findings on Firm Founders at Cambridge Innovation Center
Margaret G. Dalton '17, Economics/Spanish; Tina Y. Xu '17, Undeclared

The Meaning of “Make America Great Again,” Along Party Lines
Katherine (Katie) J. Madsen '19, English
Jacqueline Loewe Fowler ’47 Prize in Public Speaking

This year’s Ruhlman Conference will host the Maurer Public Speaking Program’s third annual Jacqueline Loewe Fowler ’47 Prize in Public Speaking competition. The prize honors Mrs. Fowler’s support of public speaking at Wellesley through her substantial contributions to the public speaking program established by Anne E. Maurer ’51 and her husband, Gilbert, in 2012.

The five finalists, listed below, will be presenting throughout the day in PNE-239, and their talks can be viewed online at www.wellesley.edu/live.

Finalists (in schedule order)

9:15–10:25 a.m.  Angela M. Sun ’17
Architecture/Philosophy
**Advisor:** Erich Matthes, Philosophy
“The Values of Architecture”

10:45–11:55 a.m.  Amal W. Cheema ’17
Biochemistry/Political Science
**Advisor:** David Lindauer, Economics
“Calderwood Seminars in Public Writing: Engaging Interviews”

1:30–2:40 p.m.  Agnes (Aggie) G. Rieger ’17
Psychology
**Advisor:** Beth Hennessey, Psychology
“Creativity as a Route to Attitude Change: Collage-Making and the Elaboration Likelihood Model”

Lisa J. Jenkins ’17
Psychology
**Advisor:** Jennifer Grossman, Wellesley Centers for Women
“Let’s Talk About Sex: How Parents’ Conversations with Teens About Sex Change Over Time”

3:00–4:10 p.m.  Caroline R. Bechtel ’17
Middle Eastern Studies/Political Science
**Advisor:** Paul MacDonald, Political Science
“Stumbling Into Progress: Military Learning in Disaster Relief Operations”
Frequent Sources of Support for Student/Faculty Research

Brachman Hoffman Fund
Elizabeth Davis Cook Student Research Fund
Pamela Daniels ’59 Fellowship
Educational Research and Development Committee
Virginia Fiske Fund
Fund for Summer Research in the Social Sciences
Howard Hughes Medical Institute
IBM Research Fund
Amabel Boyce James Fund for Summer Research in the Sciences
Keck Northeast Astronomy Consortium Grant
Sara Langer Fund for Research in Geosciences
John and Elizabeth Alden Little Science Fund
Janina A. Longtine Fund for Summer Research in the Natural Sciences
Massachusetts Space Grant Consortium Grant
Georgeanne Miller Mulhern Fund for Faculty/Student Research in the Sciences
National Buchet Fellowship
National Institutes of Health
National Science Foundation
Office of the Provost and Dean of the College
Barbara Peterson Ruhlman ’54
Jerome A. Schiff Fellowships
Joan and Herbert Schilder Student Research and Travel Fund
Staley Fund for Cancer-Related Research
Robert and Karl Staley Fund
<table>
<thead>
<tr>
<th>Time</th>
<th>Presentation 1</th>
<th>Presentation 2</th>
<th>Presentation 3</th>
<th>Presentation 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:15–10:25 a.m.</td>
<td>Topic:</td>
<td>Topic:</td>
<td>Topic:</td>
<td>Topic:</td>
</tr>
<tr>
<td></td>
<td>Presenter(s):</td>
<td>Presenter(s):</td>
<td>Presenter(s):</td>
<td>Presenter(s):</td>
</tr>
<tr>
<td></td>
<td>Location:</td>
<td>Location:</td>
<td>Location:</td>
<td>Location:</td>
</tr>
<tr>
<td>10:25–10:45 a.m.</td>
<td>BREAK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:45–11:55 a.m.</td>
<td>Topic:</td>
<td>Topic:</td>
<td>Topic:</td>
<td>Topic:</td>
</tr>
<tr>
<td></td>
<td>Presenter(s):</td>
<td>Presenter(s):</td>
<td>Presenter(s):</td>
<td>Presenter(s):</td>
</tr>
<tr>
<td></td>
<td>Location:</td>
<td>Location:</td>
<td>Location:</td>
<td>Location:</td>
</tr>
<tr>
<td>12:00–1:30 p.m.</td>
<td>LUNCH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:30–2:40 p.m.</td>
<td>Topic:</td>
<td>Topic:</td>
<td>Topic:</td>
<td>Topic:</td>
</tr>
<tr>
<td></td>
<td>Presenter(s):</td>
<td>Presenter(s):</td>
<td>Presenter(s):</td>
<td>Presenter(s):</td>
</tr>
<tr>
<td></td>
<td>Location:</td>
<td>Location:</td>
<td>Location:</td>
<td>Location:</td>
</tr>
<tr>
<td>2:40–3:00 p.m.</td>
<td>BREAK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:00–4:10 p.m.</td>
<td>Topic:</td>
<td>Topic:</td>
<td>Topic:</td>
<td>Topic:</td>
</tr>
<tr>
<td></td>
<td>Presenter(s):</td>
<td>Presenter(s):</td>
<td>Presenter(s):</td>
<td>Presenter(s):</td>
</tr>
<tr>
<td></td>
<td>Location:</td>
<td>Location:</td>
<td>Location:</td>
<td>Location:</td>
</tr>
</tbody>
</table>

Please note that people will be leaving or entering the rooms between or even during presentations.
**Humanities**

**Lighting a Candle for Hemingway in His Sacred Landscapes: A Pamela Daniels Fellow Project**
Houghton Chapel
Connie Chen ‘17, English
ADVISOR: William Cain, English, Mary Jewett Gaiser Professor

Experience the power and meaning of religion in Hemingway’s work with me in Houghton Chapel. My thesis examines Hemingway’s conscious religious design in The Sun Also Rises and The Old Man and the Sea. With the generous support of the Pamela Daniels ’59 fellowship, I retraced Hemingway’s religious pilgrimage, following his footsteps to the places where he lived, worshiped, and wrote faithfully. I visited 30 cathedrals in France and Spain, and immersed myself in the landscapes and cultures that shaped and influenced Hemingway. I recognized as I looked up at the stained glass windows in Leon Cathedral, as I felt the indentations on the stones formed by centuries of pilgrims in Santiago de Compostela, how little I knew about the subject I have been actively pursuing in my thesis. During my presentation, I will share how the depth of faith in the geography, the people, and the background helped me to gain a deeper and more sensitive insight into Hemingway’s work.

**Forbidden Love and Conservative Romanticism: Brahms’ Piano Quintet in F Minor**
PNW-201 (Long Performance)
Julia F. Wells ‘17, Physics; Sharon S. Kim ‘18, Computer Science; Alice Z. Xu ‘17, Economics; Ya Hui (Yinan) Gan ‘20, Undeclared; Yuriko A. Fukumura ’19, Neuroscience
ADVISOR: Jenny Tang, Music

During the Enlightenment era of 18th-century Europe, the power of the Christian church and aristocracy were in decline, replaced by logic and reason rather than dogma and divine right. This ethos permeated many aspects of life, including music. Composers wrote music according to their personal inclinations, resulting in a very emotionally intimate approach to their music. One of these composers is Johannes Brahms (1833–1897). In contrast to many of his contemporaries, he continued to write chamber music for small ensembles. His music is reminiscent of historical forms and devices, especially those of Bach, a composer he was keenly interested in. However, the sentiments and romanticism conveyed through his music are of his time, and are expressed vividly through his Piano Quintet in F Minor, Op. 34. Our presentation will discuss the historical context and musical structure of the piece, followed by a full performance.

**The Artist and the Craftsman**
Green Beach
(On-Location Presentation)
Christine J. Galloway ‘17, Art Studio
ADVISOR: Andrew Mowbray, Art

During the past six months I have been building an 11’ 6” Wee Lassie cedar strip canoe. This process has accompanied my personal exploration of the concepts of craft, craftsmanship, and the craftsman through the course of my honors thesis. Where does craft fit into the context of contemporary art? How do gender and class fit into the discourse around them? I welcome you to join me on the shore of Lake Waban for a full performance. Our presentation will discuss the historical context and musical structure of the piece, followed by a full performance.

**Videnda: An Exploration of Visual Storytelling**
Knapp Media Center (Exhibition)
Michelle Gao ‘17, Media Arts and Sciences; Ruby Feng ‘17, Media Arts and Sciences
ADVISOR: David Olsen, Art

For our thesis, we decided to make a multimedia exhibition that explores different ways of storytelling. We created paintings, 3D models, and an interactive piece based on a fantasy world using programs that include Adobe Photoshop, Autodesk Maya, and the Unity game engine. Videnda is the interactive portion of our thesis, which is centered on the idea of environmental storytelling within a fantastical setting. The title of the piece comes from the word “videnda,” which means something that should be observed or visited. In this piece, viewers can travel back and forth between landscapes that represent different characters through either virtual reality (VR) or a more traditional computer setup. Every object in the space is symbolic of a character’s traits and persona, but viewers are left to draw their own conclusions about the story and the people involved.

**Tell Me a Story**
FND-102 (Talk)
“Ovid, God, and Gilgamesh Walk into a Bar...”: On the Comparison of Mythological Literatures
Austen N. Aquino ‘17, Classical Civilization/Comparative Literature
ADVISOR: Edward Silver, Religion

In the mythological literature of the ancient Near East and Augustan Rome there can be found striking motivic and thematic similarities, such as stories of the Great Flood, that are present in ancient Mesopotamian texts like The Epic of Gilgamesh, in Biblical texts like Genesis, and Roman texts like Ovid’s Metamorphoses. This Great Flood story is ubiquitous, emerging in literatures spanning thousands of years, across the Mediterranean and beyond, and vast cultural and linguistic barriers; yet, the stories have numerous and fascinating thematic parallels and motivic overlaps that invite comparison. Even more compelling is the fact that the Flood story is not a solitary conundrum—this phenomenon is also present in Creation mythologies and stories of theoxeny (divine beings receiving hospitality from mortals). So, how do we best approach the task of making sense of the obvious similarities between texts that seem tenuously connected at best? Can these similarities be understood only within the larger context of cross-cultural contact? If so, how do we avoid sideling textual analysis in favor of historical inquiry; and, even more importantly, how do we avoid falling into the realm of harmful diffusionist models of thinking and imposing false cultural hierarchies? At the other end of the spectrum, how can we focus on the textual similarities without devolving into universalist tendencies? The act, and the art, of literary comparison involves walking a tightrope between these extremes; and ultimately it is impossible for us to satisfactorily answer these questions. Nevertheless, the salient similarities between these texts compels many a comparativist to approach this problem anyway, which is what I am trying to do in my senior thesis project. I have chosen a purely literary approach for my comparison, with no historical presuppositions or theories of hypothetical cultural contact. My method
of comparison, which is based upon the structuralist tradition, particularly the work of Levi-Strauss, is a tabular, text-focused analysis that allows me to clearly see the patterns of convergence and divergence between my chosen texts despite their distance from each other. In this presentation, I will discuss my comparative methodology, why I chose this approach in contrast to previous approaches, and illustrate the application of my method with examples from Flood, Creation, and theoxeny literatures.

**Cuando se te esponja el arroz: Tradition, Modernity, and the Identity of Mexican Women**  
**Johana C. Mata ’17, French/International Relations-History**  
**ADVISOR:** Nancy Hall, Spanish

Mexican women both shaped and were shaped by forces of change in the late 19th and early 20th centuries. The modern era’s economic and educational opportunities, however, were often in direct conflict with the essential proscription of Mexican womanhood. Tradition placed her in the kitchen and defined fulfillment as marriage, motherhood, and homemaking. How did the women of Mexico evolve and adapt when educational access and jobs outside the home became possible? My presentation will explore the broad strokes of Mexico’s development as a modern nation in order to examine how technological innovation, and in particular, the creation of tortilla-making machines, redefined age-old concepts of identity for the women of Mexico, and how technology continues to influence the perception of Mexican womanhood in the present day.

**Child’s Play?: Researching and Writing a Children’s Novel**  
**Isabelle A. Chen ’17, English/French**  
**ADVISOR:** Susan Meyer, English

For my honors thesis in the English department, I am writing a novel for middle-grade readers entitled *The Metas of Salem*. The book tells the story of timid Sophie Shilas, who, during the summer before middle school, makes it her mission to survive summer camp and make at least one friend. Her summer takes an unexpected turn, however, when she befriends a boy with supernatural powers, and proceeds to become involved with an underground group of people with superhuman abilities and likely connections to the Salem witch trials. As Sophie’s friendship with this boy develops, she must learn how to come to terms with the seemingly significant differences between them. In this presentation, I will discuss how my research, writing, and editing processes have come together in this thesis project to retell the Salem witch trials in a way that presents their essential questions of difference, acceptance, and community in a context familiar to a young audience.

**Accessing Myth in the Modern Day: The Odyssey and YA Magical Realism**  
**Allyson F. Larcom ’17, Classical Civilization/English and Creative Writing**  
**ADVISOR:** Susan Meyer, English

Stories of myth and legend hold a different sort of power in the modern day. Creating a novel that utilizes these stories and remains relevant and engaging to a contemporary teenage audience is challenging. In this presentation, I will be reading selections from *Seafarer*, a YA magical realism novel based on *The Odyssey*, and discussing the process of retrofitting a myth to the modern day, the significance of queer stories for a YA age group, and the function and importance of YA as a genre.

**Saving History, Recording Our Presence**  
**PNE-239 (Talk, Fowler Presentation)**

**The Values of Architecture**  
**Angela M. Sun ’17, Architecture/Philosophy**  
**ADVISOR:** Erich Matthes, Philosophy

What is architecture, and what makes it good or bad? Because the Western art tradition classifies architecture as a fine art alongside painting, sculpture, music, and literature, such questions are typically subsumed under more general questions about what art is and what makes art good or bad. Philosophers search for definitions of art rather than of individual art forms, and propose all-encompassing theories of artistic value rather than independent theories of sculptural value, musical value, etc. Architecture, however, is fundamentally unlike the other fine arts. It is public, site-specific, constrained by functionality, and immersed in everyday life—characteristics that challenge the applicability of a unified framework of art to architecture. My research examines the aesthetic and moral implications of thinking about architecture in isolation from the broader arts. I address the differences between good architecture and good art, and between good architects and good artists. Ultimately, I show that reflecting on the values of architecture instead of elite museum art can provide a new way of approaching aesthetic objects that explains how they can be valuable to us in our everyday lives.

**Creating a Photographic Memory**

Doris Li ’20, Undeclared  
**ADVISOR:** Alison Hickey, English

We upload 350 million pictures to Facebook a day, post 2.5 million Instagram photos per hour, and share 8,796 snapshots on Snapchat every second. The result? We’ve created an extensive, complex set of recollections on our public profiles. We’ve created an ability, and perhaps a need, to document our lives in photographs, constructing synthetic photographic memories to supplement our natural recall systems. It’s become a way of life—a way of remembering life, that is. Researchers at Microsoft have made this process automatic, creating a camera that can document virtually every moment of every day without user interference—a real game-changer. The Microsoft SenseCam is a wearable camera designed to take photos when it senses significant changes in light and body heat. The result? Up to 300 photos per hour of your life can be preserved through this device. In what ways does our use of Facebook, Instagram, and Snapchat parallel the process of a SenseCam? How heavy is our reliance on photographs for memory? And how does such a reliance help or hurt our internal memories? Most important, regardless of whether we are using devices such as SenseCam or applications such as Snapchat, what can and should we do with all of the data we have generated?

**Guns and Grits: Black Womanhood and Radical Self-Preservation in the Black Panther Free Breakfast Program**

Meredith J. Wade ’17, Environmental Studies/History  
**ADVISOR:** Brenna Greer, History, Knafel Assistant Professor of Social Sciences

In May 1969, FBI director J. Edgar Hoover alerted the bureau to “the greatest threat to efforts by authorities to neutralize the Black Panther Party”: the free hot breakfasts the Panthers served to schoolchildren each day. Through the Free Breakfast for Children, volunteers enacted the Black Panthers’ ethos
of radical self-determination and community care. Black women within and outside the party provided crucial emotional and physical labor to the Panther breakfasts, yet they are glaringly absent from the historical record. We will trace both their contributions and their continued erasure through oral histories, Panther-produced media, and hundreds of letters condeming the breakfast program. Follow an Afro-Haitian dance teacher, an Irish Catholic priest, and countless anonymous black women in their struggle for survival, quality of life, and self-expression through food.

Classical Antiquities at Wellesley College
Margaret A. Justus ’17, Art History/Classical Civilization Advisor: Kimberly Cassibry, Art

Inspired by prior coursework and the recent reinstallation of the Davis Museum, last fall I conducted an independent study (advised by Prof. Cassibry) on the history of classical antiquities at Wellesley College. My preliminary research over the summer resulted in an interactive digital timeline of classical and neoclassical elements of our campus (generously supported by the Classics Department’s Miranda Marvin Memorial Fund Award). The independent study during the following fall semester resulted in a more comprehensive website. I collected, synthesized, and contextualized existing records and conducted oral interviews to create a new, multi-dimensional body of evidence. These were great opportunities to explore my interest in this topic while also testing the applications of new digital humanities tools. Since the founding of the College, classical antiquity has been part of campus life, from the Davis to the dorms, in ways both explicit and implicit. I am excited to share this new body of evidence with the Wellesley community. It’s my hope that the audience, regardless of major or field, will leave my presentation with a new understanding and appreciation of antiquities on campus.

Value Systems Time After Time
FND-120 (Talk)

Medical Ethics in Islam: Theory and Practice
Julide E. Iye ’18, Middle Eastern Studies Advisor: Louise Marlow, Religion

Islamic ethics draws on the sacred sources, the Qur’an and traditions of the Prophet Muhammad, which Muslims have interpreted in various ways. Interpretations of the ethical guidelines set forth by these texts have been formulated over centuries in several branches of knowledge or discourse, including jurisprudence (fiqh), Medical ethics sets forth principles and judgments regarding the practice of medicine, but more specifically, health, healing, and mental and physical wellness. In my research, I will examine the wealth of information and revelation from religious texts and tradition with special attention to medical decisions and medical practice. The presentation will investigate and draw from a variety of perspectives ranging from scholars to health professionals to patients to gain insight on the development of these principles and the transition to how Muslims incorporate them into real-life practice.

The Degraded Regimes in Plato’s Republic
Peijing (Peggy) Zhu ’17, Philosophy Advisor: Corinne Gartner, Philosophy

In the Republic, Books 4, 8, and 9, Plato discusses five types of regimes: aristocracy, timocracy, oligarchy, democracy, and tyranny, which are described in order by their degree of justice. Each regime after aristocracy occurs as the result of the inevitable degradation of the precedent. The discussion about the five regimes takes place within the bigger context of his argument about justice. Plato argues in the Republic that being just is more beneficial than being unjust. To demonstrate his point, he compares the unjust life with the just life, and argues that the latter is better than the former. Plato’s comparison between justice and injustice is carried out on two levels, the individual and the city, for he believes that the characteristics of a city are mirrored in its citizens. Therefore, the just city, Kallipolis, which exemplifies aristocracy, and the corresponding just citizen, the aristocrat, are the happiest. The degree of happiness declines as the city degrades. The purpose of the current research is to yield a holistic account of the degradation of the five regimes based on a rigorous and original interpretation of Plato’s Republic. Questions to be answered include: Why does each regime decline? What’s bad about the degraded city? Does this account of degradation apply to both the city and the soul of its citizen? How does the degradation of justice relate to the degradation of other virtues in the city and the soul?

Unstable Warps: Contested Visions of Empire in Agostino Brunias’s Market Scenes
Rebecca E. Selch ’17, Art History/Sociology Advisor: Elizabeth Oliver, Art

When Mary Prince (c. 1788–c. 1833), a freed West Indian slave, described being sold in her 1831 autobiography The History of Mary Prince, she disclosed that her mother dressed her in “osnaburg” to ready her for the slave market. Readers of the time would have recognized Prince’s message, as the coarse linen she mentions commonly dressed enslaved people in the Americas. Following Prince, I discuss four 18th-century paintings of West Indian linen markets by Italian-British painter Agostino Brunias (c. 1730–1796) to explore the myriad meanings inscribed in representations of cloth. I argue that Brunias presents a fantasy of colonial life imbued with ambiguity reflective of conflicting anxieties and desires of free and enslaved life in the West Indies. By considering the role of cloth and its trade, I explore how colonial conquest and the agency of free and enslaved women of color in the 18th century were bound together in gendered, sexualized, and racialized networks.

Science and Technology

Women Who Will Farm: A Proposal to Cultivate a Sustainable Food System at Wellesley
SCI-277 (Pre-formed Panel Discussion)
Sarah H. Koenig ’17, Environmental Studies; Clara (Clare) C. Sache DS, Environmental Studies; Heike J. Jacob ’17, Architecture/ Environmental Studies; Alysha E. Cross ’17, Environmental Studies; Sarah H. Koenig ’17, Environmental Studies; Rebecca E. Selch ’17, Art History/Sociology Advisor: Monica Higgins, Environmental Studies

In recent years, Wellesley College and its dining services have made strides in sustainability through initiatives for composting, local purchasing, and food waste reduction. However, there are still major improvements to be made. This year’s Environmental Studies capstone class is reimagining what a sustainable food system could look like at Wellesley College. With
an examination of the Regeneration student farm on the North 40 as a starting point, we will offer a proposal for food system improvements that prioritize our whole community’s health and well-being. Our aims are to maximize the environmental sustainability, student health, accessibility and equity, academic integration, and economic viability of the College’s food system.

Exploring the Landscape of an Ancient Supercontinent Using Microscopic Grains of “Sand”

SCI-278 (Interactive Teaching Presentation)
Disha C. Oktat ’17, Geosciences
ADVISOR: David Hawkins, Geosciences

Two hundred and eighty million years ago, in the Late Paleozoic era, the Earth was dominated by the supercontinent Pangea. Our knowledge of Pangea’s landscape is based on the distribution of rocks that formed from sediment deposited in different environments such as deserts, shallow seas, rivers, or deltas. The provenance of sediment—where it came from—can help determine the relative locations of ancient mountain ranges, river flow direction, and even prevailing wind direction. Minerals, such as zircon, which are about 0.1 mm in length, store age and geochemical information within their structures that can help determine the provenance of a sedimentary unit. The goal of this study was to compare hundreds of zircon grains from a preserved delta, currently exposed in the Guadalupe Mountains of West Texas, to hundreds of zircon grains from potential source rocks thought to be exposed in an ancient mountain range in the Late Paleozoic.

Chemistry’s Next Top (Computational Model): Optimize Your Way to the Top!

FND-225 (Pre-formed Panel Discussion)
Shi Hui (Fiona) Ng ’17, Biological Sciences; Carla P. Perea ’18, Chemistry; Rachel Kim ’19, Undeclared; Alexandria Guo ’19, Undeclared
ADVISOR: Mala Radhakrishnan, Chemistry

Elmore and Radhakrishnan Modeling & Co. are looking for chemistry’s next top model. Or someone to manage them, at least. Computational representations of DNA, buforin, imatinib, and ponatinib all think they have what it takes to take home the prize protein, but it will take more than CHARMM to make it in this industry. Will they hold up to the test? In differently solvated systems, populated with water molecules, pushy macromolecular crowders, and competitive promiscuous proteins, only the most favorable binding energy can prevail.

Biomolecular Damage and Bacterial Interactions: A Sampling of Biochemistry Research

SCI-396 (Pre-formed Panel Discussion)
Leah M. Fuerman ’17, Chemistry/French; Lucia J. Ortega ’17, Spanish; Dania M. Figueroa ’17, Biochemistry; Margaret (Maggie) A. Klureza ’17, Chemistry
ADVISOR: Megan Nunez, Chemistry

This panel highlights four senior biochemistry research projects that investigate the effects of damage in biomolecules and biomolecular interactions with bacteria. The first two projects explore the spirominodihydantoin (Sp) lesion, a product of oxidative damage in DNA. One of these projects creates the Sp lesion by oxidizing DNA with iridium and then utilizes high-performance liquid chromatography (HPLC) to probe the formation of the lesion. The other studies the effects of the Sp lesion on nucleosome formation. A third project uses DNA hairpins to characterize the structural repercussions of DNA lesions, revealing the similarities and differences between the effects of base-pair mismatches and oxidative lesions on overall helix stability. The last project employs biomolecules, in this case histone-derived antimicrobial peptides (HDAPs), as an alternative to replace more traditional antibiotics. The project has developed gram-positive cell-wall deficient bacteria as a tool to enhance the characterization of HDAPs through confocal microscopy.

Brainy Science

SCI-392 (Talk)
Conductive Polymer Fiber Mats for Both Stimulating and Measuring Oligodendrocyte Progenitor Cell Differentiation

Alexis L. Lowe ’17, Neuroscience
ADVISOR: Deborah Bauer, Neuroscience

In patients with multiple sclerosis (MS), an autoimmune response destroys the critical myelin sheath of the central nervous system (CNS). Normally, myelin insulates neuron axons to promote fast transmission of action potentials, and it is produced by glial cells called oligodendrocytes. After a demyelinating event, oligodendrocyte progenitor cells (OPCs) in the adult CNS can differentiate into myelinating oligodendrocytes to promote repair. Unfortunately, this process of remyelination is not efficient enough to return all axons to their fully myelinated state. There are currently no FDA-approved remyelination drug therapies for MS patients. In our lab, we hypothesize that this drug-discovery process is hindered by the primitiveness of the available platforms for studying OPC differentiation in vitro. OPCs are often cultured on stiff, flat polystyrene dishes, which could not be more different from their in vivo environment. Myelin production and wrapping is impossible to effectively observe on a flat surface. Our work focuses on the development of axon surrogate structures around which differentiating OPCs can begin to myelinate. Specifically, we aim to produce electrically conductive fibers using biocompatible, conductive polymers. This cell seeding platform allows us to observe OPC differentiation while cells are adhered to a fibrous substrate and are stimulated by electric fields. In addition, we aim to measure whether or not cell growth and myelin production changes the electrical properties of the substrata. In doing so, we provide evidence as to whether electrically conductive fiber substrata can stimulate OPC differentiation; and, in addition, whether the property changes of the substrate can provide a high-throughput readout for drug screenings.
Breeding for the Brain: A Look into Huntington's Disease, Decision Making, and Selective Mouse Models  
Ruth H. Vorder Bruegge '18, Neuroscience; Serena K. Bourque '19, Undeclared  
ADVISOR: Leif Gibb, McGovern Institute for Brain Research, Neuroscience

The Graybiel lab researches the role of striosomes, specialized structures of the striatum, in rodent behavior and decision-making processes, and explores the relationship between striosomes and diseases of the basal ganglia. Huntington's disease, for instance, is an inherited neurodegenerative disease known to cause movement, cognitive, and mood impairments, eventually resulting in death. Over the past year, we have collected preliminary data supporting the hypothesis that Huntington's disease model mice may have impaired cost-benefit conflict (CBC) decision making and increased perseveration. Since it has previously been found that striosomes are involved in CBC decision making, we have helped create complex Huntington's disease model mice with selective striosomal expression based on the birthdate of striosomal neurons during embryonic development. By using optogenetic manipulation and calcium imaging with these “birthdating mice,” we hope to achieve a better understanding of how striosomes are implicated in this deadly disease, perhaps facilitating the development of new treatments and helping in the search for a cure.

The Effect of Glutamate Transporter Deletions on Receptor Distribution in the C. elegans Synapse  
Andrea M. Bejar '19, Undeclared  
ADVISOR: Deborah Bauer, Neuroscience

The amino acid glutamate is a major excitatory neurotransmitter and is necessary for cognition, learning, and memory. Glutamate concentrations in the synapse are therefore tightly regulated by transporters in order to maintain signal specificity and prevent cell death due to excitotoxicity. Once in the synapse, glutamate binds to receptors to transmit various signals throughout the body. It has been shown that glutamate receptors redistribute about the neuron when new tasks are learned and memories are formed. In C. elegans, GLT-4 is the only glutamate transporter that can be found on the neurons. This semester, C. elegans will be mated to create a strain with a GLT-4 deletion and a GFP tag on the glutamate receptor GLR-1. Once obtained, our goal is to subject the GLR-1:GFP; GLT-4 strain to learning tasks to determine if the GLT-4 deletion affects receptor redistribution on the neuron. The presence of the GFP tag will be confirmed using fluorescence microscopy, and a PCR protocol is being developed to confirm the GLT-4 deletion. Protocols are being developed to mate worms, test for the GLT-knockout using PCR and gel electrophoresis, and image the C. elegans nerve ring.

Glutamate Transporters in Caenorhabditis elegans: The Implications of Transporter Deletions on Behavior, Learning, and Memory  
Moriah R. Harling '17, Chinese Language & Culture/Neuroscience  
ADVISOR: Deborah Bauer, Neuroscience

Glutamate is a neurotransmitter involved in cognition, memory, and learning. If transporters do not remove excess glutamate from the synapse, cell death occurs due to excitotoxicity. Research on the role of glutamate transporters and basic behaviors has been conducted by comparing the behavior of wildtype Caenorhabditis elegans to that of glutamate transporter deletion mutants. Basic behaviors tested include measuring how long the worms spent moving in various directions; response to contact with a foreign object or a bad smell; and chemotaxis either toward or away from a chemical that is attractive or repulsive. More complex tests include habituation and associative learning. Preliminary data suggest that basic behaviors may rely on different glutamate transporters and their respective locations more learning and memory. Research is currently being conducted to examine addiction as a type of memory and the ability for different mutant strains to express drug-seeking behavior.

Sleep and (Altered) Consciousness  
FND-207 (Talk)

Dissecting the Origins of the Primary Somatosensory System (S1) Resting State Functional Connectivity (RSFC) in the Rat Brain  
Jiyoung J. Lee '17, Neuroscience  
ADVISOR: Michael Wiest, Neuroscience

Resting state functional connectivity (RSFC) is the presence of synchronized neural activity observable in the form of distinct functional networks when the animal is awake but inactive. However, there is still much that is not known regarding RSFC, including the origins of these networks. This research project utilizes an awake-paralysis fMRI method to examine the origins of resting state functional connectivity in one of the most extensively studied areas of the brain, the primary somatosensory cortex (S1). In particular, it looks at the effect that the thalamus, the primary afferent input to the S1, plays on the S1 RSFC.
The Neuroscience of Consciousness: Can We Have Attention Without Consciousness?
Shivani A. Dayal ’18, Neuroscience
ADVISOR: Claudia Carrara-Augustenborg, Neuroscience
The relationship between attention and consciousness is not yet understood. However, there is a consensus that spatial attention is a critical evolutionary tool that allows humans to maintain awareness of their surroundings by allowing a choice in what to pay attention to and by protecting from information overload. Previous experiments have shown that unconscious erotic stimuli can guide spatial attention; however, the degree to which spatial attention can be guided by unconscious stimuli is unknown. In this study, we investigate whether attention can be guided by incremental differences in location between a conscious and an unconscious stimulus. The ultimate question is whether attention and consciousness share (or have distinct) underlying neural mechanisms. This research has significant implications for both our daily lives and the study of consciousness itself.

Automatic Detection of Sleep Spindles in Simultaneously Acquired EEG-fMRI Data
Kanupriya Gupta ’18, Neuroscience
ADVISOR: Laura Lewis (MIT, Health Sciences and Technology), Neuroscience
Sleep spindles play an important role in memory and cognition. In this study, we compare an automated method for detecting sleep spindles in EEG and EEG-fMRI data. Sleep-scored EEG data were obtained from the preexisting DREAMS Sleep Spindles Database, while EEG-fMRI data were collected from two subjects. First, stage two EEG data was filtered and then subjected to a Hilbert transform. Then, spindles were detected by locating peaks that were above a set threshold, and then compared to spindles detected manually. We found that sleep spindles in the DREAMS database were detected with 55 percent sensitivity and 43 percent precision. Using EEG-fMRI data, we detected spindles with 54 percent sensitivity, but only 26 percent precision. While the sensitivity of the spindle detector was not affected in EEG-fMRI data, its precision decreased. Therefore, future work will address artifact cleaning approaches to improve these results.

Data and Learning
SCI-E-111 (Talk)
Improving Dynamic Data Race Detection with Reprivatization Analysis
Samula (Sam) Y. Minchesa ’17, Computer Science
ADVISOR: Benjamin Wood, Computer Science
Concurrency and parallelization lie at the core of modern-day computing. In the multithreaded programming model, different threads within the same process can run concurrently and access the same data, which makes multithreading a powerful tool for the parallelization of large-scale systems. However, the presence of shared data leaves programs vulnerable to various concurrency errors. Data races are errors in which two or more threads access and modify the same shared data at the same time with no proper synchronization. Such errors often result in incorrect data being stored and used, which could have dire consequences in systems that handle sensitive data, such as online voting systems and banking applications. Because of the nondeterministic nature of multithreaded program execution, however, data races are insidious and hard to detect. This project explores the ways in which reprivatization analysis and other techniques for filtering unnecessary run-time checks can improve the performance of existing data race detection tools.

Predicting Churn in Massive Open Online Courses
Nancy Ho ’18, Computer Science/Mathematics
ADVISOR: Brian Tjaden, Computer Science
Massive open online courses (MOOCs) have become a popular way to learn for many people. Although MOOCs draw in many to their resources, they also face a high dropout rate from users, otherwise known as customer churn. Users churn when they stop using or subscribing to a service. To investigate churn in MOOCs, we used a dataset about users from a Chinese MOOC site, XuetangX, in order to apply machine learning algorithms and mathematical models to gain new insights about MOOC users. We first cleaned up the data and constructed several features for each user such as, but not limited to, number of sessions, month the user started, and the last time a user logged in. We then used our features with several machine learning algorithms in R and Python: logistic regression, neural network, decision trees, and random forests. Additionally, we implemented multiple mathematical ranking methods to rank the “top churners.” Our results indicate that a combination of machine learning algorithms and mathematical ranking methods offers improved performance over using machine learning methods or ranking methods individually. We propose how these new techniques can be applied to prepay customer churn predictions at Huawei Technologies Co. Ltd.

Singing in the Brain: The Contribution of New Neurons to Behavioral Plasticity in the Zebra Finch Brain
Rebecca B. Jennings ’17, Biological Sciences
ADVISOR: Sharon Gobes, Neuroscience
In humans, the left hemisphere is dominant for language production and perception in monolinguals. It is unclear how learning more than one language affects the hemispheric dominance in language-related brain regions. Zebra finches (Taeniopygia guttata) learn their song from their father (tutor), like humans learn speech from their parents. Similar to humans, zebra finches that have been exposed to one song tutor during development show activity in the left hemisphere in response to tutor song. When zebra finches are first exposed to one tutor early in development and a second tutor later on in development, they are able to imitate this second song, just like humans are able to learn a second language. For these birds, greater retention of first-tutor song is correlated with increased right dominance, while a greater retention of second-tutor song is characterized by more left dominance. This indicates that the left hemisphere is more flexible in its ability to acquire new song memories. The current study investigates whether individual variability in neurogenesis, the process by which new neurons are born and added to the brain, can explain variability in learning outcomes for first- and second-tutor song acquisition.
Due to the rise of accessible and affordable mobile phones, technology is changing people’s lives in many developing countries, especially in Africa. However, the lack of computer science education and the existence of online materials and tools mostly in the English language limit the students’ ability in countries like Burundi to embrace the technological revolution as creators instead of consumers of technology. To support students who have an interest in tinkering with technology, especially mobile app development, as part of my independent study, I am developing, translating, and distributing instructional materials in our national language, Kirundi. Using MIT App Inventor (a platform to create Android mobile apps), I am learning to develop life-changing mobile applications and transfer that knowledge to my community. Join me in my efforts to make mobile app development possible to the youth in my country.

**Cells that Make Bread and Beer**

**SCI-E-211 (Talk)**

**Introducing Mobile App Development to Youth in Burundi**

*Belyse Imanahoro ’19, Media Arts and Sciences*  
**Advisor:** Eniana Mustafaraj, Computer Science

**Cells that Make Bread and Beer**

**SCI-E-211 (Talk)**

**Using Atomic Force Microscopy to Characterize *S. pombe* Cell Wall Synthase-Deficient Cells**

*Kathryn M. Barth ’17, Biochemistry*  
**Advisor:** John Goss, Biological Sciences

In order for cells to successfully divide into equal and identical daughter cells, it is necessary for cytokinesis, the final stage in cell division, to occur at the right time and in the proper location within the cell. Improper cellular division can lead to neurological disorders, diabetes, and cancer. In order to determine how failure in cell division contributes to these disorders, it is necessary to study the mechanisms and processes of cytokinesis. One of the key components of cytokinesis in fission yeast is the formation of the septum, or the combination cell membrane and cell wall that extends to separate the two cells. The cell wall of fission yeast is composed of sugars, which are synthesized by the enzymes a- and b-glucan synthases (ags and bgs). When these enzymes are mutated, the integrity and stability of the cell wall is compromised. In regions of high synthase activity we predict that the cell wall will be weaker, as the glucans are still be to synthesized and added. Additionally, cells with mutated forms of glucan synthases should have reduced cell wall stability due to the altered composition. This strength can be directly measured by calculating the force that the cells can withstand using an atomic force microscope (AFM), which applies pressure to the cell surface and measures the resulting resistance. In this study, I characterize cell wall strength in normal fission yeast cells and cells with defective synthases. I then investigate how these synthase enzymes are transported to the sites of active remodeling within the cell, where they function via intracellular vesicles. These vesicles are tethered to sites of activity at the cell membrane by a protein complex called the exocyst. When components of the exocyst complex are removed, the function of the synthase Bgs1p and the stability of the cell wall are both impacted. Understanding the mechanism by which the glucan synthases are transported and function during cytokinesis will provide valuable insight into how membrane remodeling at the division site contributes to successful cell separation.

**Characterizing Protein Interactions Responsible for the Spatial and Temporal Regulation of Cytokinesis in Fission Yeast**

*Ruby Ye ’17, Biochemistry*  
**Advisor:** John Goss, Biological Sciences

Cytokinesis, the final stage in cell division, is the process through which one cell is separated into two daughter cells through the constriction of a contractile ring. Defects in this process can lead to a variety of diseases such as neurological disorders, diabetes, and cancer. However, we have an incomplete understanding of the regulatory mechanisms that control this essential process. Recently two regulatory proteins, Blt1p and Gef2p, have been identified as spatial and temporal regulators of cytokinesis. Both are known to localize to the division site in dividing cells where they contribute to timely recruitment of the Sid2p/Mob1p protein kinase complex, which is involved in initiating cytokinesis. However, the biochemical interactions between these proteins have not been characterized. In order to explore interactions between Blt1p, Gef2p, and the Sid2p/Mob1p complex, we have developed and optimized immunoprecipitation protocols that enable us to purify proteins of interest from cells and evaluate any in vivo binding partners. Using this approach, we will characterize binding affinities and map interaction domains among the proteins of interest. This project provides insight into the mechanisms by which Blt1p and Gef2p work to regulate cytokinesis through localization of the Sid2p/Mob1p kinase complex. This in turn contributes to a better understanding of the underlying mechanisms of contractile ring constriction, cytokinesis, and successful completion of cell division.

**Evaluating the Localization Interdependence of Blt1p, Gef2p, and Rng2p in *S. pombe***

*Alexis D. Crayton ’17, Biological Sciences/Chinese Language & Culture*  
**Advisor:** John Goss, Biological Sciences

A model organism, *Saccharomyces pombe*, or fission yeast, boasts a fully sequenced genome and short generation period. Using tetrad dissection and confocal microscopy, I observed the interdependence of three key proteins—Blt1p, Gef2p, and Rng2p—in *S. pombe*, and how they collectively affect the recruitment of the Sid2/mob1 in vivo. Gef2p is a regulator of division plane specification and contractile ring function in late cytokinesis. Blt1p is a tetramer that stabilizes the nodes formed during interphase. Rng2p is a multidomain adaptor protein that is localized in the nodes during interphase. It is speculated that the Sid2p- and Mob1p-mediated phosphorylation events that take place late in the SIN pathway allow for the final output of pathway. Since key genes, signaling pathways, and regulatory mechanisms are conserved among eukaryotes like *S. pombe* and humans, the results of the research that I am conducting for my thesis will hopefully allow us to better understand how the protein homologs in humans lose function.
Social Sciences

Perspectives from the Freedom Project I: Geopolitics After Trump
PNE-139 (Pre-formed Panel Discussion)
Kaila L. Webb ’20, Undeclared; Cassandra M. Allen ’18, International Relations-Economics; Sabrina Liang ’19, Political Science
ADVISOR: Joshua McCabe, Sociology

The recent election of President Donald Trump weighs heavily on the minds of many Americans. Trump’s rhetoric and early actions suggest he will pursue substantial domestic changes on a sweeping scale. Internationally, the waters are churning from the potential impacts of his political agenda, with countries as large as China and as small as Taiwan struggling to react to the repercussions of his actions at home and abroad. This panel will explore the present and prospective consequences of the Trump administration’s foreign policy on East Asian countries, with a focus on how American policies might affect access to critical resources, including food, energy, and minerals.

The Economics of Gender and the Family
SCI-264 (Pre-formed Panel Discussion)
Leah A. Plachinski ’17, Economics; Clio B. Flikkema ’17, Economics/Russian Area Studies; Madeline E. Stern ’17, Economics/Mathematics
ADVISOR: Eric Hilt, Economics

Our three thesis projects are connected by a desire to apply economic tools to investigate the patterns of opportunity and discrimination present in the lives of modern-day women. Madeline Stern ’17 investigates whether professional women face assumptions of lack of competency and dedication by employers, and how those assumptions may lead women to invest less in their careers and damage their prospects for promotion to top positions. Clio Flikkema ’17 uses observational data and a targeted experiment to examine the discussions that take place behind closed boardroom doors, hoping to gain insight into whether women’s ideas are systematically undervalued and ignored. Leah Plachinski ’17 utilizes vital statistics of birth data from 1989 to 2002 to quantify the effect of older women’s differential access to prenatal genetic diagnostic tests for Down syndrome on test utilization and corresponding birth outcomes.

SCI-274 (Pre-formed Panel Discussion)
Tanvee Varma ’18, Economics; Linda W. Zhao ’18, Chinese Language & Culture/Political Science; Carol Liu ’17, Psychology; Riann K. Tang ’19, Computer Science/Political Science; Dana Lann ’20, Undeclared; Grace R. Ming ’18, Media Arts and Sciences; Heng (Amber) Qin ’18, Political Science; Jennifer Miu ’18, Economics/Psychology; Lydia Gao ’20, Undeclared; Tenti Kodali ’20, Undeclared
ADVISOR: Stephen Chen, Psychology

Accessibility of data is a social justice issue because data can quantitatively highlight issues facing marginalized communities and allow these communities to use data as a tool to advocate for reform. Data can be even more important for Asian-American and Pacific Islander (AAPI) communities because data can help dispel the model minority myth and highlight the many disparities within the AAPI community. As a result, many cities and states across the United States make it a point to create a report on the status of Asian-Americans and Pacific Islanders in their regions. Boston creates no such report. In collaboration with Boston’s Mayor’s Office, our group is spearheading the creation of the first report on the status of Asian-Americans and Pacific Islanders in Boston. The report will include comprehensive information on topics such as income, education, health, violence and crime, immigration, and other information relevant to the AAPI community in Boston. AAPI data will be presented alongside data from other racial groups to highlight disparities. In addition, this report will highlight disparities within the AAPI community by examining data based on country of national origin. The goal is to be a resource for AAPI organizations in Boston and policy initiatives that seek to empower Boston’s AAPIs.

From Glyphs to Bytes: Ancient Egypt and the Future of Digital Humanities
FND-307 (Pre-formed Panel Discussion)
Isabel A. Staccanedo ’17, Economics/Women’s and Gender Studies; Sarah N. Michelon ’18, Art History/English; Kate E. Kennedy ’18, Computer Science; Paola M. Favela ’19, Anthropology
ADVISOR: Elizabeth Minor, Anthropology, Mellon Postdoctoral Fellow

Interested in ancient Egypt? Digital humanities and bridging the divide between “hack” and “yack”? Join ANTH 246: From Glyphs to Bytes: Ancient Egypt and the Future of Digital Humanities in discussing digital Egyptological resources, both abroad and at our own Davis Museum. We will also be showcasing the beta versions of our final projects. Come interact with our contributions to the field of open-source digital humanities! We’ll be gathering user feedback as part of our iterative project design process. In our content, we’ll be answering and asking questions about advanced media visualization, data analysis, 3D modeling, visual reality, and more!

Reflecting Backward and Forward: Identity in a Time of Change
SCI-268 (Talk)
Adulting Is Hard: Anxiety and Insecurity in the Millennial Generation’s Coming-of-Age Process
Amy L. Johnson ’17, Sociology/Spanish
ADVISOR: Thomas Caubman, Sociology, Deffenbaugh de Hoyos Carlson Professor

Although ubiquitous in the media, sociological analyses of the millennial generation are sparse. This thesis places millennials at the intersection of modernity and generational theories by analyzing the generational identity and coming-of-age processes of modern young adults in conjunction with the anxieties, insecurities, and existential concerns that accompany their transition into adulthood. Data was collected in northern California using in-depth interviews with 25 young adults between the ages of 17 and 27. Despite being members of the same generation, their experiences are not easy to generalize due to the increasing importance of identity factors such as race, gender, and social class. Their present life stage—existing between adolescence and adulthood—and
upbringing within the fluid context of modernity have led to anxieties, concerns, and fears regarding the uncertainty of their future. These concerns are exacerbated by the constant presence of social media, which leads to comparison and fosters insecurity, competition, and envy. To cope with the anxiety and insecurity of this life stage, many millennials participate in modern therapeutic culture by prioritizing and openly discussing their emotions. Furthermore, parents play a key role by creating a “safety net” that millennials believe they can fall into, thereby assuaging some of the fear of failure. Millennials are distinctly modern: They engage in reflexivity, understand their identity both subjectively and socially, and prioritize individualism and diversity.

Aesthetics, Memes, and Social Justice: Identity Formation and Political Engagement on Tumblr
Julia J. Chmyz ’17, Computer Science/Sociology
ADVISOR: Markella Rutherford, Sociology

Though they originally created accounts for fun, fandom, or fashion, many users of the blogging website Tumblr now use the site to gain information about social and political issues and current events. Through a survey of over 250 Tumblr users, computational analysis of the contents of hundreds of blogs, and in-depth interviews with users, my thesis seeks to uncover how and why these conversations—about sexual orientation, gender identity, mental health, race, social movements—occur on Tumblr, and the differences in the way these topics are approached offline and on other social networks. Structural features of the website create circumstances where users are exposed to content they are not actively searching for, while the anonymity of Tumblr creates a space in which users feel comfortable exploring facets of their lives that they may not discuss offline or in more public online spaces. In the context of increasingly insular online political discussion, the features of Tumblr that promote discovery of new viewpoints provide an alternative to filter bubbles. Analysis of Tumblr as a society with an explicit structure in the form of web design and algorithms also offers new insight into the sociological debate of structure and agency.

African Ancestral Knowledge and the Black Identity
Camille C. Stowell-Ceja ’17, Individual-Peace & Justice Studies/Psychology
ADVISOR: Opheba Davis, Africana Studies

Inspired by the African ancestral curiosity catalyzed by Alex Haley’s Roots, this research examines the social-psychological impact of ancestral knowledge. Due to the history of slavery and erasure of African identities in America, most Black Americans are unable to trace their ancestry through and prior to the era of slavery. As scientific technology advances, Black Americans are being given further access to develop their ancestral knowledge through DNA tests. However, access is still limited to those with the financial means necessary to purchase these tests. Black-identifying students at Wellesley College were given a survey, modeled by the Multidimensional Inventory of Black Identity, to examine the many facets of Black American identities. This was compared with the students’ breadth of knowledge of their own African ancestral lineage. The results aim to encourage an understanding of the importance of ancestral knowledge among displaced peoples.

A Child’s Mind: Imagination and Intelligence in the Early Years
SCI-104 (Talk)

Toy Stories: Children’s Use of Gender Stereotypes in Making Social Judgments
Zichun (Michelle) Wang ’18, Psychology
ADVISOR: Tracy Gleason, Psychology

Preschool children emphasize social categories, such as gender, in making judgments. For example, young children prefer same-sex over expert informants (Boscoski, Hughes, & Miller, 2016). However, children also attend to individual differences: they support pursuit of counter-stereotypical interests (Conry-Murray & Turiel, 2012). In Study 1, we investigated whether 33 3- to 5-year-old children would actively prioritize categorical (i.e., gender) over individual (i.e., interests) information when predicting hypothetical peers’ preferences. Results suggest that preschool children use individual-level information in making social judgments, and that use of this information is not compromised by conflict with categorical information. In Study 2, we examined the role of culture in children’s use of gender stereotypes by comparing preschool children from the U.S. (n = 40) with preschool children from China (n = 21). We replicated Study 1 and added an additional component to examine if preschool children relied on gender stereotypes when evaluating a playmate. According to previous research, Chinese preschool teachers often conveyed traditional Chinese gender values through their repeated use of gendered routines in the classroom to reinforce gender stereotypes (Chen & Rao, 2010). Thus, we predicted that Chinese preschool children would be more likely to use gender stereotypes than American preschool children when making social judgments.

Pretend Play Diary Study
Madison M. Flowers ’17, American Studied Psychology
ADVISOR: Tracy Gleason, Psychology

Pretend play is a quintessential part of child development. The act of pretending allows children to practice skills or take on roles they may use later in life. One form of play is the creation of imaginary companions (ICs). During childhood and into adolescence, about 65 percent of children create ICs, which can be in the form of either invisible companions or personified objects. While traditional pretend play can take on many forms, including role-play, make-believe play, and sociodramatic play, interactions with ICs are similar to social exchanges, and children treat their IC as people. Parents of 45 preschool-age children were asked to keep diaries of their children’s pretend play for approximately two weeks, and these diaries were compared to existing diaries of children’s interactions with ICs. We predicted that children’s interactions with ICs would occur in the stream of the child’s ongoing reality and would not be distinctly different from interactions with real people in the child’s life, while pretend play would occur separately from reality and would be acknowledged by all involved as play.

Benefits of Consensus
Liliana Mayorga ’19, Psychology
ADVISOR: Tracy Gleason, Psychology

Can parents influence a child’s memory of the child’s internal imaginative play? There have been studies about the importance of consensus between children and their parents. People have investigated consensus between parents and children because the amount of consensus has been correlated
with the child’s social and emotional well-being. Yet few studies have examined child-parent consensus on a particular issue at different points in development. Will children later agree with their parents about memory of their imaginative play or will the parents have no effect on the children’s perspective? Certainly, the child’s perspective will change with development, but how it might do so in relation to the parent’s perspective is unclear. This question is important because if adolescents lean towards the parent’s perspective more than they did in childhood, we can begin to find ways for parents to positively affect their child’s memory of imaginative play. I will be investigating the correlation of consensus between parent and child perspectives on the child’s imaginary companion. I will primarily focus on the physical description of the imaginary companion, and the type of play done with the imaginary companion. Lastly, I will compare consensus in early childhood to consensus in adolescence, roughly 10 years later. I expect that since imaginary companions are internal creations of the child, children will be the experts on their own imaginary companions, but will have a harder time keeping all the details of the imaginary companions clear over time. The parent’s perspective will be seen when the consensus will increase between the parent and child.

Examining Children’s Conceptualization of Separateness in Imaginary Companions

Kiera M. Parece ’17, Political Science/Psychology Advisor: Tracy Gleason, Psychology

This study will explore the extent to which children conceptualize imaginary companions (ICs) as separate, distinct individuals. Participants consisted of 41 preschool-aged children with ICs, 20 with invisible friends and 21 with personified objects (imaginary companions that are manifested in objects such as stuffed animals or dolls). Over the span of two weeks, parents recorded the daily interactions between children and their imaginary companions, documenting the nature of these occurrences. Diary entries will be coded for the degree to which children demonstrate a sense of the IC as a unique individual, separate from themselves. Upon completion of this coding, comparisons will be made between children’s conceptualization of the IC as separate, independent entity and the type of IC possessed by the child (personified object or invisible friend). I expect to find that children who possess invisible friends will be more likely to convey a sense of the IC as a separate individual than those children who possess personified objects. Additionally, the relationship between children’s conceptualization of the IC as a separate individual and the type of relationship between a child and an IC (egalitarian or hierarchical) will be examined. I expect to find that children who have egalitarian relationships with their ICs will be more likely to exhibit a sense of their IC as separate than children with hierarchical relationships to their ICs.

Intimate Conversations: Shedding Light on Closed-Door Discussions

SCi-270 (Talk)

Young Adults’ Reflections on Abstinence Messages in School

Lauren I. Mostrom ’18, Classical Civilization/Economics Advisor: Wendy Robeson, Wellesley Centers for Women

Many high schools in the United States still teach abstinence-centered messages to their students at the expense of a more realistic approach that prioritizes health and safety. In order to assess not only the physical health outcomes of these students, as is discussed at length in existing literature, but also their emotional responses to these abstinence programs, a survey was created and distributed to young adults aged 18 to 24 (n = 342). The findings in this study indicate a statistically significant difference in feelings of sex-negativity.

In Conversation with Donor-Conceived Teenagers

Jacqueline (Jackie) G. McGrath ’17, Women’s and Gender Studies Advisor: Rosanna Hertz, Women’s and Gender Studies, Class of 1919 Professor

Over the past three years I have been a research assistant on a study of donor-conceived families. My presentation for the Ruhlman Conference is based on my work last semester, which focused on analyzing kids (ages 10–20) who were donor-conceived. I focus on the frequent use of the word “weird,” which emerges frequently in the in-depth interviews. During interviews with teenagers it was often difficult to deepen the conversation/analysis when the interviewee declared that the situation was “just weird.” “Weird” is a placeholder word that kids use to indicate uncertainty and limit of understanding. Although these moments were casual, they proved to touch on important themes of donor conception and kids’ constructions of family. In this presentation I will present the four themes I identified in usage of “weird” and connect it to our larger research. The presentation will demonstrate different aspects of conducting interviews, coding data, and forming analyses.

The New Muslim Woman

Amina Ziad ’17, Women’s and Gender Studies Advisor: Charlene Galarneau, Women’s and Gender Studies

My thesis explores past and current meanings of modesty within Islam, and how these meanings relate to the lives of Muslim-American women today. Islamic meanings and interpretations of modesty have changed over time. Hijab, or headscarf, for many women, is a religious obligation; however, other women understand wearing hijab as a subversive political statement. To explore such meanings of hijab and modesty, I utilize a mixed-methods approach that incorporates analyses of religious texts (both Qur’an and Hadith), contemporary academic scholarship, and qualitative data collected via a focus group and interviews. In doing so, I gain and present an understanding of the multiple ways in which Muslim-American women live out their modesty.

“During the first session in the library about the history of Wellesley, I was fascinated by the presentation, which was excellent …”

–Barbara Peterson Ruhlman ’54
The Danger of a Single Story: Portraits of Immigration
FND-126 (Pre-formed Panel Discussion)
Arianna G. Regalado ’18, Religion; Emerson S. Goldstein ’18, American Studies/Political Science; Esther A. Miller ’18, Art Studio; Faiza S. Aslam ’19, Sociology
Advisor: Soo Hong, Education

In EDUC 334: Understanding Education Through Immigrant Narratives, we study immigrant youth and families’ experiences in educational spaces. As a method of qualitative analysis, we use portraiture to explore the complex lived realities of immigrants in the United States. We will discuss portraiture as a methodology to address the following questions: How does critical race theory help us conceptualize the framework of portraiture as a research tool? What can we learn from including a variety of narratives in our understanding of education? How does sharing others’ voices emancipate and empower? In our exploration of several individuals’ educational journeys, we debunk the myth of the single story—that is, that there exists only one immigrant experience. Chimamanda Ngozi Adichie confronted the danger of this myth in her 2009 TED Talk, saying, “Stories matter. Many stories matter. Stories have been used to dispossess and to malign, but stories can also be used to empower and to humanize.” Through our work, we will humanize the experiences of immigrants in U.S. schools with the ultimate goal of exploring the multidimensional relationship of immigration and education.

An Artist’s Botany, a Botanist’s Art: Botanical Watercolors in the Collection of Helen Frances Ayres at Wellesley College
SCI-155 (On-Location Presentation)
Ningyi Xi ’17, Art History/Classical Civilization
Advisor: Martha McNamara, Art

Hanging quietly in the corridor leading to Wellesley College’s greenhouses are 1,349 watercolor studies of plants by various artists. Very little is known about these botanical illustrations or the artists. The only information in the archives is that they were given by Helen France Ayres, of Medford, Mass., to the Department of Botany in 1907.

For my research project for ARTH 318: New England Art and Architecture, I have been able to piece together a rough outline of the life of Helen Frances Ayres, although many questions remain unanswered and await further investigation. Her gift was perhaps intended to strengthen Wellesley’s robust botany program for women who shared her passion for plants. Most importantly, her botanical illustrations were not only an artistic endeavor, but incorporated a spirit of scientific inquiry as well. Ayres’ combined interest in art and botany also reflects important trends in 19th-century American society, namely the diminishing acceptance of botany as a subject fit for women and the growing prestige and popularity of botany in the country at that time, especially in New England.

Od: The Animated Thesis
Collins Cinema (Film Screening)
Katherine H. Roche ’17, Classics/Media Arts and Sciences
Advisor: David Olien, Art

The graphic image has come a long way since the days of crude figure on cave walls. As a classics/media arts and sciences double major, I have always been fascinated by the act of storytelling and the process of animation. For the past year, I have spent every day imagining, reinventing, creating, designing, and animating one of my favorite ancient stories: The Odyssey. Though the narrative I wove does not directly resemble the ancient epic, the path to making it more closely follows the essence of the story: the story behind the story. Odysseus passed though many mouths, mediums, and molds before he ever reached his home. Do you really think the story we know today was the one Homer told thousands of years ago? Come be part of the ancient and traditional process of trans-media storytelling and rediscover the well-known tale as it passes from Greek text to storyboard to animated film.

Dueling Influences
FND-120 (Talk)

Practical Debauchery, Homesick Sailors, and Nautical Rhythms: Sea Shanties in Classical Music
Pallas C. Riedler ’17, English and Creative Writing/Music
Advisor: Gurinder Bhogal, Music

This presentation is an exploration of how classical composers have been influenced by music from the maritime cultures of Western Europe. I evaluate the use of sea shanties and “pirate songs” in classical music written between 1689 and 1951. My thesis draws on a range of musical compositions while exploring the impact of maritime music in the intellectual life of this broad time period. In order to determine the extent to which the traditional sea shanty form has been altered to fit a classical framework, I focus on the most piratically imbued, shanty-riddled “classical” works of music in terms of their historical contexts, harmonic characteristics, and thematic contents.

“History Has Its Eyes on You”: Lin-Manuel Miranda’s Interpretation of Hip-Hop Culture in Hamilton
Maleah P. Maxie ’18, Cognitive & Linguistic Sciences/Music
Advisor: Lawrence Rosenwald, English, Anne Pierce Rogers Professor

Lin-Manuel Miranda’s Hamilton (2014) has been praised for being a new approach to the American musical. As the show continues to grow in popularity, it also illuminates the history of hip-hop culture in the United States. While there are moments in Hamilton that were undeniably used by prominent hip-hop artists first, Miranda also included more obscure references to artists, from the manifestations of characters in the musical to the music’s lyrics and chord progressions. However, many viewers of the musical do not immediately realize the lesser known, yet unequivocal connections between Miranda’s Hamilton score and artists such as Tupac or Jay Z. To demonstrate the historical hip-hop influences throughout Hamilton, I will examine the references Lin-Manuel Miranda explicitly employs that connect the musical to hip-hop culture, music, and history.
This Isn’t Even My Final Form: Techno-Orientalist Women Who Will
Claire S. Shin ’17, American Studies
ADVISOR: Elena Creef, Women’s and Gender Studies

This presentation is based on the independent research that I conducted in fall 2016 and into spring 2017 on the topic of techno-Orientalism, which is the phenomenon of imposing cybernetic and steampunk elements within the context of interactions between the Western world and Asia. In this presentation, I will introduce the cultural phenomenon that is techno-Orientalism and explain it in relation to Asian-American cultural relations. Topics that will be covered here are the events that happened between the U.S. and the East Asian countries—of China, Japan, and Korea; from these shared histories, the cultural perceptions that arise are vital to the creation and surge of techno-Orientalism and techno-Orisel cultural works. Many clips and images of popular techno-Orisel themed works, such as the futuristic sequences in a neo Korea in the film Cloud Atlas or choice shots from the film Deus ex Machina, will be alluded to in this presentation. There will be many mentions and references to popular culture pieces that contain techno-Orisel themes, such as the anime that will be localized into a Hollywood film, Ghost in the Shell, and video games such as Final Fantasy. This presentation will tie the past to the present as the mechanized perceptions of Asia have persisted in newer works such as the television show Westworld. This presentation will examine cultural sources in order to explain the broader aspects of techno-Orientalism and how Asia is viewed through a Western lens. Furthermore, this will delve into the intersection between race and gender and how techno-Orientalism is applied to Asian and Asian-American women in the cultural works that reproduce them.

Scholasticism and Clerical Authority in The Canterbury Tales
Nikita R. Nagras ’17, Economics/English
ADVISOR: Cord Whitaker, English

Medieval experts have long debated Geoffrey Chaucer’s personal stance toward the church and contemporary heretical movements. The Canterbury Tales, while rich in its nuanced depiction of medieval society, contains no straightforward answer to the question. Does the Man of Law’s pomposity entail a satire of clerical and scholastic authority? Does the Wife of Bath’s irreverent tone highlight women’s supposed inability to engage in exegesis or undermine the foundation of the Catholic Church? I argue that Chaucer uses his collection of tales for a more literary, rather than political, purpose: His deft subversion of scholastic language undermines conventional authority and contemporary language itself, though it doesn’t necessarily offer a rigid stance on heresy or the church.

Out of Sight, But Not Out of Mind: Revealing Hidden Communities
FND-102 (Talk)

The Social Worlds of Beijing’s Electronic Underground
Juliet Y. Liu ’17, Anthropology/History
ADVISOR: Justin Armstrong, Writing Program

Electronic music, an art form that has existed in dynamic states since the 1970s, is rapidly moving from the underground to the mainstream all across the globe. Electronic music—as a phenomenon, a cultural practice, a lifestyle, a broker of community, and an aesthetic—deserves significant cultural analysis in various global contexts. Specifically, there is a noticeable dearth of ethnographic explorations of electronic music and art in China. Over the course of three weeks, I conducted anthropological fieldwork in China to better understand the social worlds, aesthetic impulses, and musical philosophies of electronic producers in Beijing to better understand global circuits of cultural exchange, concepts of cultural authenticity, and the fluid concept of “cool.”

Still Here, Still Queer: Activism in the Postcolonial South Asian Diaspora
Dharani A. Persaud ’17, International Relations-Political Science
ADVISOR: Pushington Oheng, Africana Studies

Over the course of the semester, I have been doing research on the history of South Asian queer involvement in activism during the postcolonial era. The queer community in the South Asian diaspora is often erased from historical narrative because of cultural taboos, so my presentation seeks to explore the untold aspects of how queer activism relates to broader activism within postcolonial communities. I aim to address the gaps in dialogue that have been neglected in order to analyze how the South Asian diasporic queer community has contributed to resistance culture and how their involvement has been affected by their identity.

In-Between: Narratives of Identity and Community by Chinese-American Adoptees
Isabelle L. St. Clair ’17, Peace & Justice Studies
ADVISOR: Catia Confortini, Peace & Justice Studies

Chinese-American adoptees’ lived experiences provide a unique lens through which to view and understand Asian-American identity and U.S. race relations. Chinese adoptees are transnational, transracial adoptees who have crossed borders of nationhood, culture, race, ethnicity, and class, as most are adopted into white, well-off families. Yet even though all these “border crossings” take place, it remains uncertain as to how the adoptees fit into the image of the U.S. and negotiate their multiple, in-between identities. In this presentation and for my senior thesis, I explore how adoptees situate themselves within the United States, within Chinese-American communities, and within the adoptee community. I share their stories, as well as mine, to elevate the voices of Chinese adoptees, voices often marginalized or unheard in Asian-American and adoption literature.

Touching Base: Isolation and Community on Maine’s Islands
Ruth E. Wasker ’17, Anthropology/Biological Sciences
ADVISOR: Justin Armstrong, Writing Program

Despite existing on the periphery of mainland society, most people on the islands of Matinicus and Monhegan seem to operate in their own sociocultural microcosms. For my senior thesis I wanted to investigate the workings of these small communities, specifically how they sustain their population and encourage growth. This ethnographic study examines interpersonal interactions as well as anthropological engagements with space and place in these isolated environments to better understand how they maintain a vibrant and viable community. These two remote, unbridged islands operate in different cultural modes despite their similar geographic locations. In an era of ever-increasing globalization and
interconnectivity, members of these small isolated communities are often “othered” and romanticized in a way that negates the embedded struggle of everyday island life. Here, they have (sometimes begrudgingly) come to rely on one another in their tight-knit communities with little outside help.

**Who Tells Your Story? Narratives Reclaimed**

**SCI-396 (Talk)**

**Voice, Silence, and Testimony: Recovering Feminist Voices in Italian Poetry and Autobiography**

_Cat Yoke ‘17, Italian Studies/Women’s and Gender Studies_  
_ADVISOR: David Ward, Italian Studies_

It is no secret nor a provocative assertion that men’s voices, primarily white, male, European, have prevailed throughout history. These voices tend to represent the inventors, the geniuses, the colonizers, the conquerors, the artists, the poets, and so much more. They are voices so loud and so pervasive that they effectively drown out any evidence of an utterance made by a subordinate “other.” But just because these voices and their narratives have been suppressed by the persistent noise of dominant institutions of power and their associated discourses does not mean that they cease to exist and to matter. In fact, it has been the mission of many contemporary feminist literary critics, working in a variety of ways and drawing on a variety of discursive spheres, to identify, recover, and remember female and minority voices. Two such critics cited in this thesis are Adriana Cavarero and Leigh Gilmore; while Cavarero offers a feminist reading of classic philosophical texts and concepts, Gilmore explores the construction and perception of autobiography as a genre and the subsequent ways women have been both included and excluded from the literary discipline. Both scholars are chiefly concerned, in notably different and interesting ways, with the concept of female voice. Extending the arguments of Gilmore and Cavarero to the world of Italian poetry and autobiography, it is possible to identify and recognize moments in which Italian women, not merely and no longer passive recipients of oppression, actively reflect, anticipate, and create the various “feminisms” of their era.

**A Study of Female Agency in The Homeric Hymn to Demeter, Accompanied by Lithographic Illustrations**

_Virginia G. White ‘17, Classical Civilization_  
_ADVISOR: Catherine Gibbuly, Classical Studies_

*The Homeric Hymn to Demeter* is a 500-line poem detailing the union of Hades, Lord of the Dead, and Persephone, daughter of the agriculture goddess, Demeter. The essence of the myth lies in Demeter’s unwillingness to bless her daughter’s marriage, which began in rape, sanctioned by Zeus. Demeter’s defiance and its consequences raise questions about female subjectivity in ancient Greece and suggest a Panhellenic interest in how rulers divide their power. While this idea can be explored verbally, there are certain nuances that can only be expressed through images. The lithographic illustrations illuminate patterns and symbols that are often lost in academic writing.

**Hemingway and Elizabeth**

_Edith (Edie) M. Sharon ‘17, Chemistry/English_  
_ADVISOR: William Cain, English, Mary Jewett Gaiser Professor_

This presentation deals with my thesis work in the English department surrounding connections between Ernest Hemingway and Queen Elizabeth I. Hemingway’s second novel, _A Farewell to Arms_, is named after an Elizabethan poem. Looking at his work as an abstract representation of Elizabeth and her era provides new insights regarding the major themes of the novel. This interpretation also allows for further exploration of Hemingway’s fascination with gender roles, an idea that coincides with the necessity of balancing gender roles for Elizabeth as queen. In my presentation, I will discuss this content and also address the foundations and development of my subject.

**Jet Lag: Narrating a 21st-Century South Asian Experience in the United States and Abroad**

_Kanika A. Vaish ‘17, English/Political Science_  
_ADVISOR: Octavio Gonzalez, English_

Through this collection of short stories, I aim to contribute to South Asian diaspora literature, pay tribute to my extended family members by immortalizing their sacrifices and achievements through a written work, and create a distinct, second-person voice for my own alter ego. In _Jet Lag_, I make a conscious decision to keep Hindi words unitalicized. By doing so, I express agency in preventing Western tradition from dictating my experience. I also alienate the reader, at times, by sporadically including non-Western language, still expecting the reader to keep up with the pace of this nonchronological, geographically diverse series. Rather than allowing this language to be exoticized or othered by non-Indian audiences, I choose to italicize instant messages, creating an alternative foreign tongue that is similarly inaccessible. In this presentation, I will share excerpts from my work and engage in discussion with the audience on the material.

**Science and Technology**

**Exploring the Relationship Between the Innate Immune System and Adult Neurogenesis in the Brains of Procambarid Crayfish**

_SCI-256 (Pre-formed Panel Discussion)_  
_Megan E. McNeil ‘17, Biochemistry; Anubree Dugar ‘18, Neuroscience; Kara M. Banson ‘17, Neuroscience_  
_ADVISOR: Barbara Beltz, Neuroscience, Allene Lummis Russell ’46 Professor_

Adult neurogenesis, the lifelong process by which new neurons are produced in the adult brain, occurs in both vertebrate and invertebrate species. It is thought that neurogenesis in mammalian systems is regulated by self-renewing neural precursors; however, neural precursor cells found in the crayfish *Procambarus clarkii* are not self-renewing and instead must be replenished by an extrinsic source. Recent studies suggest that blood cells generated by
the immune system are neural precursors. In an attempt to better characterize this relationship between adult neurogenesis and the immune system at a physiological and molecular level, our aims include: 1) defining the electrophysiologic properties of cells in the brain that are derived from blood cells; 2) determining whether immature immune cells can be biased toward a neural fate in vitro; and 3) identifying the neurogenic roles of the immune-derived proteins astakine 1, a cytokine, and crustacean hematopoietic factor, an anti-apoptotic agent.

Does Developmental Pollen Stress Affect the Performance of Inspector Honey Bees?
SCI-E-211 (Pre-formed Panel Discussion)
Anita M. Yau ’17, Biological Sciences; Anne H. Shen ’17, Biological Sciences; Clare Auld-Brokish ’19, Biological Sciences/Chinese Language & Culture
ADVISOR: Heather Mattila, Biological Sciences

One of the most important jobs of a honey bee worker is to collect food from flowers to feed its colony. Pollen in particular serves as bees’ primary source of essential proteins, lipids, vitamins, and minerals, especially during larval development. However, colonies can become pollen stressed, and workers under these conditions rear undernourished larvae. Work in our lab has shown that limited access to pollen during larval development results in adult workers who are relatively poor foragers compared to workers who had adequate access to pollen-based foods during development. In the present project, we attempted to quantify the effects of pollen stress on inspector foragers, workers who independently revisit known food sources to reactivate their nestmates to these sites if they begin to yield food once more. Our study examines one of the ways that pollen stress can impair the ability of honey bees to take up specialized foraging tasks.

Masses of Gases: Using Inorganic Gas Tracers to Examine Oceanic Processes
SCI-268 (Pre-formed Panel Discussion)
Alice Zhou ’17, Chemistry; Haley M. Pleskow ’17, Economics; Brenda Y. Ji ’18, Biochemistry; Katherine Chan ’18, Chemical Physics; Helene Alt DS, Chemistry; Charli Klein ’19, Chemistry; Mariisa Menzel ’18, Geosciences and Environmental Studies
ADVISOR: Rachel Stanley, Chemistry

Climate change has affected our oceans globally, resulting in record-low sea ice extent, increasing rates of warming, and significant ocean acidification. Oceans currently represent the largest active carbon sink on Earth, absorbing over 25 percent of anthropogenic CO₂. Without this mitigation, the magnitude of climate change would be more severe and its effects more rapidly felt. It is thus crucial to understand the ocean’s role in and response to climate change. The Stanley lab relies on mass spectrometry to measure naturally occurring inorganic gases—particularly the noble gases—and uses them as tracers to characterize climate-relevant processes. Our panel will cover the theory and instrumentation behind these measurements, and discuss several projects involving their applications in the field. Research topics will include quantifying biological production in the Arctic Ocean, gauging the effects of ocean turbulence on phytoplankton productivity, and establishing a baseline pH in the Southern Ocean to improve biogeochemical models.

The Haines Lab: Applications of Organic Chemistry to the Development of Novel Therapeutics
SCI-264 (Pre-formed Panel Discussion)
Laura M. Bancroft ’17, Chemistry; Lazel M. Pineda ’17, Biochemistry; Gwendolyn Towers ’17, English; Christina E. Lepore ’17, Biochemistry; Sara M. Elamani ’17, Biochemistry
ADVISOR: David Haines, Chemistry

The Haines lab members are focusing on two medical subfields. The first of these involves Type II diabetes research on glucagon-like peptide-1 receptor (GLP-1R), which is implicated in the pancreatic signaling pathway responsible for insulin secretion. Due to its seven transmembrane domains, a nuanced model of the GLP-1R active site structure cannot be elucidated through X-ray crystallography. We intend to improve current understanding of GLP-1R by chemically modifying T-0632, one of the non-peptide small molecule antagonists for GLP-1R, in order to alter its interactions with the GLP-1R active site. To accomplish this, members of the Haines lab are taking two different synthetic approaches. The first involves producing a T-0632 analog in which an amine group is inserted at the standard carboxylic acid locus. This alteration is expected to change the interactions between T-0632 and the GLP-1R. Short peptide GLP-1 mimetics will be added to the T-0632 amine in order to promote GLP-1R activation. The second approach involves adding photolabile groups to T-0632 in order to spatially map the active site of GLP-1R. Specifically, we will modify T-0632 through synthesis of aromatic iodides, which are precursors to photoreactive aryl azides that can be used for binding studies. The second project in the Haines lab involves antibiotic resistance. Developing methods of prevention and intervention of bacterial infection, specifically due to methicillin-resistant Staphylococcus aureus (MRSA), has become critical in recent years. Dolosigranulum pigrum, a gram-positive firmicute found within human nasal passages, has demonstrated a negative correlation with S. aureus colonization. Antibacterial substance(s) can be extracted from D. pigrum liquid culture through organic extraction. Current research focuses on the purification of these extractable inhibitory compound(s) via chromatography and bioassay-guided fractionation. Subsequent characterization of these inhibitors will be accomplished via MALDI-TOF mass spectrometry and NMR.

Climate Change and Collateral Damage
SCI-277 (Talk)
Exploring the Epigenetic Reasons Behind Invasive Species
Mary Kate Dornon ’17, Biological Sciences
ADVISOR: Andrea Sequeira, Biological Sciences

Invasive species threaten global diversity and impact both the native species and surrounding ecosystem. Upon the introduction of nonindigenous species, the introduced species often undergo genetic events causing a loss of genetic variation and reduced genetic diversity. Yet the spread
of invasive species persists, presenting a genetic paradox: If introduced populations undergo such drastic genetic events, how are they able to acclimate so successfully to new environmental conditions? To understand the reasons for the ecological success of species introductions, our study examines the introduction of North American Nanapactus weevils. We propose that introduced populations of Nanapactus weevils experience shifts in gene expression associated with their introduction and establishment. In particular, differentially expressed genes may be in response to the variation in host plant availability and overcoming new host defenses. We compare the intensity and diversity of gene expression between native and introduced species populations to explore the transcriptome signal of species introductions.

**Bugs and Biodiversity: How Climate Change Is Affecting Arthropods in Northern Hardwood Forests**

Jennifer (Jenny) E. Harris ’19, Biological Sciences; Emma D. Scalsi ’17, Anthropology/Biological Sciences

**ADVISOR:** Nicholas Rodenhouse, Biological Sciences

Climate change can affect ecosystems in a variety of ways, including decreasing community productivity and biodiversity. Generally, climate change is associated with effects on macrofauna, while in reality it may disrupt all aspects of food webs. Here, as a contribution to further understanding changes in temperate deciduous forests in New England, two long-term datasets of insect abundances were analyzed. One dataset was generated by capturing flying insects with Malaise traps and examines trends across multiple orders of arthropods, while the other focuses on families of beetles from the forest floor sampled using window traps. We tested for trends in relative abundance and diversity compared within and between years as well as across an elevation gradient. We relate, to the extent possible, these trends with differences in climate and weather patterns within the Hubbard Brook Experimental Forest, New Hampshire. Initial data evaluation reveals noticeable decreases in abundance across taxa, with some groups disproportionately affected. Additionally, populations were higher at greater elevation, where mean annual temperature is about two degrees Celsius cooler than at the low-elevation sampling sites. These results indicate that forest food webs have changed significantly during the past 40 years and suggest that climate warming may have contributed to these population shifts.

**Monkeys Need the Forest for the Trees: Assessing the Impact of Deforestation on Bornean Primate Behavior**

Kylie M. Sorensen ’17, Biological Sciences

**ADVISOR:** Adam Van Arsdale, Anthropology, Whitehead Associate Professor

Habitat loss and deforestation are some of the greatest challenges for biodiversity conservation today. This is a particular concern for primates, as more than 60 percent of primate species are threatened with extinction, mainly due to habitat loss. As our closest relatives and indicators of our evolutionary past, primates have long been the objects of fascination and research within biology and anthropology. Their behavior has been the subject of short- and long-term field research over the past 60 years. However, while it is agreed that the behavior of this order is highly varied and plastic, the degree to which environmental change such as deforestation impacts primate behavior is less well understood. This presentation will explore the patterns of deforestation in central Kalimantan, Borneo, over the past 30 years. It will assess the ways that these patterns have altered and will continue to alter primate behavioral diversity and will offer solutions for mitigating negative behavioral change and promoting primate conservation.

**Mighty Microbes**

FND-207 (Talk)

**Estradiol Differentially Alters Gut Microbiota Response to Diet Change**

Manjot K. Nagyal ’17, Biochemistry

**ADVISOR:** Vanja Klepac-Ceraj, Biological Sciences

Postmenopausal women have an increased risk of developing metabolic disorders, such as obesity and Type II diabetes. Estradiol, a type of estrogen, which is primarily produced by ovaries and declines in postmenopausal women, protects against diet-induced obesity in women and female mice. However, the mechanisms by which estradiol prevents diet-induced obesity are not completely understood. Diet has been shown to shape the collection of microbes in the gut, called the gut microbiota. Both diet and the gut microbiota have been linked to weight gain and obesity. To investigate the effects of diet change on the gut microbiota in the presence of estradiol, we analyzed the fecal gut microbiota from 14 adult C57BL6 mice that were ovariectomized and subcutaneously implanted with capsules containing either 17ß-estradiol or oil (control). All mice were fed a standard rodent diet for 10 days and then switched to a high-fat diet for 25 days. To identify and compare microbial community composition of samples across treatments, we analyzed the longitudinal 16S rRNA gene data from fecal pellets. Additionally, to assess the role of estradiol on the gut microbiota independent of the host, we supplemented enrichment slurries containing fecal pellets with different concentrations of estradiol. In my presentation, I will present how estradiol affects the dynamics of the female mouse gut microbiota undergoing a diet change. I will also present the direct influence of estradiol on the gut microbiota and discuss the possible implications of the microbe–estradiol interactions on women’s health.
Examining the Innate Immune Response to Influenza Virus
Sara H. Shin ’19, Undeclared Advisor: Yuichiro Suzuki, Biological Sciences

Considering the need for potent drugs against influenza virus, current research focuses on identifying host cell factors that the virus co-opts to propagate. By depleting these factors, drugs can then obstruct stages of the viral life cycle. To develop such antivirals, a comprehensive understanding of the body’s innate immune response to influenza virus is crucial. Previous studies reported that a phosphorylated gene complex was primarily responsible for stimulating the body’s immune response. However, our current study refines the previous theory by demonstrating that the late expression of an unphosphorylated complex prolongs the body’s immune response. The appearance of a phosphorylated complex was confirmed 12 to 24 hours after infection. But the elevated expression of the unphosphorylated complex from 48 to 72 hours post-infection was more significant since it inhibited viral transcription, and thus reduced infection by 70 percent. Future studies will examine immune responses in in vivo models and apply such findings to drug discovery.

Exploring Anaerobic Microbial Communities Capable of Oxidizing Manganese
Sophia (Sophie) B. Rowland ’17, Biological Sciences/Classical Civilization Advisor: Vanja Klepac-Ceraj, Biological Sciences

The metabolic pathway of oxygenc photosynthesis is fueled by sunlight and the oxidation of water; oxygen is produced as a waste product. Before the rise of oxygenic phototrophs, microbes utilized anoxygenic photosynthesis to form organic carbon compounds using electron donors such as iron (Fe²⁺) and reduced sulfur compounds. We study enrichment cultures of microorganisms driven by anoxygenic photosynthesis to determine whether and how they use another possible electron donor, manganese (Mn²⁺). Cultures reduced with sulfide (H₂S) and enriched with Mn²⁺ as a potential electron donor oxidize Mn²⁺ and form various manganese oxide minerals in the presence of light. To further characterize these anaerobic microbial communities and the role of manganese, we grow the cultures on different concentrations of Mn²⁺ and H₂S and isolate individual microbes. We characterized the composition of the microbial communities by extracting copies of a specific gene, 16S rRNA, which is a highly conserved gene and standard species-identifying sequence. Communities grow only in the presence of light and obligately anaerobic green sulfur bacteria from the phylum Chlorobi are the only phototrophic organisms. A species of Chlorobi identified as Chlorobium phaeobacteroides was isolated on an agar medium enriched with H₂S as the electron donor and characterized by sequencing nearly the entire 16S rRNA gene. This organism matches the most abundant Chlorobi sequence from the Mn-oxidizing enrichments. In my presentation, I will talk about how the communities utilize manganese over time and in varying concentrations of H₂S and Mn²⁺. I will also discuss the implications of these findings on the environmental cycling of sulfur and manganese and photosynthesis on the early Earth.

Characterization of CpClec, a C-Type Lectin of the Parasite Cryptosporidium parvum that Mediates Infection in Vivo
Katherine (Olivia) J. Yanes ’17, Biochemistry Advisor: Yuichiro Suzuki, Biological Sciences

Cryptosporidium presents a large burden on the human population by causing the diarrheal disease cryptosporidiosis. Previous work done with Cryptosporidium parvum shows that a C-type lectin protein known as CpClec is expressed on the surface of sporozoites, the life stage of Cryptosporidium that invades host epithelial cells in the intestine. CpClec has also been found to be important for attachment and invasion of host cells by attaching to host glycosaminoglycans. In order to further determine the function of CpClec, our lab has developed two novel transgenic strains using CRISPR/Cas9 technology: one expressing a CpClec-HA tag (HA) and one with a CpClec gene deletion (KO). Using a mouse model infected with HA-tagged and KO CpClec oocysts, CpClec was found to play a role in infection. These results were confirmed through quantification of infection levels by analyzing 18s gene levels in stool samples via quantitative PCR. Additionally, immunofluorescence assays were used to determine that the localization of HA-tagged parasites throughout the Cryptosporidium life cycle in intestinal epithelial cells appears to follow specific patterns at various life stages. Confirmation of CpClec’s role in infection in vivo and in vitro models further strengthens the importance of this protein as a potential target for drug or vaccine development against Cryptosporidium.

Shining Light on Dark Matter
SCI-278 (Talk)
From Silence to Signal: The Story of :net:
Catherine R. Nicoloff DS, Physics Advisor: James Battat, Physics

Galactic rotation curves and models of galaxy formation predict that our galaxy is surrounded by a spherical halo of dark matter. This halo is theorized to be made up of weakly interacting massive particles (WIMPs). As the Earth moves through this halo, WIMPs stream through us like an invisible wind. Directional dark matter detectors seek to measure the direction of WIMP-induced nuclear recoils. The angular distribution of these recoils provides a unique signature of galactic dark matter that is not mimicked by any known background population. Low-pressure gas time projection chambers (TPCs) have a long and successful history in directional dark matter searches. The benefit of the low-pressure gas target is that the nuclear recoils from dark matter extend several millimeters—long enough to be reliably reconstructed—but the low-density target necessitates larger detector volumes. It is critical to maximize the detector’s WIMP sensitivity per unit detector volume to keep the volume as low as possible. It is also necessary to minimize diffusion in order to improve the accuracy of the recoil tracks. This makes the choice of fill gas important. This past year, we developed :net:, a prototype directional dark matter detector that uses a Micromegas for gas amplification with orthogonal strips for charge signal readout. We began the initial commissioning with an electron drift gas and recently made the challenging switch to a negative ion drift gas. Its design, function, and recent commissioning data taken in a surface laboratory will be summarized.
Galactic Halo Model Selection in Directional Dark Matter Detection

Louisa Huang Ruixue '19, Physics
ADVISOR: James Battat, Physics

Research in cosmology has predicted that dark matter makes up more than 20 percent of the mass-energy content of the universe. However, because dark matter does not interact with electromagnetic radiation, it is essentially invisible, making its direct detection and determination of its identity long-standing challenges. Weakly interacting massive particles (WIMPs) are leading candidates for dark matter whose signals are being actively searched for. In theory, due to the Earth’s motion through the dark matter surrounding our galaxy, we as earthbound observers would experience a “WIMP wind,” an anisotropy in velocity distribution that is unique to WIMPs. To capture this signature of dark matter, researchers around the world are developing directionally sensitive dark matter detectors. Data from such detectors would not only confirm the existence of WIMPs, but also give us insight into its other properties. In this project, I simulated WIMP signals expected from directional detectors and applied statistical inference methods to study how the quality and quantity of detector data affect our ability to pinpoint the velocity distribution of dark matter in our galaxy.

Lunar Laser Ranging: Testing Gravitation to the Moon and Back

Else P. Schlerman ’17, Physics
ADVISOR: James Battat, Physics

Capable of testing Einstein’s theory of general relativity, lunar laser ranging measures the orbit of the moon around the Earth by pulsing laser light from a telescope to lunar reflectors installed by Apollo astronauts in 1969. One such operation, APOLLO (the Apache Point Observatory Lunar Laser-ranging Operation), has achieved millimeter precision in its measurements of the Earth-moon distance, allowing for 10 times more precise constraints of gravitational parameters. However, while APOLLO has made great leaps in terms of precision, until recently there was no way to assess the measurement accuracy. In order to test gravitational models with greater accuracy, APOLLO implemented the absolute calibration system (ACS), an internal calibration laser, which pulses light at a frequency stable at the part per trillion level. For my thesis research, my work centered around making improvements to one component of the ACS, the laser slicer board (LSB), which acts as a very fast on/off gate for light from the ACS calibration laser.

Around the Sun We Go!: Modeling the Earth-Moon Distance for Different Theories of Gravitation

Sanaea C. Rose ’17, Astrophysics
ADVISOR: James Battat, Physics

Einstein’s theory of general relativity (GR) remains the foremost theory of gravitation. Experimental tests of this theory rely on the interactions of massive objects. One such test, lunar laser ranging, measures the transit time of a laser pulse from an observatory to a corner cube retroreflector on the moon, installed by Apollo astronauts and Russian rovers. This transit time gives the Earth-moon distance with millimeter precision. Successive measurements indicate the evolution of the Earth-moon distance as the two orbit the sun and can constrain theories of gravitation, including GR and alternative theories called parameterized post-Newtonian (PPN) frameworks. Present simulations in Python of the motion of the Earth, moon, and sun, which elucidate the expected evolution of the Earth-moon distance for different gravitational frameworks.

Chemistry at Different Scales

SCI-E-111 (Talk)

A Story in Sediment: Uncovering the History of Walden Pond

Melanie (Mel) T. Pasaretti ’18, Geosciences
ADVISOR: Katrin Monecke, Geosciences

Most commonly known as the title location of Henry David Thoreau’s Walden, Walden Pond provides evidence of a turn from an entirely natural landscape to an environment populated by an industrialized society. The logging of the surrounding forest in the 17th to 19th centuries, the construction of a railroad in 1844, the industrialization of the northeastern United States, and heavy recreational use since the 1920s significantly altered sedimentation in Walden Pond. This project focuses on discovering possible markers of human activity and natural processes in sediment cores from Walden’s three basins reaching depths from 16m to 30m. Each core was examined for sedimentary characteristics, such as magnetic susceptibility, grain-size distributions, and physical properties, as well as composition as smear slides. These environmental proxies demonstrate dramatic changes around the time the Walden Pond area became populated by European settlers. The data from sediments of the last four centuries will be compared to pre-European sediments across all three basins in order to examine the environmental history of Walden Pond through the last 1,500 years.

Regioselective Synthesis of Pyrazole Derivatives

Natalie J. Norman ’18, Chemistry; Diane Cheon ’17, Chemistry
ADVISOR: Adrian Huang, Chemistry

Nonsteroidal anti-inflammatory drugs (NSAIDs) are the most common class of painkillers, and they act through the inhibition of COX-1, COX-2, or both. Celecoxib is a selective COX-2 inhibitor that reduces inflammation and pain while minimizing the side effects associated with nonselective NSAIDs. Common methods to synthesize celecoxib yield two regioisomers, the N1 and N2 isomers. Since only the N1-pyrazole is biologically active, costly and tedious separations of these regioisomers are needed. The Huang lab aims to develop regioselective methodologies to synthesize celecoxib and similar derivatives. We have since achieved selective N-arylation of 3-substituted pyrazoles and have made strides towards the halogenation of C-5. Our current focus is synthesizing various pyrazole derivatives with similar properties to celecoxib and eventually testing their pharmacological activities.

The Role of Low-Energy (< 20 eV) Electrons in Astrochemistry

Sabha Banerja ’19, Biochemistry; Rhoda Kesewa Tano-Menka ’19, Chemistry
ADVISOR: Christopher Arumainayagam, Chemistry

In the interstellar medium, UV photolysis of ice mantles encasing dust grains is thought to be the mechanism that drives the synthesis of “complex” molecules. The source of this reaction-initiating UV light is assumed to be local because externally sourced UV radiation cannot penetrate the ice-containing dark, dense molecular clouds. Specifically, high-energy cosmic rays penetrate and ionize the molecular clouds, generating secondary electrons. Hydrogen molecules, present within these dense molecular clouds, are excited in collisions with these secondary electrons. The UV
light emitted by these electronically excited hydrogen molecules is generally thought to photoprocess interstellar ice mantles to generate “complex” molecules. In addition to producing UV light, the large numbers of low-energy (< 20 eV) secondary electrons, produced by cosmic rays, can also directly initiate radiolysis reactions in the condensed phase. We hypothesize that cosmic-ray induced low-energy electron processing of interstellar ices may occur via three mechanisms: 1) the interaction of cosmic rays with gaseous molecular hydrogen producing low-energy electrons that can interact with the surface (top few molecular layers) of cosmic ices; 2) the interaction of cosmic rays with molecules within cosmic ices generating a cascade of low-energy electrons that can interact with the surface and the bulk of the ice mantles; and 3) the interactions of the cosmic rays with the dust grain beneath the ice mantle engendering low-energy electrons that can interact with the bottom ice layers in contact with the dust grain. The goal of our studies is to understand the low-energy, electron-induced processes that occur when high-energy cosmic rays interact with interstellar ices. Using post-irradiation temperature-programmed desorption (TPD) and infrared reflection absorption spectroscopy (IRAS), we have investigated the radiolysis initiated by low-energy (5–20 eV) electrons in condensed methanol, ammonia, and water at ~90 K under ultrahigh vacuum (1x10^-9 Torr) conditions. Our experimental results suggest that low-energy, electron-induced condensed phase reactions may contribute to the interstellar synthesis of “complex” molecules previously thought to form exclusively via UV photons.

### Social Sciences

**Calderwood Seminars in Public Writing: Engaging Interviews**

PNE-239 (Pre-formed Panel Discussion, Fowler Presentation)

Clio B. Flikkema ‘17, Economics/Russian Area Studies; Sarah H. Koenig ‘17, Environmental Studies; Zahra K. Pirani ‘17, Biological Sciences; Amal W. Cheema ‘17, Biochemistry/Political Science

**Advisor:** David Lindauer, Economics, Stanford Calderwood Professor

Amal Cheema: Bioethics examines the norms that influence society in the context of medicine. These norms often constitute the Western value system. During my Calderwood experience in law, medicine, and ethics, I interviewed Islamic bioethicist Aasim Padela. An emergency medicine physician, Padela directs the initiative on Islam and medicine at the University of Chicago. In our interview, we discussed the mutually informing and contradictory aspects of Islam and medicine's value systems.

Clio Flikkema: When I set out to find a specialist in the combined fields of Russian area studies and economics to interview for my Calderwood seminar, Advocating for Other Cultures, I was not sure such a person existed. Fortunately, I was mistaken. Elizabeth Brainerd, professor of economics at Brandeis University, also pursued this double major as an undergraduate and now investigates topics such as sex-selective abortion in the Russian Caucasus and divorce rates in pre-revolutionary Russia. In our conversation, she highlighted the importance of language education to promote cultural understanding among academics in all disciplines and drew my attention to the exceptional value of interdisciplinary research.

Sarah Koenig: For my interview assignment in Environmental Synthesis and Communication, I explored newly established oyster reefs in Boston’s harbor with Anamarja Frankic, a marine scientist at UMass Boston. As part of her Green Harbors Project, she is using biomimicry—the application of nature-inspired solutions—to restore Boston’s coastal ecosystems, long degraded by urban pollution, through the reintroduction of oyster beds. Oysters are a key ally in her work. As filter feeders, oysters remove excess nutrients from water and improve water quality so that harbor conditions are more conducive to life.

Zahra Pirani: Characterized by their unspecialized identity, stem cells have the potential to be reprogrammed to treat diseases caused by pathogenic cells that have developed in the body. This fall, I had the opportunity to interview Dr. Maya Mitalkopova, director of the Human Stem Cell Lab at MIT’s Whitehead Institute, who has spearheaded numerous breakthroughs in how stem cells help us better understand neurodegenerative diseases like Parkinson’s and Alzheimer’s. Mitalkopova highlighted not only the complexity of studying human diseases with stem cells, but also the interconnected roles that patients, physicians, and basic science researchers have in propagating these discoveries.

**Mellon Mays Research Imperatives I**

SCI-274 (Talks)

“That Old Threadbare Lie”: Women, the NAACP, and the Sexual Politics of Lynching 1909–1939

Imara McMillan ’17, History/Education Studies

**Advisors:** Tracey Cameron, Mellon Mays Undergraduate Fellowship Program Coordinator; Ryan Quintana, History

In 1893, Ida B. Wells published *Southern Horrors*, a pamphlet laying bare the hypocrisies surrounding the more common terror tactic of white supremacy—lynching. Two decades later, she spearheaded the movement to create an anti-lynching branch of the NAACP. My research explores the early role black women played in the anti-lynching movement, a role that lay the groundwork for unrealized federal anti-lynching legislation, as well as a curtailment of the violence that took the lives of over 100 African-American people each year during that time.
Experiencing the Ever-Evolving Intersectional Identities within LGBTQIAP+ Autobiographical Writing(s) in the 21st Century
Gabriela Avraam ’17, Women’s and Gender Studies/American Studies
ADVISOR: Octavio Gonzalez, English
In recent decades, the autobiography and memoir have emerged as lasting voices and tools used in the practice of recording (personal, collective, cultural) histories, and in the case of LGBTQIAP+ communities whose shrines may go unworshipped and genealogical trees uprooted too soon, text holds an even greater power and potential. The queer autobiography and memoir shifts from its complicated beginnings as a pathologized and criminalized subject, before beginning to move toward political explorations, until finally sprouting into its intersectional, identity-focused present. As these writings begin to move beyond the closet and into the clinic, the streets, and the home, it is vital to examine and explore these ever-evolving steps towards a queering of genre and history.

Black Women and Perceived Masculinity in the Media
Brianna Ruffin ’17, Women’s and Gender Studies
ADVISOR: Tracey Cameron, Mellon Mays Undergraduate Fellowship Program Coordinator
Black women in the United States have traditionally been seen as less feminine and more masculine than other women because they do not meet the ideals of hegemonic femininity. In addition, their blackness is often seen as a masculine trait that overrides traditional markers of femininity. In recent years, a stereotype about black women’s perceived masculinity has taken on a life of its own, distinct from other common media stereotypes such as the Sapphire, Mammy, and Jezebel. This new stereotype—the Serena—is routinely applied to black women on the basis of their blackness. Through textual analysis and historical research, I investigated how the media representation of black women as masculine has increased in order to uplift black men, white women, and members of other marginalized groups and to assuage anxieties about racial progress.

Community College Student Experiences: A Winding Path through Higher Education
Christina Phelps ’17, Sociology
ADVISOR: Tracey Cameron, Mellon Mays Undergraduate Fellowship Program Coordinator
Community colleges affect millions of students who navigate those institutions in search of themselves, their career paths, and a secure future, all while in the period of life termed “emerging adulthood.” Current literature understands that higher education both responds to and reinforces emerging adulthood as a period of life (Stetterson, 2015). Yet the role that community colleges play for students in emerging adulthood is not thoroughly understood. My thesis seeks to understand how community college students make meaning of their circuitous route through higher education, and the role that community college plays for emerging adults. How does higher education allow them to navigate this period in life, marked by the need to manage uncertainty and be interdependent? My thesis also explores students’ agency in the face of uncertainty, their willingness to trust the community college as an institution that structures their lives, and their overall aspirations, hopefulness, and confidence.

In Defense of Lucretian Symmetry
Adèle Watkins ’17, Philosophy
ADVISORS: Corinne Gartner, Philosophy; Mary Kate McGowan, Philosophy
In De Rerum Natura, Lucretius argues that prenatal and postmortem nonexistence are metaphysically symmetrical and, given this, we should have the same attitude toward postmortem nonexistence that we do toward prenatal nonexistence. Given that we do not regret not having been born sooner, that is, we do not regret our prenatal nonexistence, we should not lament impending postmortem nonexistence; we should not fear death. I argue in defense of Lucretius, refuting arguments that prenatal and postmortem nonexistence are asymmetrical. In defense of Lucretius, I argue that prenatal and postmortem nonexistence are relatively symmetrical and that we ought to have the same attitude toward postmortem nonexistence as we have toward prenatal nonexistence.

Creating from the Margins: Exploring Asian-American Activism and Art
Ally Ang ’17, Sociology
ADVISOR: Tracey Cameron, Mellon Mays Undergraduate Fellowship Program Coordinator
This project explores the role of art (in particular, visual art and poetry) in contemporary Asian-American activism. Can art be considered a form of activism? How are artists and activists pushing back against the stereotype of Asian-Americans as the passive, apolitical, “model minority”? By interviewing contemporary Asian-American artists whose work has a political focus, as well as conducting my own in-depth analyses of poetry and visual art by these same artists, I will explore the relationship between art and activism for Asian-Americans today. I will also contextualize the current wave of Asian-American activism within the history of Asian-American identity and the Asian-American movement that began in the 1960s.

Economics of Finance
SCI-392 (Pre-formed Panel Discussion)
Lilian Ma ’17, Computer Science/Economics; Katharine Y. Liang ’17, Economics; Michelle F. Namkoong ’17, Economics; Mingfei Li ’17, Economics
ADVISOR: Eric Hilt, Economics
Senior honors students from the economics department employ economic analysis to study optimal behavior by agents participating in the financial markets and overall aggregate outcomes of economies. Mingfei Li examines the influences of country-specific factors and global factors in portfolio investment from advanced economies to emerging market economies. Lilian Ma investigates how the presence of unsophisticated investors in the financial market affects the market portfolios investors choose. Using firm-level data and modern theories of financial panics, Katharine Liang seeks to make sense of numerous competing theories on the causes of the Panic of 1837. Michelle Namkoong analyzes what determined the quality of financial reporting done by NYSE-listed firms in the early 20th century, given the lack of regulation to protect investors.
Perspectives from the Freedom Project II: Barriers to Economic and Personal Freedoms in Latin American Authoritarian Regimes  
**PNE-139 (Pre-formed Panel Discussion)**  
Elaina (Ellie) T. Chalphin ’19, Economics/Religion; Samantha Ostenso ’19, Economics; Hannah Jacobs ’19, Biochemistry  
**ADVISOR:** Joshua McCabe, Sociology  

Oppression in Latin America, specifically in Cuba and Venezuela, is nothing new for their citizens. These regimes regulate personal, political, and economic freedoms, but these freedoms are not mutually exclusive. Even though the United States has political and economic freedom, it does not grant its citizens other “freedoms” such as social mobility, better health outcomes, or overall happiness. Similarly, people in authoritarian regimes can potentially lead happier lives, even without having political freedoms. Authoritative regimes in China and Russia, for example, have provided economic freedoms. Why can’t Latin American countries do the same? How do other freedoms, such as economic and political, positively or negatively impact a citizen’s health? Sam Ostenso will analyze why there isn’t more economic freedom in Latin American authoritative regimes and how this lack of freedom negatively impacts a country’s GDP. Hannah Jacobs will look at how the U.S. embargo affects Cuba’s access to health care and how Cuba’s strict regulations prevent scientific freedom. Ellie Chalphin will explore the relationship between Latin American authoritative regimes’ treatment of women and their level of freedom.

Shaping One’s Self: Early Cultural Experiences  
**SCI-270 (Talk)**  

Simulating a Third-Culture Kid Experience to Enhance Friendship Prospects in Early Interactions  
Meltem Ozcan ’17, Psychology  
**ADVISOR:** Angela Bahns, Psychology  

This research project investigates whether beginning interactions with potential friends at a higher level of intimacy can benefit relationships. Third-culture kids (TCKs), individuals who experience high mobility and multicultural exposure in their developmental years, tend to skip small talk and disclose emotional or personal information early on in friendships. In Study 1, TCK and non-TCK samples were compared on relational and residential mobility, open-mindedness, cultural empathy, and their approaches to friendships. TCKs were found to be more welcoming of potential friends broaching intimate topics in early conversations than non-TCKs. In Study 2, participants will be primed for open-mindedness and a shared understanding of norms in an attempt to accelerate friendship formation in non-TCKs. It is expected that being put in a mindset similar to that of TCKs will make higher intimacy disclosures more acceptable and mitigate the negative effect such a norm breach could otherwise have on liking.

Impact of Child-Care Policies on Satellite Babies: Chinese Immigrant Families’ Access to Early Child Care and Education (ECE) Programs in Massachusetts  
Lucia Tu ’19, Music/Psychology  
**ADVISOR:** Nancy Marshall, Wellesley Centers for Women  

Immigrant children are a highly vulnerable population. They are more likely to face circumstances such as low family income, low parental education, and language barriers than children with native-born parents, which in turn places them at risk of developmental delay and academic struggles once they enter the school system (Karoly & Gonzalez, 2011). Although participation in early childhood care and education (ECE) programs has been shown to have substantial benefits for immigrant children, they have lower rates of participation than children with native-born parents (Karoly & Gonzalez, 2011). This presentation will discuss a research project on the impact of early childhood care and education policies on Chinese-American families’ access to ECE programs in Massachusetts, with a focus on how accessibility (or lack thereof) to these programs contributes to families’ decisions to send their children back to family in China “satellite babies.” The presentation will examine policies on three separate levels: the local community level (Boston, Quincy, Malden), the state level (Massachusetts), and the national/federal level. In addition, the presentation will incorporate interviews with Chinese immigrant families, conducted by Professor Stephen Chen’s Culture, Family, and Development Lab.

Subjective Social Status in Minority Children: How It Is Understood and How It Affects Their Development  
Michelle M. Wang ’17, Psychology  
**ADVISOR:** Stephen Chen, Psychology  

Labeling one’s social class is often difficult. Although social class consists of both objective socioeconomic status (SES, measured with some quantification of family income, parental education, and occupational prestige) and subjective social status (SSS, measured by one’s perception of his/her social standing in relation to others in society), previous studies have solely focused on researching SES in children. While these studies reveal important relationships between SES and child developmental outcomes, they do not provide any information on the child’s understanding or experience of social class. Furthermore, given that several adult studies have suggested SSS might also be a better predictor of child developmental outcomes than SES, especially for minority children, this study aims to research 1) how minority children understand and experience social class, and 2) how SSS affects their development. To do so, we collected data from children and their parents on their SSS, SES, perceptions and racial representations of children of high/low social class, attributions to high/low social class, and preferences for children of high/low social class. We also ran correlations between SSS/SES and three child developmental outcomes—child loneliness, social competence, and child behavior problems—to examine if SSS is a better predictor than SES for these three developmental outcomes. By researching SSS, this study also aims to shed light on how potential biases and stereotypes associated with social class develop.

Changing Minds, Growing Minds  
**SCI-104 (Talk)**  

Fairness of Feedback: Psychology Research on Feedback Style  
Jung Hyeun Choi ’18, Economics/Psychology; Karilyn Reyes ’17, Psychology; Nicole E. Anderson ’18, Psychology  
**ADVISOR:** Angela Bahns, Psychology  

Feedback is such an important part of peer to peer interactions that finding a way to improve feedback delivery may improve
feedback outcomes. Through this study, we wanted to find a relationship between feedback type and the opportunity to respond. More specifically, we examined whether people perceive peer feedback, whether verbal or written, as more fair if they have an opportunity to respond to it. The connection between how fair someone perceives feedback to be and the type of feedback they are given has been made before, but previous research did not find a connection between feedback type and the ability to respond. Our study sought to fill a gap in the research of feedback by relating feedback type in conjunction with response styles, with perceptions of feedback fairness.

**Wellesley AWARE: From University to Liberal Arts College**

*Corinna Zhang '17, Psychology*

ADVISOR: Stephen Chen, Psychology

AWARE, or the Asian Women’s Action for Resilience and Empowerment, was originally an intervention created by Professor Chris Hahn (Boston University) to address the mental, sexual, and physical health of Asian-American women. A pilot version of the intervention has been brought to Wellesley College as a response to a growing need for mental health support for the Asian-American students on campus. This presentation will focus on the process of adapting the intervention from its original format within Boston University, a large research institution, to one that would better fit Wellesley College, a small liberal arts college.

**Benefits of a Brief, Youth-Directed Growth Mindset Intervention for Family Functioning and Parental Depression**

*Manaswi Kashyap ’19, Psychology*

ADVISOR: Robin Akert, Psychology

Youth anxiety and depression have shown consistent associations with both psychopathology in parents and increased family dysfunction, and research suggests that these effects are bidirectional. Previous studies have found that multisession youth-focused cognitive behavioral therapy (CBT) for anxiety disorders improved global family functioning; however, it is unclear whether very brief youth-focused interventions directed toward improving youth mental health can have positive, sustained effects on overall familial stress. To investigate this possibility, we examined whether a single-session, youth-directed intervention that teaches growth personality mindsets (the belief that one’s personality is malleable) reduces parental depression and family dysfunction in families of 96 youths with elevated internalizing difficulties. Compared to a supportive-therapy control, the intervention predicted three-month reductions in family dysfunction and parental depression. Increases in youth growth mindsets mediated these effects.

“**The Ruhlman is truly a magical, inspirational day that is hard to describe, but is better experienced in person.**”

–Barbara Peterson Ruhlman ’54

---

**Humanities**

**“To Till and Keep”: Creating Environmental Paradigms of Dominion and Sustainability From Genesis**

FND-102 (Interactive Teaching Presentation)

*Emma G. Brewer-Wallin ’18, Religion/Individual-Peace & Justice Studies; Ciaran L. Gallagher ’17, Individual-Environmental Chemistry*

ADVISOR: Edward Silver, Religion

Climate change and environmentalism are politicized and associated with religious belief, and the Judeo-Christian creation accounts in Genesis 1–2 are often used as justification. The interpretations of this text have produced contrasting theological frameworks of dominion, stewardship, and nurture, which lead to divergent perspectives on climate change and environmental use. An exploration of the Genesis creation accounts and interpretations—from a variety of sources, including Calvin, ecofeminists, and Pope Francis—exhibit how contrasting theological and ecological conclusions stem from the same biblical text. Emma, a future minister, and Ciaran, an environmental chemist, will lead a discussion on Genesis 1–2 and how it has been used to justify varying interactions with the Earth. We will reflect on these interpretations through discussion, and we will create concept maps in small groups, which will allow further analysis of the interplay between Judeo-Christian scripture and environmental understanding.

**Together, Restoring Their Names: Humanizing Women’s Experiences from the Holocaust**

FND-120 (Pre-formed Panel Discussion)

*Callie Kim ’18, Philosophy; Arianna G. Regalado ’18, Religion; Samantha M. Stewart ’19, International Relations-Economics*

ADVISOR: T. James Kodera, Religion

A group of Wellesley students embarked on a service trip to Berlin, Germany, to restore the forgotten voices of women in the Holocaust. They spent time exploring Jewish life in Berlin before and after the Holocaust, engaging in memory work, and confronting the painful heritage of Germany. Through this presentation, these students will delve into the lessons they learned about
the importance of studying gender in the Holocaust and bringing women's voices out of the dark to recognize them as part of the greater narrative of the Holocaust. These students learned how women’s voices are often left out of the picture and how that construes and misguides the holistic conceptualization of that point in time because sources are missing vital components: women’s voices. In addition to memory work, they visited the German Federal Foreign Office and met with key figures in the fight against anti-Semitism in Europe, such as the deputy federal foreign office special representative for relations with Jewish organizations and issues relating to anti-Semitism. They also visited the Israeli embassy to meet with the head of public diplomacy to discuss the evolution of Jewish life in Europe. In the presentation, they will discuss their reflections on these matters and speak to how they memorialized the narratives of several women who fought against Nazism, who remained strong, and who resisted.

The ascenDance Experience: Dance at Wellesley and Student-Run Dance
PNW-201 (Long Performance)
Zoe M. Iacovino ’17, Political Science; Nhia M. Solari ’19, Geosciences/Philosophy; Melanie (Mel) T. Pasaretti ’18, Geosciences; Kendra Cui ’18, Economics/Theatre Studies
ADVISOR: Phyllis McGibbon, Art, Elizabeth Christy Kapf Professor

Although there is no unifying dance program at Wellesley, there are many active dancers across the campus. These dancers are engaged in a number of different styles, from ballet to hip-hop to Chinese traditional dance, and each dance community creates opportunities for performance every semester. ascenDance is Wellesley’s ballet and contemporary dance company on campus. As a group, ascenDance works to provide rehearsal performance opportunities for any member of the Wellesley community who is interested in dance. Members range from beginning dancers to those with an extensive and diverse dance background, and are committed to creating a strong community of dancers from all different styles on campus. This Ruhlman presentation is organized by ascenDance, and offers a look at the student-run dance community at Wellesley through the eyes of active members of the community. In a combination of spoken introduction and a number of dance performances in varying styles, this presentation will highlight the dancers’ diverse interests and abilities, and showcase work from rehearsal to performance.

Looking Across the Globe
SCI-396 (Talk)
Iceland Outfitted: The Impact of Globalization on Reykjavik Fashion
Kaylee (Amelia) A. Rodriguez ‘19, Undeclared
ADVISOR: Justin Armstrong, Writing Program

The Iceland of the tourist imagination is a natural paradise untouched by the struggles of the modern world—an idealized landscape that is readily reflected in the hiking clothes and practical parkas that are the hallmarks of foreign visitors. The young Icelanders of today, however, are enanored with “fast fashion” brands like H&M and Zara and do much of their shopping abroad. The Reykjavik resident’s adoration of inexpensive, trendy clothing reflects a departure from the staunch traditionalism that Americans might attribute to Iceland’s people, but H&M’s purported commitment to sustainability is in keeping with the country’s environmentally conscious reputation. Through street-style photography, interviews, and participant observation during a two-week field trip to Iceland, I explored the tourist gaze of Iceland, the country’s desire to “catch up” culturally in a globalized world, and ultimately, what clothes can say about the people wearing them from an anthropological perspective.

Retelling the Story of Development through an Anthropological Lens
Kavindya Ibbenathna ‘19, Anthropology/Cinema and Media Studies
ADVISOR: Justin Armstrong, Writing Program

Last year I carried out a semester-long independent study with Professor Justin Armstrong with the aim of unpacking the development world through an anthropological lens. The study gave me the opportunity to reflect back on my personal experiences of working with the United Nations for two years, and to then contrast this encounter with my work with grassroots organizations and social enterprises. The main aims of my study were to critically analyze the gaps left over by the development world’s dependence on quantitative data and to then explore the extent to which this approach obscures a realistic understanding of the intricacies and complexities of the human experience. I studied several failed development interventions to illustrate the manner in which the overreliance on traditional methods of quantitative research leads to life experiences, cultural complexities, and local ways of life being reduced to mere binaries. I also explored concepts such as the “passive recipient versus active participant” rhetoric, the role of local culture within development interventions, and how traditional methods of research are incapable of recording and analyzing these subtle yet significant intricacies. Through my presentation, I will draw from my personal experiences and also share my findings on how storytelling through visual and collaborative ethnography could fill in the gaps left by an overreliance on quantitative hard data. I evaluate its ability to connect macro-level policy making with grassroots realities, its untapped potential in helping design development projects that are community-owned, participatory, effective, and sustainable, and in doing so to foster a more constructive relationship between anthropology and development.

The Ambassadors of Dreams: Russian Innovation and the Exploration of Humanity and Soul
Laura Zawaski ’18, Russian Area Studies
ADVISOR: Diego Arciniegas, Theatre Studies

Something incredible is happening in Moscow. As part of the 25th year in the longest continuous cultural exchange between the United States and Russia, a group of American students arrived at the Moscow Art Theater School this fall in the midst of an artistic Russian renaissance. Finding roots in the sudden fusion of mass theatrical literacy with the incredible capabilities of the contemporary Russian actor, the most recent wave in Russia’s long-standing tradition of theatrical innovation changes everything we know about the exploration and representation of soul. In their search for understanding of the human experience, Moscow theaters have developed a new language for the expression of the intangible.
Two Halves Make a Whole?
SCI-264 (Talk)

Mind Over Matter?: An Inquiry into the Materiality of the Conceptual Art Object, Focusing on Realization, Display, and Conservation in the Work of On Kawara
Aisha Lovise Maud Borne '17, Art History
ADVISOR: Patricia Berman, Art, Art History. Theodora L. and Stanley H. Feldberg Professor of Art

The work of art is often synonymous with the cult object. Greatly revered and valued by humankind, these works of art are deemed important for perpetuity and worthy of preservation for future generations, often due to their material ability to transport human expression across time and space. However, certain artworks reject objecthood in favor of conceptualism, where a material body is unnecessary or ancillary to the work itself. This senior thesis explores the conceptual art object’s dissonance between conceptualism and cult objecthood through an exploration of the oeuvre of the Japanese artist On Kawara (1933–2014). The work of Kawara, whose conceptualism is deeply entwined with materiality, is approached through a triad of approaches mapping the life of the conceptual art object as it is realized in the studio, enters the market and museum, and transitions to an afterlife.

Cartesian Dualism and Women’s Right to Education
Sirwi (Chloe) Xiao ’17, International Relations/Political Science/Philosophy
ADVISOR: Julie Walsh, Philosophy

How has Descartes’ dualist thinking influenced women’s right to education? Women’s right to education is never a topic in Descartes’ writings, but his revolutionary mind-body dualism in 17th century Europe has nonetheless offered his contemporaries a powerful theoretical justification for women's equal access to education. I will analyze primary texts on Descartes’ dualist system and his contemporaries’ discourses on the subject of female education in the first part of my presentation, then I shall present a compelling objection to Cartesian feminists. Descartes’ dualism is an extreme, indeed revolutionary, form of masculinization of thought, a term that no longer pertains to femininity in the age of Cartesian dualism. Scholars viewing dualism as a setback for feminism have long argued along this line of objection by examining gendered traits within the Western cultural context, which dates back to ancient Greece and the Middle Ages. In the second part of my presentation, I shall explicate the objection outlined above, and offer the two opposing stances from the first two sections in order to raise a question: Why is the influence of dualist rhetoric on women’s right to education so paradoxical? In the third part, I will propose an answer by briefly looking at oppressions particularly pertaining to the female body throughout history — and men’s general lack of understanding thereof — and tie it back to both Descartes’ works and recurring themes/stuggles in feminist waves in more contemporary settings. I shall conclude my presentation by then hypothesizing that we, as a society, need to broaden tools for our acquisition of knowledge to include culturally feminine traits, in order to broaden the answer to “who is capable of thinking?”

Investigating Aristotelian Dualities in Quattrocento Florentine Painting: Woman’s Place on the Left-Hand Side of Man
Hannah K. Augst ’17, Art History
ADVISOR: Jacqueline Musacchio, Art

This presentation will investigate the ways in which an association between the female sex and the left side originated in ancient texts by Aristotle and existed as a cultural topos in 15th- and early 16th-century Florence. It will look at examples from three categories of Florentine paintings that demonstrate this association by portraying the female figure on the left-hand side of the male figure, exploring how an affiliation with the left side communicated woman’s sexual inferiority. It will conclude with a discussion on how these paintings were used to confine Renaissance women to domestic roles in a Florentine patriarchal society.

Examining the Relationship Between Identity Power and Knowledge
Fani Ntavelou-Baoum ’17, Philosophy
ADVISOR: Helena de Bres, Philosophy

I will present the results of my independent research in the comparative literature department as an extension of the course CPLT 209: Literature on the Brain: Introduction to Cognitive Poetics. One way humans can be wronged is by having their capacities unjustly limited or disrespected. For example, they can be wronged as social beings by being deprived of social interaction or by being unjustly socially rejected. My thesis examines how individuals can be wronged in another distinctly human capacity: as subjects of knowledge. I argue that when people are not recognized and treated as knowers and/or are prevented from creating and sharing knowledge, they are suffering a kind of injustice. I will refer to it as “epistemic injustice,” i.e., an injustice specifically in relation to knowledge. This presentation will focus on how the distribution of social power leads to inequalities related to knowledge. I will consider questions such as: Are men better able to share knowledge because they are seen as more rational, and hence, better knowers? Do white Westerners create and impose social meanings? How are these inequalities generated and sustained by oppressive social structures?

Snapchat @ Wellesley

Wellesley College RuhLMAN Conference 2017

1:30 – 2:40 p.m.

Two Halves Make a Whole?
SCI-264 (Talk)

Mind Over Matter?: An Inquiry into the Materiality of the Conceptual Art Object, Focusing on Realization, Display, and Conservation in the Work of On Kawara
Aisha Lovise Maud Borne ’17, Art History
ADVISOR: Patricia Berman, Art, Art History. Theodora L. and Stanley H. Feldberg Professor of Art

The work of art is often synonymous with the cult object. Greatly revered and valued by humankind, these works of art are deemed important for perpetuity and worthy of preservation for future generations, often due to their material ability to transport human expression across time and space. However, certain artworks reject objecthood in favor of conceptualism, where a material body is unnecessary or ancillary to the work itself. This senior thesis explores the conceptual art object’s dissonance between conceptualism and cult objecthood through an exploration of the oeuvre of the Japanese artist On Kawara (1933–2014). The work of Kawara, whose conceptualism is deeply entwined with materiality, is approached through a triad of approaches mapping the life of the conceptual art object as it is realized in the studio, enters the market and museum, and transitions to an afterlife.

Cartesian Dualism and Women’s Right to Education
Sirwi (Chloe) Xiao ’17, International Relations/Political Science/Philosophy
ADVISOR: Julie Walsh, Philosophy

How has Descartes’ dualist thinking influenced women’s right to education? Women’s right to education is never a topic in Descartes’ writings, but his revolutionary mind-body dualism in 17th century Europe has nonetheless offered his contemporaries a powerful theoretical justification for women’s equal access to education. I will analyze primary texts on Descartes’ dualist system and his contemporaries’ discourses on the subject of female education in the first part of my presentation, then I shall present a compelling objection to Cartesian feminists. Descartes’ dualism is an extreme, indeed revolutionary, form of masculinization of thought, a term that no longer pertains to femininity in the age of Cartesian dualism. Scholars viewing dualism as a setback for feminism have long argued along this line of objection by examining gendered traits within the Western cultural context, which dates back to ancient Greece and the Middle Ages. In the second part of my presentation, I shall explicate the objection outlined above, and offer the two opposing stances from the first two sections in order to raise a question: Why is the influence of dualist rhetoric on women’s right to education so paradoxical? In the third part, I will propose an answer by briefly looking at oppressions particularly pertaining to the female body throughout history — and men’s general lack of understanding thereof — and tie it back to both Descartes’ works and recurring themes/stuggles in feminist waves in more contemporary settings. I shall conclude my presentation by then hypothesizing that we, as a society, need to broaden tools for our acquisition of knowledge to include culturally feminine traits, in order to broaden the answer to “who is capable of thinking?”

Investigating Aristotelian Dualities in Quattrocento Florentine Painting: Woman’s Place on the Left-Hand Side of Man
Hannah K. Augst ’17, Art History
ADVISOR: Jacqueline Musacchio, Art

This presentation will investigate the ways in which an association between the female sex and the left side originated in ancient texts by Aristotle and existed as a cultural topos in 15th- and early 16th-century Florence. It will look at examples from three categories of Florentine paintings that demonstrate this association by portraying the female figure on the left-hand side of the male figure, exploring how an affiliation with the left side communicated woman’s sexual inferiority. It will conclude with a discussion on how these paintings were used to confine Renaissance women to domestic roles in a Florentine patriarchal society.

Examining the Relationship Between Identity Power and Knowledge
Fani Ntavelou-Baoum ’17, Philosophy
ADVISOR: Helena de Bres, Philosophy

I will present the results of my independent research in the comparative literature department as an extension of the course CPLT 209: Literature on the Brain: Introduction to Cognitive Poetics. One way humans can be wronged is by having their capacities unjustly limited or disrespected. For example, they can be wronged as social beings by being deprived of social interaction or by being unjustly socially rejected. My thesis examines how individuals can be wronged in another distinctly human capacity: as subjects of knowledge. I argue that when people are not recognized and treated as knowers and/or are prevented from creating and sharing knowledge, they are suffering a kind of injustice. I will refer to it as “epistemic injustice,” i.e., an injustice specifically in relation to knowledge. This presentation will focus on how the distribution of social power leads to inequalities related to knowledge. I will consider questions such as: Are men better able to share knowledge because they are seen as more rational, and hence, better knowers? Do white Westerners create and impose social meanings? How are these inequalities generated and sustained by oppressive social structures?

Snapchat @ Wellesley

Wellesley College RuhLMAN Conference 2017

1:30 – 2:40 p.m.
and reduced oxygen conditions that alter function is self-evident: Mutations, drugs, and reduced oxygen conditions that alter cardiac ion channels in normal heart and its response to low oxygen levels. The importance of cardiac ion channels in normal heart and its response to low oxygen levels. The importance of cardiac ion channels in normal heart and its response to low oxygen levels.

In studying these channels, we have established and characterized our model cell heterologous system, we utilized a diverse range of techniques—including molecular cloning, electrophysiology, biophysical imaging, and protein biochemical assays—to establish and characterize our model cell heterologous system, we utilized a diverse range of techniques—including molecular cloning, electrophysiology, biophysical imaging, and protein biochemical assays—to establish and characterize our model cell heterologous system, we utilized a diverse range of techniques—including molecular cloning, electrophysiology, biophysical imaging, and protein biochemical assays—to establish and characterize our model cell heterologous system, we utilized a diverse range of techniques—including molecular cloning, electrophysiology, biophysical imaging, and protein biochemical assays—to establish and characterize our model cell.

As part of the Knapp Center internship, interns use cutting-edge technology for pedagogical and creative purposes. Projects interns have worked on include 3D scanning and printing Grecian artifacts, recreating dig sites through virtual reality technology, and modeling and printing Gameboy Colors and game design weapons using CAD software.

The human heart is fundamentally an electrical pump, whose action is driven and modulated by a variety of ion channels. The research of the Cameron and Darling labs focuses on two types of cardiac ion channels: voltage-gated and ATP-sensitive. These channels are critical for repolarization of the heart and its response to low oxygen levels. Following artificial introduction of human genes encoding such ion channels into a heterologous system, we utilized a diverse range of techniques—including molecular cloning, electrophysiology, biophysical imaging, and protein biochemical assays—to establish and characterize our model cell system. In studying these channels, we have made progress in assessing their interactions, inherent characteristics, and regulation at the molecular level. The importance of cardiac ion channels in normal heart function is self-evident: Mutations, drugs, and reduced oxygen conditions that alter channel function lead to heart attack and cardiac arrhythmias.

Cancer from Different Points of View
FND-126 (Talk)

Understanding Cancer: From the Woes of NGOs
Chika D. Eghuzie ’19, International Relations-History
ADVISOR: Catia Confortini, Peace & Justice Studies

In this project, I had the opportunity to learn about advocacy and outreach efforts of Nigerian breast cancer organizations and their relationships with international global health organizations. Through my work as a sophomore research assistant, I transcribed interviews with breast cancer NGOs, and classified these NGOs in terms of their funding sources, focus, services, advocacy, and outreach efforts. I then imported and learned to code data using a qualitative analysis software called Nvivo, which also allowed me to import data from the social media platforms used by these NGOs. In this presentation, I discuss some of the results of this research, including problems that some of these organizations face concerning awareness raising, funding, cultural stigma surrounding breast cancer, and stigma that international NGOs have towards Nigerian NGOs.

Designing Combination Therapies for Acute Myeloid Leukemia
Haoling (Holly) Zhu ’18, Mathematics
ADVISOR: Adam Matthews, Biological Sciences

Acute myeloid leukemia (AML) is a blood cancer that results from the rapid proliferation of the myeloid lineage of cells. There are approximately 20,000 cases of the disease diagnosed in the United States every year, with the occurrence of disease increasing with age. Despite advancements in treatments, most AML patients will nevertheless develop resistance to chemotherapy and eventually die from their disease. Therefore, there is a need for improved AML therapy. Venetoclax (ABT-199) is a BH3-mimetic that has been shown to target and inhibit BCL-2, an anti-apoptotic protein that AML cells are dependent on for survival. However, despite its efficacy in treating other leukemias, ABT-199 has shown a heterogeneous response in AML patients.

As part of the Knapp Center internship, interns use cutting-edge technology for pedagogical and creative purposes. Projects interns have worked on include 3D scanning and printing Grecian artifacts, recreating dig sites through virtual reality technology, and modeling and printing Gameboy Colors and game design weapons using CAD software.

The human heart is fundamentally an electrical pump, whose action is driven and modulated by a variety of ion channels. The research of the Cameron and Darling labs focuses on two types of cardiac ion channels: voltage-gated and ATP-sensitive. These channels are critical for repolarization of the heart and its response to low oxygen levels. Following artificial introduction of human genes encoding such ion channels into a heterologous system, we utilized a diverse range of techniques—including molecular cloning, electrophysiology, biophysical imaging, and protein biochemical assays—to establish and characterize our model cell system. In studying these channels, we have made progress in assessing their interactions, inherent characteristics, and regulation at the molecular level. The importance of cardiac ion channels in normal heart function is self-evident: Mutations, drugs, and reduced oxygen conditions that alter channel function lead to heart attack and cardiac arrhythmias.

Cancer from Different Points of View
FND-126 (Talk)

Understanding Cancer: From the Woes of NGOs
Chika D. Eghuzie ’19, International Relations-History
ADVISOR: Catia Confortini, Peace & Justice Studies

In this project, I had the opportunity to learn about advocacy and outreach efforts of Nigerian breast cancer organizations and their relationships with international global health organizations. Through my work as a sophomore research assistant, I transcribed interviews with breast cancer NGOs, and classified these NGOs in terms of their funding sources, focus, services, advocacy, and outreach efforts. I then imported and learned to code data using a qualitative analysis software called Nvivo, which also allowed me to import data from the social media platforms used by these NGOs. In this presentation, I discuss some of the results of this research, including problems that some of these organizations face concerning awareness raising, funding, cultural stigma surrounding breast cancer, and stigma that international NGOs have towards Nigerian NGOs.

Designing Combination Therapies for Acute Myeloid Leukemia
Haoling (Holly) Zhu ’18, Mathematics
ADVISOR: Adam Matthews, Biological Sciences

Acute myeloid leukemia (AML) is a blood cancer that results from the rapid proliferation of the myeloid lineage of cells. There are approximately 20,000 cases of the disease diagnosed in the United States every year, with the occurrence of disease increasing with age. Despite advancements in treatments, most AML patients will nevertheless develop resistance to chemotherapy and eventually die from their disease. Therefore, there is a need for improved AML therapy. Venetoclax (ABT-199) is a BH3-mimetic that has been shown to target and inhibit BCL-2, an anti-apoptotic protein that AML cells are dependent on for survival. However, despite its efficacy in treating other leukemias, ABT-199 has shown a heterogeneous response in AML patients.
Blue Planet and Beyond
FND-128 (Talk)

Southern Ocean Acidification: Setting the Stage
Katherine Chan ’18, Chemical Physics
ADVISOR: Nikki Lovenduski, Atmospheric and Oceanic Sciences

Increasing atmospheric carbon dioxide levels cause the ocean to become more acidic, thereby disturbing marine ecosystems. Ocean acidification is projected to have the most significant impact in the Southern Ocean because of its natural undersaturation in calcium carbonate, a mineral used by many organisms to form shells. Historically, data from the Southern Ocean have been difficult to collect because of turbulent waters. Previous attempts have utilized hydrographic cruises or collected underway surface measurements. Recently, the Southern Ocean Carbon and Climate Observations and Modeling (SOCCOM) project deployed a series of floats that autonomously collect biogeochemical data. This project seeks to analyze SOCCOM pH data in order to establish a baseline pH for the Southern Ocean. The pH data generated from this analysis will be compared with previous estimates of pH in the Southern Ocean. Establishing a baseline pH will be vital in accurately modeling the acidification of the Southern Ocean.

KELT: The Hunt for Exoplanets and the Importance of Ground-Based Exoplanet Surveys
Casey A. Melton ’19, Undeclared
ADVISOR: Kim McLeod, Astronomy

Since its inception over a decade ago, the Kilodegree Extremely Little Telescope (KELT) project has been surveying the skies with its two wide-angle telescopes in Arizona and South Africa, looking for evidence of extrasolar planets (exoplanets). With the poor resolution of these two telescopes, the KELT project requires follow-up from larger telescopes around the world, one of which is at Whitin Observatory at Wellesley College. With our 24-inch telescope, we can resolve the stars in fields that have shown evidence of exoplanet transits and more accurately assess the possible cause of the change in brightness of the star. Aside from an exoplanet transit, other possible causes for brightness changes are when the star is variable or an eclipsing binary system, two common false-positive scenarios. A major component of my research, besides observing, is analyzing and interpreting data for the KELT science team to use in determining whether a star may be hosting an exoplanet. In this process, I select stars in the field to check for variance and generate a light curve of the brightness of the target star. Once I interpret the data, I send it to the team for further use. Although ground-based exoplanet surveys have obvious limitations, projects such as KELT allow for detailed follow-up on exoplanets, which further our knowledge of exoplanets and can in turn allow us to better understand our own solar system.

What Happens in the Thermosphere if the Stratosphere Is Strongly Disturbed?
Jolene W. Fong ’17, Astrophysics
ADVISOR: Larisa Gonchararenko, Atmospheric Sciences

We investigate the possible stratosphere-thermosphere coupling at high latitudes, where the cusp of the Earth’s magnetic fields lie, using Sondrestrom Winter Ionosphere Model (SWIM) and Sondrestrom Incoherent Scatter Radar (ISR) data from the last 15 winters (2001–2016). This position is of particular interest because of the ionosphere’s strong dependency on solar and geomagnetic activity, as well as its proximity to the stratospheric polar vortex. After using the model to remove daily variations, seasonal variations, and variations due to solar flux and geomagnetic activity, anomalies in the data were compared to anomalies in stratospheric winds and temperatures. Our results so far show a possible dependency between ion temperature and stratospheric winds, with higher correlations found during the daytime. This dependency is intensified during years of Sudden Stratospheric Warnings (SSWs), where sudden changes in the winter hemisphere westerly winds can result in an increase in stratospheric temperatures and sometimes even reversal of the polar vortex. Studying the connection between these anomalies can help us link stratospheric events to ionospheric disturbances, and therefore help us predict the state of the ionosphere using meteorological events, which we currently know up to several days in advance.

Perspectives on STEM Education
SCI-E-111 (Talk)

Analysis of First-Year Mentors, and First-Year Advisors’ Effects on Wellesley College Majors
Kelly C. Kang ’17, Mathematics/Economics
ADVISOR: Cassandra Pattanaik, Quantitative Reasoning, Guthman Director of Quantitative Analysis Institute

Although Wellesley College is a liberal arts institution, approximately one-third of Wellesley College students have majors in the STEM field. There have been many previous studies on the choice of major based on factors such as the student’s interests, the student’s previous courses, and the outlook of the potential jobs. In this study, I analyze the effects of first-year mentors and first-year advisors on the students’ majors. In particular, with this analysis, we can answer questions such as how to pair first-year students with mentors and advisors so that we can encourage more women in STEM.

Learning Progressions from Introductory Chemistry through Biochemistry
Charlotte R. Reed ’19, Spanish
ADVISOR: Adele Wolfsion, Chemistry, Education Studies, Nan Walsh Schow ’54 and Howard B. Schow Professor in the Physical and Natural Sciences and Professor of Chemistry

My group is working to develop learning progressions from introductory chemistry through biochemistry, i.e. pathways through a concept or discipline such that students gain successively deeper, more sophisticated understanding of the topic. Ideally, new concepts should clearly build upon previous ones. To improve student learning, we must discover how and when students master important topics, so that we can delineate which topics should be introduced and reinforced at each level of the chemistry curriculum. To accomplish this, we are assessing students’ understanding and confusion in introductory, organic, and bio-chemistry through interviews and surveys. We interviewed Wellesley College chemistry faculty about which concepts they targeted in their classes and how they assessed their students. We then interviewed students who had completed at least one biochemistry course, after they completed a short survey assessing their understanding of pH, kinetics and thermodynamics, and free energy. We found some gaps in
understanding of fundamental concepts and realized that we needed more precise questions to assess understanding along a learning progression. We focused on three essential concepts: acid/base equilibria, kinetics and thermodynamics, and energetics within the cell. To do this, we created a survey with 26 progressively more complex questions and included a scale for students to rank how confident they felt about each answer. The survey was taken as a pre- and post-test in biochemistry classes at a large research university and as post-test in several chemistry courses at Wellesley College. Our results show that progression is not linear, in that students may master complex concepts while not understanding more basic ones and/or experience losses in understanding from course to course. However, the greatest increases in understanding after biochemistry correspond to those areas of greatest emphasis in the course. Student confidence also grew steadily with each course.

**Effectiveness of Reflection Questions in Establishing Greater Understanding in CS111**

Jessica (Jess) R. Abramson ’19, Computer Science/Psychology; Khonzodakhon (Khonzoda) Umarova ’20, Undeclared

**ADVISOR:** Eniana Mustafaraj, Computer Science

CS111: Computer Programming and Problem Solving is the introductory course in the CS major at Wellesley College. The course has seen significant growth in enrollment recently as well as greater variation in student backgrounds and aptitude. To accommodate these developments, the course has undergone changes in pedagogy, including the introduction of regular quizzes and reflections about problem sets. We analyzed data from an end-of-semester student survey and reflection responses, grades, partner choices, and demographics to examine the effectiveness of the reflections in improving students’ learning of course content. Reflection questions of appropriate difficulty do provide greater insight to students. Different groups of students showed preference for different types of reflection questions depending on their depth of understanding of course material. The aspects of the course that students reported most contributed to their learning differed depending on their standing in the class.

**Design for Engagement and Inclusion**

**FND-307 (Talk)**

**Understanding and Supporting Web Literacy Skills in the Social Web**

Marisa (Claire) C. Beyette ’19, Computer Science/English; Adrianna L. Tan ’19, Computer Science

**ADVISORS:** Eniana Mustafaraj, Computer Science

Developing and practicing web literacy skills is increasingly important in our digitally mediated society, with the prominence of the web as an unregulated information delivery platform. The recent events involving the spread of fake news on the web can be attributed to the lack of mechanisms to validate the credibility of information, putting that burden on the users. Our research focuses on developing tools to support users as they consciously evaluate the information they consume on Facebook. We seek to bridge the gap between web literacy skills taught in classrooms and the application of these skills to web content encountered by users when browsing social media, by encouraging users to question who generates the content that appears on their news feeds. Our tools are a work in progress that are iteratively designed through prototyping and user studies. An additional goal of our work is to gain insight into how users consume and evaluate web-based information sources.

**Behind the Camera: Inclusivity in Design**

Katharine P. Hyslop ’17, Media Arts and Sciences; Jalea A. Keane-Lee ’17, Cinema and Media Studies/Political Science

**ADVISOR:** David Olien, Art

Kat Hyslop and Jalea Keane-Lee partnered to redesign camera equipment to fit the female body. During the previous summer, Keane-Lee filmed a documentary and learned firsthand that current camera support systems are tailored only to male bodies. Most rigs rely on the chest as the central place of support and are therefore inconvenient and physically uncomfortable for women. These limitations illustrated the lack of gender diversity both behind the camera and at the design table. Utilizing classic product design methodology, Hyslop and Keane-Lee have modeled a product that can be adapted to any body.

**HoloMuse: Enhancing Engagement with Archaeological Artifacts through Gesture-Based Interaction with Holograms**

Whitney C. Fahnbullleh ’17, Media Arts and Sciences; Jasmine N. Davis ’17, Media Arts and Sciences

**ADVISOR:** Ori Shaer, Computer Science, Class of 1966 Associate Professor

We present HoloMuse, an AR application for the HoloLens wearable device, which allows users to actively engage with archaeological artifacts from a museum collection in ways that are otherwise not possible. We designed HoloLens to facilitate learning and engagement with museum collections without taking away from the experience of viewing an original artifact within the context of an exhibit. HoloMuse can be used inside the gallery or in the classroom. It enables users to pick up, rotate, scale, and alter a hologram of an original archeological artifact using in-air gestures. Users can also curate their own exhibit or customize an existing one by selecting artifacts from a virtual gallery and placing them within the physical world so that they are viewable only using the device. We intend to study the impact of HoloMuse on learning and engagement with college-level art history and archaeology students.

**Nanomedicine: Out of the Lab and Into the Body**

Amal W. Cheema ’17, Biochemistry/Political Science

**ADVISOR:** Nolan Flynn, Chemistry

Nanomedicines, using materials with at least one dimension on the billionth of a meter scale, vary in their applications: bioimaging, drug delivery, and therapeutics. Within the field, scientists increasingly leverage gold nanoparticles (AuNPs) for their unique physicochemical properties. Despite comprehensive research on AuNPs’ synthetic identity, nanoscientists have much to learn about the interaction of AuNPs with the human body. This thesis talk focuses on assessing what happens when AuNPs are exposed to bloodstream-like environments. To understand how behavior and identity differ between lab solutions and bloodstream, we examine the interaction of AuNPs with human blood proteins. We use a variety of biochemical and chemical technique to probe the “protein corona” that forms around AuNPs. Come learn about AuNP synthesis, investigate AuNP-protein interactions, and explore the nanoworld!
Talking with parents about sex is important for teens’ sexual health. As their children get older, parents talk with them in different ways about sexual topics, but few longitudinal studies have examined the change in parent-teen communication regarding sex and relationships over time. This exploratory qualitative study used interviews with 24 parents at two time points: when their teens were in seventh and 10th grades. It examined the ways in which parents’ experiences of these conversations and how they talk about sexual topics, such as readiness for sex, and teens’ social media use, changed from middle school to high school. This study may be useful to better understand the challenges parents face when they try to talk to their kids about sex and how their motivations and underlying reasons for their conversations change as their children age.

Theories of Intelligence in Early Childhood
Elizabeth A. Rizzoni ’18, Psychology; Alejandra I. Escamilla-Saldarriaga ’18, Psychology
ADVISOR: Jeremy Wilner, Psychology

Studies have been conducted on theories of intelligence in children, and studies have been conducted on perseverance in preschool children, but connecting these areas of research has not yet been attempted. In this study, we examined how the implicit theory of intelligence would influence the perseverance of preschool children. We hypothesized that those children who were primed for the incremental view of intelligence would exhibit more perseverance than children who were primed for the entity view. Thirty-one children aged 51.16 months (SD = 6.05) who attend a laboratory preschool on a college campus were primed for either the entity or incremental theory of intelligence. Next, the children were timed as they attempted to complete a puzzle with missing pieces. Perseverance was coded as their time spent on this puzzle task. No significant results were found, although marginally significant post hoc results emerged when the data was split by gender. These marginal findings are consistent with pre-existing literature on the implicit theory of intelligence, and are worthy of further study in a larger sample to confirm or deny, with better certainty, the influence of theories of intelligence and gender on perseverance in preschool children.

Perspectives from the Freedom Project III: Exploring Threats to Free Elections
PNE-139 (Pre-formed Panel Discussion)
Samantha (Sam) M. Churchill ’20, Undeclared; Daniela (Danni) Ondraskova ’18, Economics/Russian Area Studies; Ninan S. Pollack ’20, Undeclared
ADVISOR: Joshua McCabe, Sociology

Free elections are the foundation of liberal democracies, yet history reveals that their integrity is systematically compromised time and again. This panel will explore three such threats and their possible remedies. Ninan Pollack discusses the increasingly undemocratic nature of U.S. elections due to the relaxation of once-stringent campaign finance laws. She argues that monetary political contributions are not protected “speech” and makes the case for publicly funded campaigns. Dani Ondraskova examines the Russian government’s illicit cybersecurity activities as they seek to influence elections in central and eastern Europe. She goes on to examine the implications of Russia’s activities on the traditional Atlanticist alliance and present suggestions for U.S. policy. Finally, Samantha Churchill reconsiders the idea of children’s suffrage, arguing that minors have the capacity, and therefore should have the right, to participate in the democratic processes that fundamentally shape their lives.

Mellon Mays Research Imperatives II

SCI-274 (Talks)

Divided Families and Cubanidad

Tory Roth ’18, American Studies
ADVISOR: Tiaucy Cameron, Mellon Mays Undergraduate Fellowship Program Coordinator

One way of becoming a scholar-activist involves elevating the personal to the academic by placing the stories of ordinary people into a broader narrative. Primary sources such as letters have long been prized as vital information in social science research. However, the importance of these documents often hinges on their proximity to noteworthy historical events. The Elian Gonzalez case in 2000 was one such event that, due to the international controversy it sparked, brought to light long-standing contradictions within the Cuban-American community. And yet, Gonzalez was far from the only child to be separated from his father during the U.S. embargo of Cuba. Letters exchanged between my mother’s stepfather, Gilberto Azcuy Sr., and his son, Gilberto Azcuy, Jr., over a 20-year period tell a similar story of divided family. In both there exists a fundamental conflict between political and familial obligations, but only one name is known to the world.

Understanding Community Building and Identity Formation in Cyber Spaces

Budnamput Ramanudum ’18, Computer Science/ Women’s and Gender Studies
ADVISOR: Linda Charramaraman, Wellesley Centers for Women

Social networking sites allow for the creation of communities that transcend physicality (time zones! hemispheres!), forever changing the way that people communicate. More than just a medium for new memes, viral news articles, or videos, social networking sites and the dissemination of all kinds of information by the users on them have the potential to affect “real life,” or what happens in the physical spaces these users occupy. Utilizing the preliminary findings from my role as an intern for Linda Charramaraman at the Wellesley Centers for Women, a survey of literature within social network analysis and internet studies, and my personal data-mining projects, I will be exploring how social media plays a role in people’s lives in regards to political activism, social justice, and identity formation.

The Possession Rite of Erzulie: The Conjuring of Black Womanhood in Renée Stout’s Erzulie’s Mirror

Jordan Mason Mayfield ’18, Art History/Media Arts and Sciences
ADVISOR: Nikki A. Greene, Art

In this presentation, I analyze connections between African diasporic religious forms and black female identity in Renée Stout’s Erzulie’s Mirror from the Davis Museum’s permanent collection. Stout employs the presence of Erzulie in this mixed-media piece to metaphorically explore the history of enslaved African women during the transatlantic slave trade. Although she originates from the Yoruba orisha Oshun, Erzulie is a deity unique to Haitian Vodun and the experiences of enslaved women of African descent in Haiti. I employ a formal analysis of Stout’s Erzulie’s Mirror and research on the effects of the transatlantic slave trade on black women and Haitian Vodun in order to investigate the irreversible legacy of hypersexuality forced onto enslaved African women and the complexities of black womanhood.

From Drillinois to Chiraq: The Rise of Drill Music on the South and West Sides of Chicago and Beyond

Serenity Hughes ’18, Africana Studies
ADVISOR: Michael Jeffries, American Studies; Noah Rubin, Education

Since the early 2010s, drill music has been in the spotlight. Drill music, and drill subculture, has been characterized as a genre of gangsta rap that is “dark, grim, and lyrically violent.” My research focuses on the impact drill music and drill subculture have on teenagers living on the south and west sides of Chicago. Through the lens of drill artists, I examine the oppressive social, political, and economic institutions that influence the lives of African-American youth in Chicago. I aim to humanize drill artists and drill subculture by showing that the rap lyrics they spew are a clear indication of the impoverished environments they are forced to live in. My research looks at the ways in which the Chicago Housing Authority, the Chicago public school system, and segregation in Chicago neighborhoods contributes to high levels of violence.

Dual Language, Dual Lives?

FND-225 (Talk)

A Cross-Cultural Comparison of Emotional Conceptual Metaphors: Is Love Translatable?

Xuan (Emily) Jin ’17, Comparative Literature/ Psychology
ADVISOR: Elizabeth Young, Classical Studies, Knafel Assistant Professor/Humanities; Stephen Chen, Psychology

The theory of conceptual metaphor, inspired by cognitive linguistics, proposes that metaphors are not simply formalistic techniques but conceptual categories that structure our understanding of the world. They help to explain abstract concepts, such as emotions, by comparing them to tangible elements that echo physical human experience. My senior honors thesis, bordering both the fields of comparative literature and psychology, aims to answer three questions: How does the same conceptual metaphor vary when it is present in two distinct cultural environments? When we are translating one language into another, do culturally specific conceptual metaphors carry over as well? Finally, research has always examined conceptual metaphors as linguistic constructs, yet could conceptual metaphors also manifest in other literary forms? Ultimately, through presenting this
thesis, I wish to illustrate the results of a liberal arts education—understanding the interchangeability of the humanities and the sciences.

Dual-Language Learners: The Perspective of the Teacher

Diana M. Castillo ’17, Sociology/Spanish
Advisor: Wendy Robeson, Wellesley Centers for Women

This project explored the effects of the implementation of the dual-language program in a large school district in Illinois. The study focused on the impact of the dual-language program on the language and literacy skills of elementary-level students. A district-approved survey was sent to all of the elementary-level dual-language teachers in the district. All dual-language teachers in grades K–6 were invited to participate. The survey asked teachers about their observations and opinions of the classroom, family involvement, standardized testing, Common Core standards, personal student motivation, and student proficiency in both English and Spanish. The teachers’ point of view was prioritized because they have direct contact with the students involved in this program and they see the academic progress of the students firsthand. Results and conclusions of the survey based on the teachers’ beliefs about program goals and cross-cultural attitudes and behaviors will be discussed.

English or Nah?: School Choice in Bangladesh and the Role of Language and British Imperial Legacy

Lamia S. Hossain ’17, Economics/Political Science
Advisor: Nadjia Hajj, Political Science

A wide variety of schooling options is available to children in Dhaka, Bangladesh. Classes are primarily taught in two languages: Bengali and English. Public schools provide only Bengali-medium education. Choosing to enroll a child in a public school is associated with a range of sociocultural benefits and economic incentives, such as free textbooks. However, there is a persistent demand for English-medium education as well. Unfortunately, high-quality English-medium education is accessible to only the elite classes, leading to an education-based poverty trap for those at the lower end of the socioeconomic hierarchy. My research aims to understand the long-term repercussions of this poverty trap, and identify influences on parental decision making regarding their children’s education. Key factors include the impact of the British imperial legacy, as well as the long-term economic returns to different language-based education streams.

The Effects of Early Bilingualism on Asymmetry in the Mental Lexicon: A Pilot Study

Rebecca B. Farkas ’17, Cognitive and Linguistic Sciences
Advisor: Angela Carpenter, Cognitive and Linguistic Sciences

The mental lexicon is the mechanism through which humans store and access their knowledge of words. The increased interest in bilingualism has inspired greater study of bilingual mental lexicons that contain the knowledge of more than one language. Many models and studies focus on proficiency, often disregarding age of acquisition of the second language. This approach is problematic because several studies have found marked differences in the brains of late bilinguals, who acquire a second language later in life, and early bilinguals, who learn both languages from early childhood. My pilot study expands on earlier bilingual mental lexicon research by using cross-linguistic priming to examine asymmetry in the mental lexicons of early and late English-Spanish bilinguals of higher and lower proficiency. Asymmetry refers to the varied strengths of language connections, in this case the strength of priming in either the English>Spanish direction or the Spanish>English direction. My hypothesis was that early bilinguals would have less priming asymmetry than late bilinguals with a similar level of proficiency. Although not reaching the level of significant effects, my results support the trends present in earlier research, where early bilinguals had on average shorter response times than late bilinguals of the same level of proficiency, all participants had faster response times for related word pairs than for unrelated word pairs, and within related word pairs all participants had faster responses to translation word pairs (e.g., gato-cat) than to semantically related word pairs (e.g., gato-dog).

More than Empathy: Responding to Sexual and Gender-Based Violence

SCI-270 (Talk)

Responding to Reports of Sexual Violence: Victim Service Professionals’ Testimonies on Challenges Faced with the Criminal Justice System, Assessment of Victims’ Needs, and Future Recommendations

Monica M. Naranjo DS, Psychology
Advisor: Linda Williams, Wellesley Centers for Women

Literature review indicates that the aftermath of a sexual assault has an impact on the likelihood of continued cooperation by the victims and the conviction of their perpetrators. Victim service professionals play an important role during post-assault care and in seeking justice for survivors. To learn how to achieve justice in cases of sexual assault, this research will analyze data from two focus groups in which victim services personnel discuss the relationships of different departments in the handling of sexual assault cases. They discuss the main issues victims face at the time of reporting, which services are provided to them, which need to be improved, and how to overcome barriers for the arrest and prosecution of perpetrators. Finally, they provide suggestions that they believe will better help victims of sexual assault. Focus group transcriptions will be coded and common themes identified using NVivo (a qualitative data analysis computer software package). Key themes and recommendations will be presented.

Testing for Answers: Examining the Role of Sexual Assault Evidence Collection Among College-Aged Women

Casandra M. Allen ’18, International Relations-Economics
Advisor: Linda Williams, Wellesley Centers for Women

Given the prevalence of sexual violence on college campuses, this presentation seeks to examine the preparation of sexual assault DNA evidence kits among college-aged women. Drawing from a sample of six police jurisdictions, in which 40 percent of the filed sexual assault claims were made by women ages 17–25, we seek to answer the question of what factors predict sexual assault kit evidence collection among college-aged women. We will examine the process of
sexual assault kit preparation and identify key factors that could influence the decision made by a victim to have a kit prepared. Such factors could include the nature of the assault, whether the perpetrator was known by the victim, and whether alcohol was involved. We hope to illuminate what factors encourage kit preparation so as to better understand how college-aged women can best be supported in instances of sexual trauma.

**Alternative Paths to Healing from Gender-Based Violence**

*Ananya M. Ghemawat ’17, Political Science/ Women’s and Gender Studies*

*Advisor: Irene Mata, Women’s and Gender Studies*

In fall 2016, I created a manual aimed to help survivors heal from sexual and gender-based violence. I discussed alternative methods of healing that do not rely on the criminal justice system or the legal system, and outlined ways in which communities can address harm internally and how accountability and justice can be found. This research is important because, for myriad reasons, many individuals choose not to interact with the criminal justice system to address harm that has occurred. In fact, many advocates contend that involving law enforcement officials is not the best way to address sexual violence. Furthermore, because of the stigma associated with gender-based violence, there is a lack of discussion around these issues, and many individuals do not want to identify as being a survivor or victim of violence. However, given that, according to Rape Response Services’ National Statistics, one in two women and one in five men will experience sexual violence in their lifetime, this a widespread social and health issue that needs to be addressed. After considering alternative forms to heal from gender-based violence and to seek justice and accountability, my manual ends with preliminary steps to end gender-based violence.

**Aging Across Contexts**

*SCI-278 (Talk)*

**Vulnerable and Ignored: Exploring the Unique Needs and Ethical Considerations of the Aging U.S. Prison Population**

*Shreya Thatai ’17, Women’s and Gender Studies*

*Advisor: Lee Cuba, Sociology*

The exponential growth of the U.S. prison population over the past three decades has created an extremely vulnerable population: aging prisoners. Inmates over the age of 55 comprise over 10 percent of the imprisoned population, yet there is scant research on the needs of this group. Older inmates are a unique high-risk population with specific needs related to their physical and mental challenges. This presentation will begin by situating the growth of the aging prison population within the context of legal reforms that led to the expansion of the carceral state. Next, it will explore the unique needs of older prisoners, examining policies and restrictive funding that impact their health care and quality of life. Finally, the presentation will examine the increasingly common experience of older inmates dying in prison and the ethical considerations associated with this trend.

**The Effect of Social Security on Savings**

*Rose Burnam ’17, Economics*

*Advisor: Daniel Fetter, Economics*

One of the major public policy issues of our time is Social Security reform. Social Security is the largest source of income for retired Americans—60 percent of recipients derive half of their income from Social Security, and 30 percent of recipients derive 90 percent of their income from Social Security. Empirical evidence about the relationship between Social Security and private savings is a crucial part of the reform debate, but because Social Security is a universal program, it is rare to find variation in benefits, so establishing a causal effect of Social Security on savings is difficult. To approach this question, I investigate the effect of Social Security on personal savings behavior using the large historical expansion of the program over the 1950s and 1960s that affected people differently based upon their state of residence and occupation. Along with this variation, I use data on individuals’ savings from the Survey of Consumer Finances, a rich source of data with information on different forms of private savings.

**Immigration and the Elderly: How Immigrants Influence the Living Arrangements and Health Care Outcomes of Elderly Individuals in the U.S.**

*Kelley C. Moran ’17, Economics*

*Advisor: Kristin Butcher, Economics, Marshall I. Goldman Professor*

As advances in medicine decrease mortality rates and the population of the U.S. ages, the number of people over the age of 64 continues to increase rapidly. This aging population carries substantial social and economic costs, as many elderly individuals must seek our assistance with long-term medical and custodial care due to higher rates of difficulties and disabilities. Parallel to the percentage of elderly individuals, the prevalence of immigrants in the U.S. has also been rising in recent years. Given their dominance in the health-care and home production fields, this study examines how immigrants impact the health-care and housing outcomes of elderly individuals. By examining census and vital statistics mortality data, I analyze the influence of immigrants on elderly lifestyles and emphasize how understanding the role of immigrant labor in health-care and home production may help us make better policy decisions as we confront the aging population.

**Beyond My Mother’s Story: Examining the Quality of Long-Term Care Facilities**

*Ju (Julie) Y. Kim ’17, Political Science*

*Advisor: Tom Burke, Political Science*

The World Health Organization’s definition of health is as follows: “Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.” In this project, I look at the quality of long-term health-care facilities by asking a variety of questions such as: What are the particular standards nursing homes must abide by? Is there a quality gap between Medicaid and non-Medicaid nursing facilities, and if so, how wide is it? Why do certain people end up in lower-quality nursing homes while others are placed in better ones? These questions will be answered both through the lens of experts and scholars in the area of long-term care as well as anecdotes of families who have gone through the daunting process of trying to
find a quality nursing home. The project deliverable will be in the format of a podcast so that it is accessible to a wider range of the public.

“From all reports, this year’s Ruhlman was the best! I’ve had letters from classmates, alumnae, faculty, and others about how outstanding the girls’ work is and how excellently presented. It has been very heartwarming for me.”

–Barbara Peterson Ruhlman ’54
information from the world around me. This principle has been the focus of my year-long studio art thesis exploration in pattern and pattern making. Through the support of the Suzanne Kibler Morris ’44 Fellowship, I have had the opportunity to collaborate with both the Wellesley College Botanic Gardens and the Wellesley College Art Department in developing a site-based art installation. Using my sketches of the plants in the greenhouses as inspiration, I have created printed sculptural forms that are my response to the ways of nature. By introducing the artwork within the collected ecosystem of the greenhouse, it is my hope that visitors will gain an appreciation for the complexities of the natural world.

From Chaucer to Shakespeare: An Analysis of the Humanistic Pessimism that Links Chaucer’s Troilus and Criseyde to Shakespeare’s Troilus and Cressida as well as Romeo and Juliet
Juliette C. Mann ’17, English
ADVISOR: Cord Whitaker, English

Although Chaucer and Shakespeare lived and wrote roughly 200 years apart, they both produced works that set the precedent for tragedy and romance. Respectively, they became lauded as the greatest poet and playwright of their times. In regards to their depth and influence, the two authors resemble each other more closely than they resemble any other poets or playwrights in English literature. However, the problem remains that a strategy of analysis that relies on larger implications of causation. The complexities of the natural world.

“What Is the Final Product?”: Investigating Process Art and the Individual
Some M. Louis ’17, Art History, Art Studio
ADVISOR: Phyllis McGibbon, Art, Elizabeth Christy Kopf Professor

The process of creating a work of art is not always visible. Often, artworks are seen as finished projects, rather than a series of steps or development. However, there is an extensive history of artwork that has been created with the concept of a visible process as the primary objective. These works of “process art” present concepts of personal artistic relevance for public viewing. My Ruhlman presentation addresses this concept of process art through my studio art thesis project. This installation-based project examines my individual method for creating artwork, with a focus on testing and organization, through the use of handmade paper, prints, drawings, and mixed-media experimentation. It contextualizes process art through research and written investigations. While this project is certainly an investigation of process art in relation to my own personal work and developing style as an artist, it also presents contemporary art in context to previous, relevant art historical movements, particularly process art and minimalism. This project addresses the personal act of production and the public act of viewing, concepts that are relatable both within the world of art production and the outside world of art appreciation.

Bark and Metal
FND-102 (Pre-formed Panel Discussion)
Charlotte Z. Yu ’17, Architecture; Xiaorong (Sharon) Liu ’17, Art History/Mathematics; Virginia G. White ’17, Classical Civilization; Ningyi Xi ’17, Art History/Classical Civilization
ADVISOR: Kristina Jones, Director, Wellesley College Botanic Gardens; Adjunct Assistant Professor of Biological Sciences

We live and work on a campus imbued with nature and art, but many fine features go unnoticed as we hustle past them every day. Founded by Ningyi Xi, Sharon Liu, and Charlotte Yu in fall 2014 to direct attention to elements in the campus environment, “Bark and Metal” is a talk series on outdoor sculptures and trees, a Friends of Art Student Initiative Program of the Davis Museum in collaboration with Botanistas Tree Mob Series. Past talks have covered the sculptures Shechinah Temptations, Upsurge, Mozart III, Milano, Untitled, Wild Spot, and their plant neighbors: oak trees, ginkgo trees, birch trees, katsura trees, and the linden tree. In each talk, sculptures and trees are thoroughly researched to provide an interactive presentation to the Wellesley community. The Ruhlman presentation will include the program’s overview and its impact as well as the presenters’ insights and a discussion with the audience about the program’s future.

Science and Technology

Comparative Studies of a Novel Anti-Cancer Agent Targeting Pancreatic Cancer

SCI-E-111 (Pre-formed Panel Discussion)
Milica Markovic ’17, Biochemistry; Elisa J. Wang ’18, Biological Sciences; Emma E. Goodman ’17, Biological Sciences; Jennifer C. Chang ’17, Biochemistry; Martha K. Aywa ’17, Biochemistry
ADVISOR: Dora Carrico-Moniz, Chemistry

Pancreatic cancer is one of the most lethal forms of human cancer with a low five-year survival rate (7.7 percent) due to difficulties in early detection and aggressive metastasis. Additionally, pancreatic malignancies show resistance to current chemotherapeutic treatments, although combination therapies are showing more promise. The Carrico-Moniz laboratory seeks to identify and develop novel pharmacological treatments for pancreatic cancer through the synthesis and biological evaluation of novel organic compounds derived from natural product scaffolds. Previously, our lab developed a series of isoprenylated coumarin derivatives based upon the natural product angelmanin, which exhibit selective cytotoxicity against pancreatic cancer under nutrient-deprived conditions. Current studies aim to: 1) elucidate the biochemical target of our lead compound DCM-MJ-I-21; 2) assess its relative potency in 2D and 3D in vitro PANC-1 cell cultures; and 3) compare the chemotherapeutic efficacy of commercially available anti-cancer agents gemcitabine, 5-fluorouracil, and etoposide in combination with DJM-MJ-I-21 versus monotherapy.
The average global temperature is increasing at an unprecedented rate, but here in New England, we still experience extreme cold and snowfall. Why is this? As global temperature rises, extreme climate events become more frequent, but different regions experience different types of extreme climate events. This semester, we layered long-term climate data on top of the National Ecological Observatory Network (NEON) ecoregions of the U.S. to determine what constitutes an extreme climate event for each region. With decades of data providing us with climate trends, we are constructing a model that predicts the frequency of extreme climate events in the future.

Trees as Storytellers: Analyzing Tree Rings to Understand Climate in the Past, Present, and Future
Emma M. Conrad-Rooney ’20, Undeclared; Irina Chen ’18, Biological Sciences
ADVISOR: Jaclyn Matthes, Biological Sciences

Have you ever stopped to look closely at the trees on the Wellesley campus? There are layers of history just waiting to be unpacked! Dendrochronology is the study of tree ring growth. Studying tree rings can not only tell us the age of trees, but can also give us insight into the climate patterns of the past and present. Every growing season, a new tree ring is set. Seasons with favorable growing conditions will create wider tree rings, while abiotic stress (e.g., climate change) and biotic stress (e.g., insect outbreaks) create thinner rings. By obtaining tree cores from hemlock trees and deciduous trees on the Wellesley campus, we can create snapshots of tree history and come to understand their life stories. Comparing tree ring widths to past and present climate data will help us draw connections between how environmental conditions, such as temperature and rainfall, affect yearly tree growth both in individuals and larger communities. Ultimately, this information will help us predict how trees will respond to future changes in climate and environmental stress.

Wet or Dry: How Soil Respiration Adapts to Precipitation Variation
Amandine M. Fromont ’17, English/Environmental Studies; Prapti Koirala ’19, Undeclared
ADVISOR: Jaclyn Matthes, Biological Sciences

Over the last century, precipitation patterns in the Northeast have become more intense but less frequent, partly as a result of climate change. In adapting to these changes in precipitation, soil microbes might modify their respiration rates to better survive extreme stress conditions. Our current research builds on the results from an experiment conducted in summer 2016, which examined how soil microbial respiration varied in response to the timing and intensity of experimental precipitation pulses. Collecting soil samples from Northeastern forests, we tested their adaptability to different water moisture conditions, from drying to flooding. Previous results indicated that microbes can acclimate to extreme precipitation conditions. We are now extending this experiment to measure microbial adaptation, not only to precipitation variation, but also to changes in soil oxygen levels. Broader applications of our research will enhance our understanding of soil adaptability and help to inform the discussion about whether ecosystems will be resilient to climate change.

Seeking Environmental Justice in a Modern Urban Context: All Things Interdisciplinary
Lucy A. Wenzel ’19, Geosciences; Hannah L. Oetgen ’17, Geosciences; Sarah M. Smith-Tripp ’19, Geosciences; Thosaly McFall ’19, Geosciences; Brianna N. Love ’19, Architecture; Amanda B. Hernandez ’18, Environmental Studies; Emma X. Jackman ’19, Geosciences; Alexis M. Corcoran ’18, Biological Sciences; Meredith J. Wade ’17, Environmental Studies/History; Kimberly Chia Yan Min ’19, Environmental Studies/South Asian Studies
ADVISOR: Daniel Brabander, Geosciences

Our research group focuses on interdisciplinary projects that aim to address modern environmental challenges. Our lab attracts people from a variety of majors—both STEM and humanities. This diversity helps us to approach problems from multiple unique perspectives. We use a systems-based approach to ensure all critical relationships are addressed in method development and experimentation. We want to use this opportunity to share our research group approach and share our research on geochemistry as it relates to environmental justice and partnering with communities.

The growth and maintenance of vascular plants relies on the transport of water and nutrients by the vascular tissue. According to the auxin canalization hypothesis, development of this vascular tissue is induced by the unidirectional flow of the phytohormone through channels of cells. This unidirectional flow of auxin is established by the polar localization of an auxin efflux carrier, PIN1, within the plasma membranes of these cells. PIN1 polarity is established and maintained by an endosomal recycling pathway. Within this pathway, vesicle formation off the trans-Golgi network is mediated by the coordinated actions of VAN3, VAB, CVP2, and CVL1. In order to determine if Patellin 1/2, two Sec14-like proteins, play a role in the same pathway as these previously characterized vascular proteins, plp2vab, plp2cvl1, plp2cvp2, and plp2cvl1cvp2 mutants were generated, and their vascular patterns analyzed. Similarly, we sought to identify further functional redundancy in the patellin gene family in vascular development through the phenotypic characterization of plp2p6 and plp2p4 mutants.
The phenomenon of phenotypic plasticity, common in insects, occurs when one genotype results in different phenotypes due to environmental changes. Genetic accommodation occurs when these environmentally induced phenotypes are selected over multiple generations and lose their dependence on or become hypersensitive to the initial environmental cues. While the process of genetic accommodation has been demonstrated through artificial selection experiments, the genetic basis underlying this process remains unclear. Previous studies have shown that polyphenisms might evolve through genetic accommodation. In this project, a polyphenic strain was evolved through selection for heat shock induced green color in a normally black mutant Manduca sexta strain.

The expression of hormonal biosynthesis and response genes, specifically in the ecdysteroid and juvenile hormone (JH) signaling pathways, were analyzed in heat shocked and non-heat shocked selected animals. These studies will help us better understand polyphenisms at the molecular level and ultimately allow us to determine whether genetic accommodation occurs in nature.

Hormonal Regulation of Insect Reproduction

Isabella R. McDonald ’17, Anthropology
ADVISOR: Yuichiro Suzuki, Biological Sciences

Hormones are known to play major roles during development and reproduction. However, the evolution and development of endocrine glands and hormone biosynthesis are not well understood. Ventral veins lacking (Vvl) has recently been shown to play a critical role in endocrine regulation during larval development and endocrine gland development in holometabolous insects. In this study, the role of Vvl on reproduction and embryogenesis was examined in the hemimetabolous milkweed bug, Oncopeltus fasciatus. Silencing the expression of Vvl led to reduced egg production, which could be rescued by exogenous juvenile hormone treatment. Analysis of gene expression patterns indicates that Vvl likely regulates the formation of endocrine glands as well. Given that in mammals, mutations in the vertebrate homolog of Vvl, POU3F2, can lead to hypogonadism, the role of Vvl in endocrine gland formation and reproduction may be an ancient evolutionarily conserved process.

Hormonal Regulation of Insect Reproduction

Isabella R. McDonald ’17, Anthropology
ADVISOR: Yuichiro Suzuki, Biological Sciences

Hormones are known to play major roles during development and reproduction. However, the evolution and development of endocrine glands and hormone biosynthesis are not well understood. Ventral veins lacking (Vvl) has recently been shown to play a critical role in endocrine regulation during larval development and endocrine gland development in holometabolous insects. In this study, the role of Vvl on reproduction and embryogenesis was examined in the hemimetabolous milkweed bug, Oncopeltus fasciatus. Silencing the expression of Vvl led to reduced egg production, which could be rescued by exogenous juvenile hormone treatment. Analysis of gene expression patterns indicates that Vvl likely regulates the formation of endocrine glands as well. Given that in mammals, mutations in the vertebrate homolog of Vvl, POU3F2, can lead to hypogonadism, the role of Vvl in endocrine gland formation and reproduction may be an ancient evolutionarily conserved process.

Hormonal Regulation of Insect Reproduction

Isabella R. McDonald ’17, Anthropology
ADVISOR: Yuichiro Suzuki, Biological Sciences

Hormones are known to play major roles during development and reproduction. However, the evolution and development of endocrine glands and hormone biosynthesis are not well understood. Ventral veins lacking (Vvl) has recently been shown to play a critical role in endocrine regulation during larval development and endocrine gland development in holometabolous insects. In this study, the role of Vvl on reproduction and embryogenesis was examined in the hemimetabolous milkweed bug, Oncopeltus fasciatus. Silencing the expression of Vvl led to reduced egg production, which could be rescued by exogenous juvenile hormone treatment. Analysis of gene expression patterns indicates that Vvl likely regulates the formation of endocrine glands as well. Given that in mammals, mutations in the vertebrate homolog of Vvl, POU3F2, can lead to hypogonadism, the role of Vvl in endocrine gland formation and reproduction may be an ancient evolutionarily conserved process.

Social Sciences

Give and Take: Compromise in Times of Crisis

PNE-239 (Talk, Fowler Presentation)

Stumbling Into Progress: Military Learning in Disaster Relief Operations

Caroline R. Bechtel ’17, Middle Eastern Studies/Political Science
ADVISOR: Paul MacDonald, Political Science

The U.S. military has long been able to play a critical role in responses to international natural disasters. Its forward-deployed resources, manpower, and other unique capabilities make it a critical asset for the larger disaster relief community. Since the 2004 Indian Ocean earthquake, the military has responded to about one or two international disasters per year. Has the military improved at disaster relief responses? How much, and how has it learned? The literature on military learning generally agrees that the pressure of war is largely the force that compels change; so how effectively does the military learn and improve in operations divergent from its warfighting mission, without the pressure of war? In this talk, I will discuss my research on this topic and findings.

Stand Down for What: An Assessment of the U.S. Military’s Use of Force During Operation Iraqi Freedom

Lizamaria Arias ’17, International Relations-Political Science
ADVISOR: Paul MacDonald, Political Science

As a liberal democracy, the U.S. military has set rules that govern the use of force in combat. Despite these measures to ensure that the use of force is employed judiciously, the line between acceptable and unacceptable is often blurred by the strains of combat. What, then, causes a military unit to violate these rules and deviate from accepted conduct during war, and why does this matter? Atrocities are, unfortunately, still a part of modern combat, and Operation Iraqi Freedom (OIF) was no exception. How can we place these deviations into a broader context? Through an examination of instances of military misconduct during OIF, my research seeks to distill what factors play a role in causing these violations and evaluate whether, based on these factors, it is possible to assess whether a particular unit is at risk for committing an atrocity.

Seize the Window: Targeted Killing’s Uses and Limitations in Counterterrorism Strategy

Jillian L. Kutner ’17, International Relations-Political Science
ADVISOR: Nadya Hajj, Political Science

Since the beginning of the war on terror in 2001, the United States has employed a plethora of methods to destroy terrorist organizations, ranging from conventional war efforts in Iraq and Afghanistan to espionage and, more recently, cyber warfare. However, with the advent of drones, the United States has increasingly relied on one particular strategic tool for fighting global terror: targeted killing: the assassination of a leader or key member of a terrorist group to disrupt or destroy the organization. Though the effectiveness of targeting has improved in recent years, strategic options regarding how to capitalize on instances of success have not. My research attempts to fill this policy void by asking two central research questions. First, does targeted killing reduce the rate of terrorist attacks post-targeted killing? Second, what can be done to further reduce terrorist attacks post-targeted killing?
To evaluate these questions, I use a multi-method analysis combining a quantitative analysis of the frequency of terrorist attacks, as well as a qualitative, comparative analysis of a variety of case studies on targeted killings from numerous terrorist groups and geographic areas. Using the examples of Osama bin Laden, Abu Musab al-Zarqawi, and Saleh Shehadeh, I argue that, while targeted killing is ineffective in terms of destroying or permanently debilitating terrorist organizations, this strategy does manage to create a six-month reduction in attacks. Even so, targeted killing will not reach its greatest potential until policy makers stop simply moving to the next target, and instead find a way to better capitalize on the benefits it can provide.

**Germany’s Recovery from the 2008 Global Financial Crisis: Benefits of a Flexible Labor Market and Strong Export Sector**

Zainab Younas ’17, International Relations-Economics

ADVISOR: Igor Logvinenko, Political Science

With the crash of the U.S. housing market in 2008, the global economy entered a period of economic turmoil that would come to be known as the global financial crisis. Numerous countries’ economies contracted as unemployment levels rose. While the GDP of the United States recovered rather robustly, many European economies have not been as successful. In 2015, the United Kingdom, the Netherlands, and Germany were the only economies to have reached close to pre-crisis levels, whereas Spain, Italy, and Greece are continuing to struggle. Why has the recovery process been so divergent? This presentation focuses on the most successful example of post-crisis recovery: Germany. In particular, it considers two points of interest. First, an analysis of labor market policies offers some insight into Germany’s unemployment rate. Second, the relationship between the current account and GDP provides further explanations as to why Germany weathered the crisis relatively well.

**Perspectives from the Freedom Project IV: Thinking Outside the (Urban) Box**

PNE-139 (Pre-formed Panel Discussion)

Madeleena H. Collins ’18, Individual-Peace & Justice Studies; Jeanne-Yee Z. Daniel ’17, Sociology; Mary R. Meisenzahl ’19, History

ADVISOR: Joshua McCabe, Sociology

Many of today’s discussions concerning inequality and their potential solutions are framed in such a way that they are incompatible with basic realities for the nearly 20 percent of Americans who live in rural areas of the United States. This panel will explore the basic infrastructural differences rural Americans face when confronted with what pundits often assume are uniquely urban issues. This discussion will focus on three issues in particular: housing and its impact on migratory patterns in the rural South; techno-geographic infrastructure and its consequences on rural economies; and school choice and its viability as an option for rural schools. We hope to illuminate important gaps in policy discussions as well as the necessity of considering novel options for tackling issues related to education and social mobility, which can open more choices to an often forgotten population.

**Perspectives from the Freedom Project V: Clashing Definitions of Freedom and Their Policy Implications**

PNE-127 (Pre-formed Panel Discussion)

Cassandra A. Cronin ’19, Individual-Peace & Justice Studies/Spanish; Caroline R. George ’17, Environmental Studies/Music; Sophia Leung ’19, Computer Science/Political Science

ADVISOR: Joshua McCabe, Sociology

This panel will explore how conflicting definitions of freedom affect public policy through case studies in Chinese economic policy, Cuban immigration, and regulation of women’s religious garments. Sophia Leung will explore how reformist and conservative groups within the Chinese government have shaped the country’s economic policy since 1978. While economic liberation is often viewed as China’s unified state policy, she argues that this mandate has varied depending on current officials in power. Cassandra Cronin will discuss the controversial “wet-foot, dry-foot” policy for Cuban refugees. She will argue that the policy created the illusion that the United States was taking a stance for the personal freedoms of Cubans, but that it did little to improve the lives of the Cubans impacted by the embargo. Caroline George will interrogate policies banning burqas, niqabs, and other traditional Islamic head coverings in public spaces. She will argue that such policies emerge from clashing definitions of religious freedom, freedom of expression and women’s rights/freedoms, and not simply the wish for public safety.

**Sed Ministrare: Becoming a Teacher at Wellesley**

SCI-268 (Pre-formed Panel Discussion)

Helen C. Calby ’17, Japanese Language and Culture; Charlotte J. Weiss ’16, Spanish; Rebecca R. Van Dusen ’17, Psychology; Megumi E. Takada ’17, Neuroscience; Morgan L. Millon ’17, Political Science; Jekia Brockman ’17, Psychology; Katharine A. Aoki ’17, Religion

ADVISOR: Noah Rubin, Education

Common Core, charter schools, standardized testing, Betsy DeVos. Education policy and reform is at the forefront of national debate, but for the seven students of Wellesley’s elementary teacher certification and preparation program, the debate is transformed into the daily practice of supporting the academic and socioemotional growth of children. Learn about the requirements of the program, the varied experiences of student teaching, and what inspired these students to become educators themselves. The program will also include a demonstration of Open Circle, a social and emotional learning curriculum developed by the Wellesley Centers for Women.

**China Beyond Its Borders**

SCI-274 (Talk)


Annie Wang ’17, History/Media Arts and Sciences

ADVISOR: C. Pat Giersch, History

Quotations from Chairman Mao Tse-Tung is one of the most prolifically printed books in modern history, allegedly rivalling the print numbers of the Bible. A compilation of over 300 quotes from the late Chinese Communist Party leader that was first published in 1964, this book was soon
translated and distributed worldwide with the intention of swaying foreign hearts and minds in favor of Maoism. One such target was the United States. Americans from a variety of different backgrounds were exposed to and drew influence from the “Little Red Book,” ranging from artists who used the Quotations’ text in drama to satirists who used the Quotations’ unique style to lampoon unpopular politicians. The Little Red Book thus became an imported media tool through which Americans shaped their understanding of China, Mao, and ultimately themselves during one of the most tumultuous periods of modern history, one that continues to influence the American political landscape today.

Effectiveness and Feasibility of a National Emissions Trading Scheme (ETS) in China: Examined through the Lens of the Guangdong Pilot ETS
Karen X. Ni ’18, International Relations-Economics

ADVISOR: Kyung-Hong Park, Economics

China announced the establishment of a national carbon emissions trading system in 2017. This emissions trading scheme (ETS) will be the largest of its kind in the world, and has the potential to tremendously reduce the country’s CO₂ emissions levels. Empirical analyses of the Guangdong pilot ETS show that ETS in the province will significantly lower total emissions levels without significantly shocking the economy. As Guangdong’s pilot has shown great environmental and economic potential, it could greatly help inform the design and implementation of the anticipated national scheme. Empirical research suggests that a nationally binding ETS would continue to be a cost-effective tool for carbon abatement; however, specific design issues of the Guangdong scheme will need to be taken into consideration before the national program can proceed. Finally, a stakeholder analysis shows that private enterprises and individuals employed in energy-intensive steel and iron sectors will be most negatively impacted by the creation of a national scheme.

A Poker Face No More: Japan’s New Engagement in the South China Sea
Sabrina Liang ’19, Political Science

ADVISOR: M. Taylor Fravel, Political Science–MIT

In December 2016, China militarized the Spratly Islands in the South China Sea (SCS), an area where $5 trillion of commerce passes through annually. The Southeast Asian nations bordering the region worry that Beijing’s militarization of these artificial islands will impede free navigation of sea lanes, access to the area’s natural resources, and regional stability. However, this growing security dilemma also involves other sovereign players, such as Japan. Since 2010, the year in which China’s economy surpassed Japan’s in size, Japan has become increasingly engaged in SCS politics. From greater economic aid to ASEAN nations to more defense cooperation agreements, Japan has adopted a multi-pronged, proactive approach to counter China’s “unilateral” interests in the area. My research thus focuses on how Japan, in the diplomatic, economic, and military dimensions, has become more engaged in the SCS to protect and enhance its regional and international standing.

Understanding How Big Personalities Get to the World Stage

SCI-277 (Talk)

When Personalities Dominate, Stability Fails: Great Britain’s Shifting North American Military Strategy, 1768–1775
Anna S. Page ’17, History

ADVISOR: Katherine Grandjean, History

History may be written by the victors, but war is not a solo act. Yet the narrative surrounding the American Revolutionary War makes it seem as though the other major actor in the conflict, Great Britain, only reacted to the events in her North American colonies and yielded no personal motives to ultimately declare war. Responsibility for deciding to go to war in 1775 is essentially removed from British pre-war political and military leaders. No discussion is held about the exogenous factors that would have influenced British decision makers. This presentation, however, tells an alternative story to the conventional history of the coming of the American Revolutionary War. Starting in 1768 when the first schooner, packed with British military forces, arrived in Boston Harbor, this thesis assesses how and why Great Britain’s North American military strategy evolved the way it did. Through three chapters looking at the important English personalities in charge of the military decision-making process, the actions of Great Britain’s neighboring countries, and the strength of England’s economy from 1768–1775, the nuances of the causes of warfare are discussed.

Entrepreneurial Personality in Early-Stage Ventures: Some Theory and Findings on Firm Founders at Cambridge Innovation Center
Margaret G. Dalton ’17, Economics/Spanish;
Tina Y. Xu ’17, Undeclared

ADVISOR: Sari Kerr, Wellesley Centers for Women

Entrepreneurship is a risky endeavor with extremely long work hours and low probability of success. Yet every year, we see countless new ventures opening and large amounts of money and time being invested in them. Who are the entrepreneurs behind those ventures, and why do they pursue entrepreneurship, despite the odds often being stacked against them? We provide some findings based on a comprehensive literature survey and a closer look at local founders housed at the Cambridge Innovation Center who responded to a large-scale survey on their business goals and personality traits.

The Meaning of “Make America Great Again,” Along Party Lines
Katherine (Katie) J. Madsen ’19, English

ADVISOR: Linda Charmaraman, Wellesley Centers for Women

Donald Trump ran his presidential campaign on the slogan “Make America Great Again.” Republicans often regarded this idea wistfully, yearning to return to the post-World War II era of manufacturing and social cohesion. Conversely, Democrats viewed this as a call to regress to a time when people of color, women, and LGBTQ+ people were second-class citizens. To gain a greater understanding of this divide, we surveyed nearly 2,000 participants from almost all 50 states, gauging their feelings about the election results and which issues were most important to them. In addition, we asked them what they thought Donald Trump meant with his slogan “Make American Great Again.” The presentation will focus on the answers to this question, looking into participants’ voting habits and social identities to uncover the intricacies of this seemingly black-and-white issue.
POSTER PRESENTATIONS

SCIENCE CENTER FOCUS AREA: 1:30–2:40 P.M.
**Is the Mammalian Presternum Composite?: Evidence from Giant Ground Sloths**

Asher Feldman ’17, Biology
**ADVISOR:** Emily A. Buchholz, Biology

The shoulder girdle of living placental mammals is reduced relative to that of fossil mammals and living egg-laying mammals (monotrems). This reduction could be the product of either element loss or fusion. We ask if the presternum of the giant ground sloth (Paramylodon harlani) from the La Brea Tar Pits is a single element homologous to that of monotrems or a fused composite of the ancestral manubrium, interclavicle, and/or adjacent elements. The premina show external and (via CT scanning) internal bone texture transitions indicating composite organization. All four specimens also have discrete bilateral components reminiscent of short rib homologs bridging the gap between the first sacral vertebra and ilium. These components suggest a developmental mechanism for integrating disparate tissues into one bony element. Our results strongly imply that the P. harlani presternum is a composite structure produced by evolutionary fusion of the interclavicle and the ancestral manubrium.

**Surfing the Sky with ASTR 206**

Madeleine Beck ’19, Physical/Mathematics; Casey Melton ’19, Astrophysics; Emily Yax ’19 Astronomy; Cassie Miller ’19, English; Jolene Fong ’17, Astrophysics/Geoscience; Sara Vannah ’17, Astrophysics; Julissa Sarmiento ’17, Physics/Classics

**ADVISOR:** Kim K. McLeod, Astronomy

Armed with a semester’s worth of new knowledge and Wellesley’s Sawyer 24 inch telescope, students in ASTR206: Astronomical Techniques carried out a variety of individual and group term projects. Some students observed a Koronis family asteroid (3052 Evans) and generated light curves, which they used to determine the asteroid’s rotational period. Others did a more observationally intense project and created a beautiful color mosaic image of the Wizard nebula (NGC7380). Two students tested the limits of our telescope and imaged gravitational lensing in the galaxy cluster Abel 370, something never done before here at Wellesley. Finally, one student joined the KELT team of “planet hunters” and used the transit method to search for exoplanet candidates. Come learn more about their hard work and exciting results!

**Sensory Processing Alterations in Adults with ADHD**

Noor Adria ’18, Neuroscience
**ADVISORS:** Michael C. Wiest, Neuroscience; Eve M. Valera, Psychiatry - MGH/Harvard Medical School

Studies suggest that children with ADHD exhibit more symptoms of sensory processing dysfunction (SPD) compared to healthy children. However, sensory processing has not yet been measured in ADHD using subscales for different sensory modulations (e.g., over-, under-sensitivity), studied in adults with ADHD, or examined in relation to brain volumes. Therefore, we assessed SPD in ADHD adults and looked for relationships between SPD subscales and brain volumes. Relative to healthy controls (HCs), subjects with ADHD scored higher on the sensory seeking (SS) and sensory under-responsivity subscales, with a trend toward higher values on the sensory over-responsivity (SOR) subscale. These data suggest that adults with ADHD exhibit increased symptoms of sensory processing dysfunction across all domains compared to HCs. Additionally, the amygdala volume correlated with SS total score, and the ventral diencephalon volume negatively correlated with the SOR total score in subjects with ADHD. Implications of these findings will be discussed.

**Police Body Camera Perspectives, Race, and Aggression**

Carina Y. Chen ’17, Psychology; Meredith N. Clark ’17, Psychology/Education Studies; Alejandra I. Escamilla Saldaña ’18, Psychology/Education Studies; Sharon H. Wu ’17, Psychology/Economics

**ADVISOR:** Linda Carli, Psychology

Police body cameras have been proposed as a means of increasing police accountability in interactions with civilians. The research considers a potential weakness of body cameras: any recording would focus solely on the suspect and exclude police. We hypothesized that when a suspect is the only person seen on a recorded body camera image, he/she would be judged more responsible or guilty than when both the police and the suspect are seen, and that when the police, but not the suspect, are visible in the recording, the suspect would be seen as less guilty. Participants were shown video clips that depicted interactions between a police officer and either an African-American or white American civilian. The camera perspective varied, showing only the suspect, only the police, or both. Participants then rated the guilt of the suspect, and the responsibility of the police and suspect for the outcome of the scenario.

**Effects of Anxiety on Executive Functioning**

Diederique B.W.P. van der Knaap ’18, Cognitive and Linguistic Sciences

**ADVISOR:** Jeremy Wilner, Psychology

Every day, we must perform cognitively demanding tasks in stressful environments such as school and work. Does a tendency toward anxiety hinder performance equally in all groups, or does it impact distinct groups differently? For example, past research has found that women tend to be more anxious than men—how does this affect their capacity to selectively attend to one thing while ignoring others? Here, we use the Stroop Task, a well-known measure of selective attention, to ask whether anxiety level affects selective attention differently in different individuals and what factors may explain these differences. We utilize data from a smaller sample of 40 Wellesley students and a larger sample of Amazon Mechanical Turk participants. This study will enhance our understanding of the effects of anxiety on selective attention.

**Understanding the Effect of DesHDAP1 Residue Identity on Antimicrobial Activity**

Shelly N. Kraus ’19, Chemistry

**ADVISOR:** Donald E. Elmore, Chemistry

Early findings of antimicrobial peptides (AMPs) have found encouraging results regarding their ability to kill bacteria. The peptides may either permeabilize or translocate across the membrane, which kills the bacteria. Past Elmore lab research studied histone-derived antimicrobial peptides (HDAPs); the findings indicate that of the two positively charged residues, arginine increases peptides’ antimicrobial activity. DesHDAP1 contains four arginine residues and two lysine residues. Previous experiments showed that arginine-rich mutants of Desl have a higher antimicrobial activity. In order to explain this observation, this study employed a computational model, specifically, molecular dynamics. In this study, we performed simulations of DesHDAP1 in its wild-type, arginine-rich, and lysine-rich forms interacting with lipid membranes. Peptide stability and interactions with the membrane were analyzed. Current analysis indicates that the arginine mutant interacts with the lipid...
membrane more than the lysine mutant, which supports previous findings of the arginine mutant’s higher antimicrobial activity.

The Effect of Estrogens on Neurotensin Expression in the Brains of Obese Female Mice
Priyanka Ram ’17, Neuroscience
Advisor: Marc Teetel, Neuroscience

It is estimated that over 60 percent of adults in the U.S. are overweight or obese. Moreover, obesity and its associated diseases contribute to approximately 2.5 million deaths annually in the U.S. Leptin, a hormone produced by fat, is important in regulating appetite, body weight, and energy expenditure. Recessive mutations in the gene that encodes for leptin, the ob gene, result in leptin deficiency and cause excessive obesity in humans and rodents. Estrogens, a class of ovarian steroid hormones, regulate metabolism and modulate feeding, body weight, and energy expenditure in females. Estradiol (E2), one type of estrogen, acts as an anorectic and increases activity levels in humans and rodents by binding primarily to the estrogen receptor subtype ERα. Recent work from our lab and others reveals that E2 protects against high-fat, diet-induced obesity in female mice. This effect of estrogens can also be seen in postmenopausal women who have a decline in estrogens, which results in weight gain. Early studies indicate that the hypothalamus, a brain region that expresses high levels of ERα, is the primary region for regulating food intake and body weight. Neurotensin (NT) is a peptide localized predominantly in the small intestine that is associated with obesity and diabetes. NT-deficient mice are unable to absorb fat from food and are protected from obesity and insulin resistance associated with a high-fat diet, suggesting that NT increases fat absorption. NT is also expressed in the brain, and its expression decreases in the ventromedial nucleus of the hypothalamus (VMH) in obese male rats as compared to their lean counterparts. The effects of NT are mediated through three receptors: NTR1, 2, and 3. NT binds to NTR1 in the hypothalamus. ERα and NT are coexpressed in the VMH, and E2 increases NT expression in lean female mice. Based on these findings, this study investigates the effect of estrogens on NTR1 expression in the VMH of female mice lacking leptin (ob/ob) and fed a high-fat diet. It is hypothesized that E2 treatment will increase the expression of NTR1 in the VMH of ob/ob mice, which are obese, as compared to control mice. Immunohistochemistry was used to label NTR1 in the ventromedial hypothalamus of estradiol- and vehicle-treated ob/ob and control mice. Using confocal microscopy, cells expressing NTR1 in the hypothalamus of these mice have been quantified. Investigating this relationship between estrogens and neurotensin receptor expression in an obese mouse model is essential to better understanding the role of NT in regulating obesity. NT may provide a prognostic marker for future obesity and a potential target for prevention and treatment of metabolic disorders in women.

Data Exploration and R Shiny
Hannah Murphy ’19, Computer Science
Advisor: Alden Griffith, Environmental Studies

Independent exploration of data is essential to any quantitative science class. Over the course of last year, Professor Alden Griffith developed a web-based R Shiny application to aid students in exploring data collected during lab experiments in ES101. This semester, I joined Professor Griffith’s project as a Guthman Fellow for the Quantitative Analysis Institute. I am working to expand the Data Explorer application and create more functionality in the app. I am also working to make the code base of the app more modularized and mutable, so that future programmers can customize the app to meet their needs without too much additional effort. This poster will provide information on the data explorer itself, as well as the R Shiny programming platform and an overview of the app-building process.

Time Perception: What Factors Affect Performance on Time Awareness Tasks?
Lingjuan (Lotus) Xia ’18, Psychology/Economics;
Maya Muldowney ’18, Neuroscience
Advisor: Jeremy Wilmer, Psychology

Do you struggle to keep track of time? Despite extensive research on time perception, many aspects remain a mystery, because methods used to assess time perception vary (Grondin, 2010). To provide a comprehensive assessment, we developed a test to measure different aspects of time perception: estimating time interval, comparing time interval, and determining the time of day. We will report the results of two studies, the first with Wellesley students, and the second with a more representative sample through the Amazon Mechanical Turk. We hypothesize that the three aspects of time perception positively correlate with each other. To help elucidate factors that influence time perception, we are gathering demographic information to see if more regimented sleep schedules, better punctuality, and rural childhood residence will correlate with better performances on our time perception tasks. We hope this test will contribute to a better understanding of time perception.

Further Investigation of Bilingual Advantage in Task Switching
Catharine Hemp ’18, Psychology; Jennifer Mau ’18, Economics/Psychology
Advisor: Jeremy Wilmer, Psychology

Some studies, but not others, suggest that those who learn a second language may be able to switch attention more rapidly. Here, we attempt to replicate the finding of a bilingual advantage in switching while asking whether such an advantage may depend on the age and setting in which one learned a second language. In our study, participants complete three types of sorting tasks that involved switching dimensions. We expect that those who are bi/multilingual will switch more rapidly and/or accurately than monolingual individuals, and that those who learned their other language(s) earlier in life will perform better than those who learned their other language(s) later on in life. Moreover, we believe that the bi/multilingual advantage in task switching will generalize to everyday life, with bi/multilingual individuals being more easily and effectively to new situations.

Mental Rotation Test: A Measure for Spatial Aspects of Intelligence
Lingjuan (Lotus) Xia ’18, Psychology/Economics
Advisor: Jeremy Wilmer, Psychology

Spatial processing skills predict science and math performance, and they are trainable (Tarampi, Heydari & Hagarty, 2016). Here, we develop a new web-based mental rotation test (MRT) and assess its sensitivity and validity as a measure of spatial processing. We administered our MRT along with other reliable, well-validated tests to 80 participants from Amazon Mechanical Turk with different backgrounds. Two major findings emerged. First, MRT dissociated strongly from measures of visual attention (r = 0.13) and processing speed (r = 0.04), indicating a remarkable cognitive specificity. Second, MRT associated strongly with matrix reasoning (r = 0.59), documenting its
validity as a measure of spatial processing. Taken together, these findings suggest that MRT be considered a sensitive measure for isolating spatial aspects of intelligence.

**The Bilingual Mind and Decision Making**

Naomi Smith ’17, Cognitive and Linguistic Sciences; Rachel Kwon ’17, Cognitive and Linguistic Sciences

ADVISOR: Jeremy Wilner, Psychology

As the world becomes more multilingual, the need to understand the multilingual mind becomes more pertinent. Past studies have shown that when a multilingual person makes decisions in a nonnative language, they show less loss aversion and more unbiased decisions (Keyser et al., 2012). Here we will attempt to replicate that finding while going one step further to ask if culture may also impact loss aversion. Bilingual Korean-English speaking participants will answer questions concerning losses and gains in either Korean or English. They will report their cultural background and lifestyle habits. We predict that participants’ decision making in both their nonnative language and their nonnative culture will show less loss aversion. Such a phenomenon could have substantial implications if people who constantly make decisions in their nonnative language and culture are less biased in important life decisions involving, for example, savings, investment, or retirement.

**The Influence of Physical Response on Types of Humor Perception**

Kyla Petris ’17, Psychology; Sahar Mobieze ’17, Cognitive and Linguistic Sciences

ADVISOR: Jeremy Wilner, Psychology

Research has shown that when the expression of humor is suppressed, people are less likely to find stimuli funny (Korb, 2012). Further research has dichotomized humor into two groups: physical and semantic (Baldwin, 2007). Good sense of humor has been associated with overall mood stability (Cann, 2014). However, no research to date has investigated these three concepts simultaneously in the same participants. We developed a new measure to better understand the impact of physical responses on humor perception. Participants, placed in either a control or a suppression group, were shown videos of semantic and physical humor and asked to rate how funny the videos were, along with current mood. We hypothesized that suppressing responses would differentially impact semantic versus physical humor perception, that humor preferences would be mediated by age and education level, and that participants who found the videos funnier would report a better mood.

**Exploring the Universe with the 24-Inch Telescope**

Maggie Zarlelengo ’18, Geosciences

ADVISOR: Kim McLeod, Astronomy

The Kilodegree Extremely Little Telescope (KELT) survey searches for exoplanets orbiting stars. This survey requires follow-up research from larger telescopes to confirm the transits of these exoplanets around candidate stars. Wellesley’s 24-inch telescope is active within the KELT Follow-Up Network. We spend many hours observing stars to record the transits of their exoplanets, which yield data that we then process and send to the KELT team to help confirm or rule out an exoplanet. In this 350 project, I have learned about Wellesley’s part in the Follow-Up Network, made and analyzed observations that were submitted to the KELT team, and created resources to teach future students who continue this research.

**The Morality of Plurality: Empathy in Moral Decision Making**

Jasmine Kaduthodil ’18, Neuroscience

ADVISOR: Jeremy Wilner, Psychology

When assessing the effect of empathy on morality, the effect of empathy on emotion-based versus reason-based morality is not examined. Here we ask whether empathic individuals lean more toward reason-based or emotion-based moral decision making, and whether one’s cultural background significantly influences moral decision making. We have created a test modeled after the Reading the Mind in the Eyes test to measure empathy, and compiled a series of moral dilemmas divided into depersonal/personal situations to test for a tendency toward reason-based versus emotion-based morality. Participants will be recruited using Amazon Mechanical Turk. We predict that empathic individuals and individuals from cultures emphasizing group over self will have a stronger tendency toward emotion-based morality versus logic-based morality. Morality and empathy are not interchangeable; by analyzing the effects of empathy on varying levels of moral decision making and integrating cultural perspectives, we can better understand another’s motivations and world view.

**Evidence of Ancient Plate Tectonics in Microscopic Crystals of Zircon (ZrSiO₄)**

Isabelle Herde ’17, Geosciences

ADVISOR: David Hawkins, Geosciences

Plate tectonics shape the evolution of continents through continental rifting and continent-continent collision. These tectonic processes generate molten magma with chemical characteristics imparted on the resulting igneous rocks and their constituent minerals. Over time, the igneous rocks weather and erode, decomposing most minerals in these rocks and thereby erasing key evidence of ancient plate tectonics. However, some minerals survive as sediment. One such mineral is zircon, a particularly durable mineral that records isotopic information about its age of formation and chemical information reflecting its origin. The goal of this study is to evaluate the following question: Does zircon composition reflect the tectonic setting of its source rock? Preliminary results suggest that zircons that formed from continent-continent collisions are chemically distinct from zircons that formed from continental rifts. Such chemical discrimination may provide a new tool for reconstructing the tectonic history of ancient continents.

**Comparing Reduction Methods of Nitrate to Nitrite for Spectrophotometric Analysis of Soil Samples**

Mia T. Tuccillo ’20, Undecided

ADVISOR: Alden Griffith, Environmental Studies

The use of vanadium (III) in place of cadmium has been proposed as a suitable alternative for the reduction of nitrate to nitrite during spectrophotometric determination of soil nitrate. There are several compelling aspects of the vanadium method (e.g., cost, toxicity); however, its accuracy and consistency when analyzing soil extracts (in KCl) is less known. To compare their discrepancies and similarities, identical soil extracts were reduced by both methods, including varying filtering techniques (in preparing extracts) and recovery tests after spiking samples by a known amount of 1 ppm nitrate stock solution. While filtering technique did affect results, it does not seem to interact with reduction method and efficiency. The vanadium (III) method consistently resulted in lower and less accurate nitrate.
concentrations, especially for samples with low initial concentrations of nitrate, and also has a lower recovery of spiked samples.

**Herbicides and Women’s Health: Analysis of Three Tampon Brands for Glyphosate Contamination**
Alexis Corcoran ’18, Biological Sciences; Amanda Hernandez ’18, Environmental Studies; Sarah Koenig ’17, Environmental Studies

Advisor: Dan Brabander, Geosciences

Glyphosate, commercially known as Roundup, is one of the world’s most ubiquitous pesticides and has been associated with numerous negative health outcomes, including kidney failure and cancer; however, there is little research on the potential presence of glyphosate in commercially produced cotton products such as tampons. This study seeks to use chemical tracers to better understand the transport mechanisms of glyphosate to cotton products. Three brands of tampons were analyzed with phosphorus and nitrogen as indicators of the herbicide. Organic cotton was soaked in varying concentrations of the herbicide and analyzed to model the concentrations that might be present in the tampons.

**Environmental Geochemical Investigations: Examining Mobility of Toxins, Identifying Exposure Pathways, and Linking Biogeochemistry to Public Health and Environmental Justice**
Nisreen Abo-Sido ’18, Environmental Studies; Kimberly Chia Yan Min ’19, Environmental Studies/South Asia Studies; Amanda Hernandez ’18, Environmental Studies; Gabrielle Jerz DS, Chemistry; Liani Lye Qin ’17, Individual-Robotics; Aлина Матких ’19, Geosciences; Thesady McFall ’19, Geosciences; Hannah Oettgen ’17, Geosciences; Melanie Pasaretti ’18, Geosciences/English; Sarah Smith-Tripp ’19, Geosciences; Emma Van Sooy DS; Maggie Zarleno ’18, Geosciences

Advisor: Dan Brabander, Geosciences

After learning analytical techniques in the classroom and lab, students in GEOS315: Environmental Geochemistry have applied our collective geochemical toolbox to examining new and ongoing projects addressing real-world environmental issues:

1. Single-use plastic containers are often reused and reheated, potentially leading to leaching of toxins into food. Using ICP, XRF, and GC/MS, we aim to understand transport mechanisms of potential toxins in plastic takeout containers and bottles and its implications on plastics sustainability.

2. From previous projects that measured lead levels in Boston compost, we aim to track changes in compost lead concentration over time, to identify lead signatures in different compost samples, and propose reasons behind trends observed.

3. Tar Creek, a federal Superfund site, contains heavy metal waste from a century of mining. Our work examines the speciation and transport pathways of lead, zinc, and cadmium in soil and plant samples collected from this site.

**Biogeochemical Trace Element Profiles of Urban Fruit Trees: A Resource to Increase Food Security**
Ciaran Gallagher ’17, Independent-Environmental Chemistry; Hannah Oettgen ’17, Geosciences

Advisor: Dan Brabander, Geosciences

Urban fruit trees are being rediscovered across the U.S. as a source of seasonal fresh fruit for primary consumption and canning. Little is known, however, about fate and transport of trace elements in urban environments with inventories of legacy pollutants like lead. We partner with the League of Urban Canners in the greater Boston area to quantify trace-element concentrations in urban fruit. Over 200 samples of urban fruit have been collected, as well as commercial samples for comparison. Samples were blended, dried, and analyzed using X-ray fluorescence. Preliminary analysis shows low lead concentrations and high concentrations of some micronutrients. GIS analysis indicates that these urban fruit trees have the potential to increase food security. Our research can inform planting initiatives to optimize access to fresh produce through collaboration with urban planners.

**The Development and Application of Genetic Tools for Systematic Dissection of Cortical Circuits and Brain Networks in Mice**
Ying (Ajusa) Li ’19, Biochemistry

Advisor: Martina Königer, Biological Sciences; Mark P. Bear, Brain and Cognitive Sciences, MIT

Many theories of memory posit that highly plastic brain regions such as the hippocampus encode and store information transmitted from primary sensory cortices. However, there is increasing consensus that these cortical regions can undergo dramatic experience-dependent plasticity, likely supporting memory formation. For instance, stimulus-specific response potentiation (SRP) is a rapid, long-lasting form of plasticity observed in the primary visual cortex of mice. Animals repeatedly exposed to a stimulus exhibit an increase of visually evoked potential (VEP) amplitude. Given the complexity of SRP, we postulate that SRP is mediated by complex neural networks that exceed the tuning of individual neurons. To systematically dissect this circuitry, we selectively disrupt cells in visual cortex layers 2/3, 4, 5, or 6 using NMDA-receptor genetic knockouts or diphtheria toxin-mediated ablation. Here we present histology data associated with each approach. These approaches will allow us to evaluate the contribution of canonical cortical organization to visual recognition memory.
<table>
<thead>
<tr>
<th>Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akert, Robin</td>
<td>42</td>
</tr>
<tr>
<td>Arciniegas, Diego</td>
<td>43</td>
</tr>
<tr>
<td>Armstrong, Justin</td>
<td>33, 35</td>
</tr>
<tr>
<td>Arumainayagam, Christopher</td>
<td>38</td>
</tr>
<tr>
<td>Bahns, Angela</td>
<td>41</td>
</tr>
<tr>
<td>Battat, James</td>
<td>37, 38</td>
</tr>
<tr>
<td>Bauer, Deborah</td>
<td>25, 26</td>
</tr>
<tr>
<td>Bear, Mark F</td>
<td>62</td>
</tr>
<tr>
<td>Belz, Barbara</td>
<td>34</td>
</tr>
<tr>
<td>Berman, Patricia</td>
<td>43</td>
</tr>
<tr>
<td>Bhogal, Gurminder</td>
<td>32</td>
</tr>
<tr>
<td>Bratander, Daniel</td>
<td>54, 62</td>
</tr>
<tr>
<td>Bryant, Heather</td>
<td>44, 52</td>
</tr>
<tr>
<td>Buchholz, Emily</td>
<td>59</td>
</tr>
<tr>
<td>Burke, Tom</td>
<td>51</td>
</tr>
<tr>
<td>Butcher, Kristin</td>
<td>51</td>
</tr>
<tr>
<td>Cain, William</td>
<td>22, 34</td>
</tr>
<tr>
<td>Cameron, Tracey</td>
<td>39, 40, 49</td>
</tr>
<tr>
<td>Carli, Linda</td>
<td>59</td>
</tr>
<tr>
<td>Carpenter, Angela</td>
<td>50</td>
</tr>
<tr>
<td>Carrara-Augustenborg, Claudia</td>
<td>27</td>
</tr>
<tr>
<td>Carrico-Monz, Dora</td>
<td>53</td>
</tr>
<tr>
<td>Cassiby, Kimberly</td>
<td>24</td>
</tr>
<tr>
<td>Charmaraman, Linda</td>
<td>49</td>
</tr>
<tr>
<td>Chen, Stephen</td>
<td>15, 29, 41, 50</td>
</tr>
<tr>
<td>Confortini, Catia</td>
<td>33, 45</td>
</tr>
<tr>
<td>Creef, Elena</td>
<td>33</td>
</tr>
<tr>
<td>Cuba, Lee</td>
<td>3, 51</td>
</tr>
<tr>
<td>Cushman, Thomas</td>
<td>29</td>
</tr>
<tr>
<td>Darling, Louise</td>
<td>45</td>
</tr>
<tr>
<td>Davis, Ophera</td>
<td>30</td>
</tr>
<tr>
<td>de Bres, Helena</td>
<td>44</td>
</tr>
<tr>
<td>Elmore, Donald E.</td>
<td>59</td>
</tr>
<tr>
<td>Fetter, Daniel</td>
<td>51</td>
</tr>
<tr>
<td>Flynn, Nolan</td>
<td>47</td>
</tr>
<tr>
<td>Fravel, M. Taylor</td>
<td>57</td>
</tr>
<tr>
<td>Galarneau, Charlene</td>
<td>31</td>
</tr>
<tr>
<td>Gartner, Corinne</td>
<td>24, 40</td>
</tr>
<tr>
<td>Gibb, Leif</td>
<td>26</td>
</tr>
<tr>
<td>Giersch, C. Pat</td>
<td>56</td>
</tr>
<tr>
<td>Gilhuly, Catherine</td>
<td>34</td>
</tr>
<tr>
<td>Gleason, Tracy</td>
<td>30, 31</td>
</tr>
<tr>
<td>Gobes, Sharon</td>
<td>27</td>
</tr>
<tr>
<td>Goncharenko, Larisa</td>
<td>46</td>
</tr>
<tr>
<td>Gonzalez, Octavio</td>
<td>34, 39</td>
</tr>
<tr>
<td>Goss, John</td>
<td>28</td>
</tr>
<tr>
<td>Grandjean, Katherine</td>
<td>57</td>
</tr>
<tr>
<td>Greene, Nikki</td>
<td>49</td>
</tr>
<tr>
<td>Greer, Brenna</td>
<td>23</td>
</tr>
<tr>
<td>Griffith, Alden</td>
<td>60, 61</td>
</tr>
<tr>
<td>Grossman, Jennifer</td>
<td>19, 48</td>
</tr>
<tr>
<td>Haines, David</td>
<td>35</td>
</tr>
<tr>
<td>Hajj, Nadya</td>
<td>50</td>
</tr>
<tr>
<td>Hall, Nancy</td>
<td>23</td>
</tr>
<tr>
<td>Hawkins, David</td>
<td>2, 25, 61, 62</td>
</tr>
<tr>
<td>Hennessey, Beth</td>
<td>19, 48</td>
</tr>
<tr>
<td>Hertz, Rosanna</td>
<td>31</td>
</tr>
<tr>
<td>Hickey, Alison</td>
<td>23</td>
</tr>
<tr>
<td>Higgins, Monica</td>
<td>24</td>
</tr>
<tr>
<td>Hilt, Eric</td>
<td>29, 40, 49</td>
</tr>
<tr>
<td>Hong, Soo</td>
<td>32</td>
</tr>
<tr>
<td>Huang, Adrian</td>
<td>38</td>
</tr>
<tr>
<td>Jones, Kristina</td>
<td>53</td>
</tr>
<tr>
<td>Keane, Margaret</td>
<td>2, 26</td>
</tr>
<tr>
<td>Kerr, Sari</td>
<td>49, 57</td>
</tr>
<tr>
<td>Klepac-Ceraj, Vanja</td>
<td>36, 37</td>
</tr>
<tr>
<td>Koda, T. James</td>
<td>42</td>
</tr>
<tr>
<td>König, Martina</td>
<td>62</td>
</tr>
<tr>
<td>Lee, Yoon</td>
<td>49</td>
</tr>
<tr>
<td>Lewis, Laura</td>
<td>27</td>
</tr>
<tr>
<td>Lindauer, David</td>
<td>19, 39</td>
</tr>
<tr>
<td>Logvinenko, Igor</td>
<td>56</td>
</tr>
<tr>
<td>Lovenduski, Nikki</td>
<td>46</td>
</tr>
<tr>
<td>MacDonald, Paul</td>
<td>19, 55</td>
</tr>
<tr>
<td>Marlow, Louise</td>
<td>24</td>
</tr>
<tr>
<td>Marshall, Nancy</td>
<td>41</td>
</tr>
<tr>
<td>Mata, Irene</td>
<td>51</td>
</tr>
<tr>
<td>Matthews, Ethel</td>
<td>19, 23</td>
</tr>
<tr>
<td>Matthews, Jaclyn</td>
<td>54</td>
</tr>
<tr>
<td>Matthews, Adam</td>
<td>45</td>
</tr>
<tr>
<td>Mattila, Heather</td>
<td>35</td>
</tr>
<tr>
<td>McCabe, Joshua</td>
<td>29, 40, 48, 56</td>
</tr>
<tr>
<td>McGibbon, Phyllis</td>
<td>42, 52, 53</td>
</tr>
<tr>
<td>McLeod, Kim</td>
<td>46, 59, 61</td>
</tr>
<tr>
<td>McNamara, Marsha</td>
<td>32</td>
</tr>
<tr>
<td>Meyer, Susan</td>
<td>23</td>
</tr>
<tr>
<td>Minor, Elizabeth</td>
<td>29</td>
</tr>
<tr>
<td>Monecke, Katrin</td>
<td>36</td>
</tr>
<tr>
<td>Mowbray, Andrew</td>
<td>2, 22</td>
</tr>
<tr>
<td>Musacchio, Jacqueline</td>
<td>44</td>
</tr>
<tr>
<td>Mustafaraj, Eniha</td>
<td>28, 47</td>
</tr>
<tr>
<td>Nunez, Megan</td>
<td>25</td>
</tr>
<tr>
<td>Obeng, Pashington</td>
<td>33</td>
</tr>
<tr>
<td>Oliver, Elizabeth</td>
<td>24</td>
</tr>
<tr>
<td>Olsen, David</td>
<td>22, 32, 47</td>
</tr>
<tr>
<td>Ostor, Gefred</td>
<td>52</td>
</tr>
<tr>
<td>Park, Kyung-Hong</td>
<td>57</td>
</tr>
<tr>
<td>Pattanayak, Cassandra</td>
<td>46</td>
</tr>
<tr>
<td>Peterman, T. Kaye</td>
<td>54</td>
</tr>
<tr>
<td>Radhakrishnan, Malu</td>
<td>25</td>
</tr>
<tr>
<td>Robeson, Wendy</td>
<td>31, 50</td>
</tr>
<tr>
<td>Rodenhouse, Nicholas</td>
<td>36</td>
</tr>
<tr>
<td>Rogers, Ruth</td>
<td>52</td>
</tr>
<tr>
<td>Rosenwald, Lawrence</td>
<td>32, 49</td>
</tr>
<tr>
<td>Rubin, Noah</td>
<td>49</td>
</tr>
<tr>
<td>Rutherford, Markella</td>
<td>30</td>
</tr>
<tr>
<td>Sequeira, Andrea</td>
<td>35</td>
</tr>
<tr>
<td>Shaer, Orit</td>
<td>2, 47</td>
</tr>
<tr>
<td>Silver, Edward</td>
<td>22, 42</td>
</tr>
<tr>
<td>Stanley, Rachel</td>
<td>35</td>
</tr>
<tr>
<td>Suzuki, Yuichiro</td>
<td>2, 36, 37, 55</td>
</tr>
<tr>
<td>Tang, Jenny</td>
<td>22</td>
</tr>
<tr>
<td>Tettel, Marc</td>
<td>60</td>
</tr>
<tr>
<td>Tjaden, Brian</td>
<td>27</td>
</tr>
<tr>
<td>Tynes, Jordan</td>
<td>44</td>
</tr>
<tr>
<td>Valera, Eve M</td>
<td>59</td>
</tr>
<tr>
<td>Van Arsdaile, Adam</td>
<td>36</td>
</tr>
<tr>
<td>Walsh, Julie</td>
<td>44</td>
</tr>
<tr>
<td>Ward, David</td>
<td>34</td>
</tr>
<tr>
<td>Ward, Honorine</td>
<td>37</td>
</tr>
<tr>
<td>Whitaker, Cord</td>
<td>33, 53</td>
</tr>
<tr>
<td>Wiest, Michael</td>
<td>26, 59</td>
</tr>
<tr>
<td>Williams, Linda</td>
<td>51</td>
</tr>
<tr>
<td>Wilmer, Jeremy</td>
<td>48, 59</td>
</tr>
<tr>
<td>Wolfson, Adele</td>
<td>3, 46</td>
</tr>
<tr>
<td>Wood, Benjamin</td>
<td>27</td>
</tr>
<tr>
<td>Young, Elizabeth</td>
<td>50</td>
</tr>
</tbody>
</table>

#RUHLMAN2017
The Wellesley College Guild of Carillonneurs is a student-run organization whose members provide the trademark music of chiming bells on campus. Active members of the Guild receive weekly lessons and perform regularly on the carillon during the school year. The Guild also hosts open tower events and concerts open to the entire Wellesley community. Housing 32 bells, the Wellesley carillon was installed in Galen Stone Tower above Green Hall in 1931. The tower is 182 feet tall from the ground to its highest finial. Aside from a few years during World War II, Wellesley students have performed on the carillon since its installation.

FEATURED CARILLONNEURS PLAYING DURING TODAY'S RUHLMAN CONFERENCE:

10:25 – 10:45 a.m.  
Emma Postel ’18  
“Jesu Joy of Man’s Desiring,” J. S. Bach  
“Land of Rest,” arr. Percival Price  
“Old Kentucky Home,” arr. Florence Risley  
“Davy Jones Plays his Organ,” arr. Amy Allport  
“Close Your Eyes,” arr. Emma Postel

12:00 – 12:20 p.m.  
Margaret Liu ’17  
“Marche en Rondeau,” Marc-Antoine Charpentier  
“A Mighty Fortress,” arr. Katie Musgrove  
“Campane a Sera,” Nino Rota  
“How Far I’ll Go,” arr. Margaret Liu  
“Spring Morning,” Geert D’hollander  
“Bourée from English Suite No. 3,” J. S. Bach

2:40 – 3:00 p.m.  
Kelly Navickas ’19  
“Remembrances of J. S. Bach,” Willem Creman  
“Reflection from Ludus Modalis,” Geert D’hollander  
“Traumerei,” Robert Schumann  
“Breathe” from In the Heights, arr. Kelly Navickas  
“Consolation,” Felix Mendelssohn

4:10 – 4:30 p.m.  
Kim Asenbeck ’17  
“Praeludium from Cello Suite in G,” J. S. Bach  
“Gymnopedie,” Eric Satie  
“Opening from Glassworks,” Phillip Glass, arr. Kim Asenbeck  
“Praeludium in C from WTC Bk. I,” J. S. Bach
The 2017 Ruhlman Conference Committee gratefully acknowledges faculty and staff in the following departments and facilities for their commitment to the Ruhlman Conference: Archives, Campus Police, Communications and Public Affairs, Computer Science, Custodial Services, Grounds, Library and Technology Services, Mail Services, Motor Pool, Physical Plant Administration, Science Center, Special Events, and The Wellesley College Club.