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Dear Members of the Northwestern Community:

It has been another impressive year in the world of undergraduate research at Northwestern. In fact, we realized that such rapid and continuing growth required a major initiative. Therefore, we created the Office of Undergraduate Research this year to continue to meet the needs of our students. The goals of the office are three-fold. First, the Office will continue to administer our University-wide grant programs, including the Undergraduate Research Grant program. Second, the Office will seek to coordinate efforts to support undergraduate research from around the University and communicate these opportunities, whether they are from schools, departments, labs, or external entities. Finally, the Office will work to support students in their preparation and completion of research projects. Since research works differently than the curricular model of classes, exams, and papers, we recognize the need to teach students how to get started, how to put projects together, how to write grant proposals, and ultimately as seen here today, how to successfully present their work to the wider world. Together with our incredibly generous faculty, we believe that this office will continue to transform undergraduate research at Northwestern, making the experiences more available and more meaningful.

We strongly believe that undergraduate research plays a formative role in the Northwestern education, marking the transition to more engaged learners. It is our goal to have as many students participate in these experiences as possible. To that end, we have increased the number of students funded this year to another all-time high. We awarded 133 Summer Undergraduate Research Grants, after seeing record application numbers for the fourth consecutive year. We also funded over 30 faculty members to mentor undergraduates about how the research process works in our Undergraduate Research Assistant Program. We even created, through the generosity of the Fletcher family, the Fletcher URG Award, honoring the top projects as determined by a faculty review committee. All told this year, the Office of Undergraduate Research has funded over 250 students, and this number only hints at the total student involvement through school programs, labs, and opportunities through places at Northwestern like International Program Development, the Center for Civic Engagement, and the Global Engagement Studies Institute.

Our future looks even more promising. The Office received a grant from the Arthur Vining Davis Foundations to double our Undergraduate Research Assistant Program budget for three years and to film a series of videos designed to help students get started in research. The video series has three parts. In the first part, they interviewed faculty leaders about what research in particular disciplines looks like and how to get started. In the second, they interviewed students about the value of research, allowing them to pass on their wisdom and experiences. Finally, they are currently in pre-production with the NUAMPS group to make a seven-part comic web series designed to show how to put a project together. It promises to be a fun way to share important information.

The mentoring, encouragement, and support provided by Northwestern's outstanding faculty and staff not only help students to have incredible experiences, but it also prepares them for the world beyond our campus. These successes make us proud of the education offered by Northwestern and make us hopeful for our future.

Sincerely yours, Daniel I. Linzer Provost

Exposition Logo Design by Taylor Barrett Weinberg College of Arts and Sciences, Class of 2012 Sociology / Creative Writing: Non-Fiction

# The 2013 Undergraduate Research and Arts Exposition

Northwestern University's eleventh annual celebration of undergraduate research and creativity

in conjunction with Chicago Area High School students and teachers participating in the NU High School Project Showcase

# Monday, May 20, 2013

Norris University Center

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# **80** Program of Events

10:00	Poster Session One: Louis Room (205)
11:00	Lunch N' Learn Oral Presentation Session One: Lake Room (203), Arch Room (206), Rock Room (207), Armadillo Room (208)
12:00	NU High School Project Showcase Poster Session: Louis Room (205)
1:00	Lunch N' Learn Oral Presentation Session Two: Lake Room (203), Arch Room (206), Rock Room (207), Armadillo Room (208)
2:30	Poster Session Two: Louis Room (205)
3:30	Doing Research at the Library: A Panel & Discussion: Big Ten Room (104)
6:30	Creative Arts Festival: McCormick Auditorium
8:30	<b>Post-Show Reception</b> : Wildcat (101) Open to all presenters and attendees

# **So** Exposition Steering Committee

### Students: Alina Dunbar, Jeffrey Heiferman, Emily Hittner, Bryce O'Tierney, and Felix Richner

Michele Bitoun, Medill School of Journalism, Media, Integrated Marketing Communications, Assistant Professor, Clinical, Editorial
Ronald Braeutigam, Associate Provost for Undergraduate Education
Stephen Carr, Associate Dean, McCormick School of Engineering
Sally Ewing, Associate Dean, School of Communication
Mary Finn, Associate Dean, Weinberg College of Arts and Sciences
Richard Gaber, Weinberg College of Arts and Sciences, Professor, Molecular Biosciences
Linda Garton, Assistant Dean, Henry and Leigh Bienen School of Music
Susan Olson, Assistant Dean, School of Education & Social Policy
Jane Rankin, Associate Dean, School of Communication
Helen Schwartzman, Weinberg College of Arts and Sciences, Professor, Anthropology

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# **Son** Exposition Planning & Organization

**Peter Civetta** Exposition Coordinator Director, Office of Undergraduate Research

#### Jana Measells

Exposition Poster Coordinator & Program Editor Advisor, Office of Undergraduate Research

Gretchen Oehlschlager Administrative Assistant, Office of Undergraduate Research

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# **50** Creative Arts Festival

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# **Steering Committee**

Students: Melissa Hahn, Sara Jane Inwards, Adele O'Kuforiji, Bryce O'Tierney, and Maris O'Tierney

William Bleich, School of Communication, Senior Lecturer, Radio/TV/Film

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# Jury

Gus Friedlander, Musician Thomas McCarthy, Actor, Writer, Director Mickie Paskal, Paskal Rudnicke Casting Agency Jennifer Rudnicke, Paskal Rudnicke Casting Agency

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### Masters of Ceremony

Matthew Hays, The Titanic Players Emily Olcott, The Titanic Players

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# Stage Manager

Melissa Hahn

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# **So Faculty Poster Judges**

Erik Andersen, Molecular Biosciences Elisa Baena, Spanish and Portuguese Amy Booth, Communication Sciences and Disorders Stephen Carr, Materials Science and Engineering Joan Chiao, Psychology Megen Culpepper, Molecular Biosciences Yasin Dhaher, Physical Medicine and Rehabilitation Bernard Dobroski, Music Studies Sally Ewing, School of Communication Wendi Gardner, Psychology Steffen Habermalz, Economics Laurel Harbridge, Political Science Eszter Hargittai, Communication Studies Stephen Hill, Office of Fellowships; Program of African Studies; Anthropology Philip Hockberger, Physiology Robert Holmgren, Molecular Biosciences Teresa Horton, Biological Sciences Peter Kaye, School of Continuing Studies Hilarie Lieb, Economics Joan Linsenmeier, Psychology Stanley Lo, Molecular Biosciences Bill Murphy, Anthropology Amy Osterman, Molecular Biosciences Ken Paller, Psychology Laura Panko, Biological Sciences Rakhi Rajan, Molecular Biosciences Andrew Rivers, Physics and Astronomy Andrew Roberts, Political Science Karl Rosengren, Psychology

### So Faculty Poster Judges, continued

Fay Rosner, Weinberg College of Arts and Sciences
Helen Schwartzman, Anthropology
Mark Sheldon, Philosophy
H. David Smith, Psychology
Jason Tait Sanchez, Communication Sciences and Disorders
Francesca Tataranni, Classics
Cristina Traina, Religious Studies
Akbar Virmani, Program of African Studies
Cindy Voisine, Molecular Biosciences
Brad Zakarin, Office of Fellowships; History

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### **So** Oral Presentation Judges

Medill School of Journalism, Media, Integrated Marketing Communications

Beth Bennett Deborah Douglas Anne Johnsos Ceci Rodgers Michelle Weldon

The OpEd Project (www.theopedproject.org)

Claudia Garcia-Rojas Deborah Seigel

## **50** Judges for the NU High School Project Showcase

Keegan Dunn, McCormick School of Engineering and Applied Science Madison Fitzpatrick, The Graduate School Simone Galperti, The Graduate School Ashley Gilliam, The Graduate School Jeremy Gouldey, The Graduate School Parag Gupta, The Graduate School Sam Hadden, The Graduate School Louis Knapp, McCormick School of Engineering and Applied Science Kathryn Knowles, The Graduate School Ting Li, The Graduate School David Little, The Graduate School Scott Mayle, The Graduate School Aaron Oppenheimer, The Graduate School Marc Royster, The Graduate School Hiro Tanaka, The Graduate School Sara Thomas, The Graduate School Ramón Torres, The Graduate School Joseph Warfel, The Graduate School Jia Wu, The Graduate School

### 2013 UNDERGRADUATE RESEARCH & ARTS EXPOSITION <u>POSTER SESSIONS - LOUIS ROOM 205 MAP</u>



COFFEE/WATER

2013 Undergraduate Research and Arts Exposition STUDENT PRESENTER DIRECTORY (Alphabetical by Last Name)						
LAST NAME	FIRST NAME	PRESENTATION TYPE	PRESENTATION TITLE	TIME	ROOM	PROGRAM PAGE #
Ahmed	Sarah	AM Poster #6	Conservation Psychology Survey	10:00 AM	Louis 205	2, 22
Alcorn	Danielle R.	Oral Presentation	Overhearing Objectifying Body Comments	11:00 AM	Armadillo 208	5, 22
Alexander	Christina	PM Poster #11	Liberalism Against Itself	2:30 PM	Louis 205	8, 23
Amer	Lindsay	Oral Presentation	Social Issues in British TYA	11:00 AM	Rock 207	5, 23
Ayerdi Bandurovych	Alex	PM Poster #49	Optimization Using GPU Acceleration	2:30 PM	Louis 205	2 24
Barstow	Fullya	Oral Presentation	Sub-Sabaran Refugees' Livelihoods in Rabat	11:00 AM	Arch 206	3, 24
Bayan	Sasha	Creative Arts Festival	Sasha Bayan's hand	6:30 PM	McCormick Aud	18
Beckerman	Laura Grace	Oral Presentation	Sulfur's Role in Initiating OAE2	11:00 AM	lake 203	1.0
Bernhard	Paula	PM Poster #34	Survey of Men Sexually Attracted to Children	2:30 PM		9.26
Boffi	Nicholas	Oral Presentation	HHG From Polyatomics	1:00 PM	Louis 205	6.26
Cannady	Kathryn	PM Poster #1	Beaton, Penn, and Artificiality at Vogue	2:30 PM	Louis 205	8, 27
Castellanos	John	PM Poster #27	Finding Meaning in Fantasy	2:30 PM	Louis 205	9.28
Chang	Victor	Oral Presentation	TGS of LDHA in Cancer Cells	11:00 AM	Lake 203	4, 28
Chavez	Raul	AM Poster #20	Safety of Barium-Containing Glazes	10:00 AM	Louis 205	3, 29
Clark	Michael	Oral Presentation	Reconstitution of the Sin3 Complex	11:00 AM	Lake 203	4, 29
Clinton	Jacob	Creative Arts Festival	Ronnie Baitt	6:30 PM	McCormick Aud.	17
Coffel	Ethan	AM Poster #16	Machine Learning in Tornado Detection	10:00 AM	Louis 205	2, 30
Coughlin	Scott	AM Poster #29	Biases in Black Hole Parameter Estimates	10:00 AM	Louis 205	3, 30
Dalal	Prarthana	AM Poster #14	Comparing Healthcare in the US and India	10:00 AM	Louis 205	2, 31
Datla	Siddarth	AM Poster #25	Practice Interactive Surgical Knee	10:00 AM	Louis 205	3, 31
DeStefano	Sherilyn	PM Poster #10	Empathy and Premedical Volunteerism	2:30 PM	Louis 205	8, 32
Dillon	Claire	Oral Presentation	The Work of Félix González-Torres	11:00 AM	Rock 207	5, 32
Dunbar	Alina	Oral Presentation	Subversion in Children's Literature	11:00 AM	Rock 207	5, 33
Eck	Chase Stephen	PM Poster #18	Claims of Racism at Northwestern	2:30 PM	Louis 205	8, 33
Eugenio	Roelle	AM Poster #23	Effect of Aloe vera on Hair Growth	10:00 AM	Louis 205	3, 34
Fiat	Aria E.	AM Poster #12	Mind Your Mood	10:00 AM	Louis 205	2, 34
Finbloom	Joel A.	PM Poster #46	Peptide Amphiphiles for Cancer Therapy	2:30 PM	Louis 205	10, 35
Frankenthal	Alex	Creative Arts Festival	Not Otherwise Specified	6:30 PM	McCormick Aud.	16
Frost	Kyle	PM Poster #32	Siblings and Social Cognition in ASD	2:30 PM	Louis 205	9, 36
Garrett	Tim	Oral Presentation	Alexandrian Political Graffiti	1:00 PM	Rock 207	7,36
Gerst	Emily	AM Poster #11	Controlling Christianity in China	10:00 AM	Louis 205	2, 37
Giordano	Nicolas Grosso	AM Poster #19	Pd Catalysts for Green Diesel Production	10:00 AM	Louis 205	3, 37
Glenn	Cheisea	Oral Presentation	Retninking Refugee Self-Reliance	11:00 AM	Arch 206	4, 38
GO	Kevin	AIVI Poster #25	Practice Interactive Surgical Knee	10:00 AM	LOUIS 205	3, 31
Gomaa	Kavla	DM Dector #29	Redu Dissatisfaction & Visual Attention	0:30 PIVI	NICCOFMICK AUG.	1/
Grayson	Nayla	Oral Procentation	Body Dissatisfaction & Visual Attention	2:30 PIVI	Louis 205	9,38
Hallaman	Gia	Dial Presentation	Linking Prarie Ant Communities & Fire	2:30 PM	Louis 205	7, 39
Halpern	Kathryn	Creative Arts Festival	Prostitution Poetry	6.30 PM	McCormick Aud	17
Haneman	Тгасеу	Oral Presentation	Language and National Identity in Turkey	1:00 PM	Armadillo 208	7.40
Hernández	Michael	AM Poster #9	Training Reappraisal via PC Paradigm	10:00 AM		2 41
Hlebowitsh	Nadia	Creative Arts Festival		6:30 PM	McCormick Aud	14
Houskeeper	Sam	PM Poster #5	The Evolution of International Sanctions	2:30 PM	Louis 205	8.41
Huang	Victoria L	Creative Arts Festival	The construction of unlivable castles	6:30 PM	McCormick Aud	14
Ilhardt	Peter	AM Poster #17	Investigation of Yucatán Microbialites	10:00 AM	Louis 205	2.42
Jahangir	Samuel	PM Poster #29	Social Rejection & Emotional Regulation	2:30 PM	Louis 205	9.42
Jennings	Jasmine	Oral Presentation	The Problem in Room 24	1:00 PM	Armadillo 208	7.43
Ji	Jingran	PM Poster #44	MiR-9a Confers Phenotypic Robustness	2:30 PM	Louis 205	10, 43
Johnson	Eric	Oral Presentation	A Moated Order	1:00 PM	Armadillo 208	7.44
Kathuria	Parul	AM Poster #4	Metabolic Syndrome among the Tsimane'	10:00 AM	Louis 205	2,44
Kerwin	Meghan	PM Poster #3	Trust: Denmark vs. the US	2:30 PM	Louis 205	8, 45
Kovalchuk	Maria	Oral Presentation	Religion in Sophocles' Antigone	11:00 AM	Rock 207	5, 46
Krivicich	Peter	PM Poster #23	Media Manipulation and the Chechen Wars	2:30 PM	Louis 205	9, 46
Kucybala	Karolina	Oral Presentation	Collagen XV and Pancreatic Cancer	11:00 AM	Lake 203	4, 47
Kuterbekov	Mirasbek K.	Oral Presentation	SWCNT-Gelatin for Tissue Engineering	1:00 PM	Lake 203	6, 47
Lam	Ryan	PM Poster #45	Engineering Thromboprotective Grafts	2:30 PM	Louis 205	10, 48
Layton	Taylor	PM Poster #2	Deleuze, Guattari, and Electronica	2:30 PM	Louis 205	8, 48
Le	John	AM Poster #29	Biases in Black Hole Parameter Estimates	10:00 AM	Louis 205	3, 30
Lee	Ann Hyunji	AM Poster #13	Ethnic Politics in Singapore	10:00 AM	Louis 205	2, 49
Lee	James	PM Poster #26	Prematurity and Cortisol Profile	2:30 PM	Louis 205	9, 49
Lloyd	Alyssa	Oral Presentation	Australian Carbon Tax Effects	1:00 PM	Arch 206	6, 50
Lu	Hannah	PM Poster #40	Pediatric Oncology Phase I and II Studies	2:30 PM	Louis 205	10, 50
Magabo	Nicole Amani	Oral Presentation	Globalization & Social Entrepreneurs in Uganda	11:00 AM	Arch 206	4, 51
Maluff Masi	Mauricio	<b>Oral Presentation</b>	World White Web	1:00 PM	Arch 206	6, 51

	2013 Undergraduate Research and Arts Exposition STUDENT PRESENTER DIRECTORY (Alphabetical by Last Name)					
LAST NAME	FIRST NAME	PRESENTATION TYPE	PRESENTATION TITLE	TIME	ROOM	PROGRAM PAGE #
Manchanda	Shivon	AM Poster #24	Function of Protein Kinase C in Memory	10:00 AM	Louis 205	3, 60
Mattimore-Malan	Mallory	PM Poster #19	Teacher Identity on Strike	2:30 PM	Louis 205	9, 52
Mayer	Allegra	PM Poster #36	Local vs. Global Isotope Trends of OAE2	2:30 PM	Louis 205	9, 52
McLoughlin	Mark	PM Poster #4	Rise of Gay Rights in Ireland	2:30 PM	Louis 205	8, 53
McSweeney	Melissa	AM Poster #24	Function of Protein Kinase C in Memory	10:00 AM	Louis 205	3,60
Mehta	Dhrumil	Oral Presentation	Political Framing	1:00 PM	Rock 207	7, 53
Mele	Levi L.	PM Poster #24	The Mormon Effect	2:30 PM	Louis 205	9, 54
Merlo	Catherine	Oral Presentation	Changing the American Dream	1:00 PM	Armadillo 208	7, 54
Merrill	Nick	PM Poster #37	Spatial Reasoning and Information Encodi	2:30 PM	Louis 205	9, 55
Merrill	Nick	Creative Arts Festival	Automatic Meditation Trainer	6:30 PM	McCormick Aud.	15
Mills	Jennifer	Oral Presentation	Sulfur Cycle Dynamics during OAE1a	1:00 PM	Lake 203	6, 55
Mills	Ashley	Creative Arts Festival	Inside the Intersection	6:30 PM	McCormick Aud.	16
Montgomery	Jacqueline	PM Poster #15	Understanding Malian Refugee Counts	2:30 PM	Louis 205	8, 56
Morgan	Michael	AM Poster #6	Conservation Psychology Survey	10:00 AM	Louis 205	2, 22
Morimoto	Sarah	Creative Arts Festival	Storytelling and Creating Worlds	6:30 PM	McCormick Aud.	15
Murphy	Parker	Creative Arts Festival	Not Otherwise Specified	6:30 PM	McCormick Aud.	16
Nehrkorn	Melanie	Oral Presentation	Nonlocal Competition among Populations	1:00 PM	Lake 203	6, 57
Nelson	Claire	AM Poster #7	Deception in the Legal Arena	10:00 AM	Louis 205	2, 57
Nicholson-						
Klingerman	Briana	Creative Arts Festival	COLLIDEscope	6:30 PM	McCormick Aud.	19
North	Janice Li	Oral Presentation	Music-Liberal Arts Dual Degree Education	11:00 AM	Armadillo 208	5, 58
North	Leah	PM Poster #25	Victorian Masculinity at Northwestern	2:30 PM	Louis 205	9, 58
Obregon	Roxana A.	AM Poster #8	Spatial Abilities of Middle Schooler	10:00 AM	Louis 205	2, 59
Olson	Ezra	Oral Presentation	Reading Wallace's Infinite Jest	11:00 AM	Rock 207	5, 59
O'Tierney	Bryce	Creative Arts Festival	maeve & quinn: fusion/fission	6:30 PM	McCormick Aud.	14
O'Tierney	Maris	Creative Arts Festival	maeve & quinn: fusion/fission	6:30 PM	McCormick Aud.	14
Park	Kyeonggook	PM Poster #16	Factors that Influence Sunk Cost Bias	2:30 PM	Louis 205	8, 60
Parsons	Gabrielle	Creative Arts Festival	The World at My Fingertips	6:30 PM	McCormick Aud.	19
Patel	Neil	Oral Presentation	Function of Protein Kinase C in Memory	11:00 AM	Lake 203	4, 60
Patel	Tirth	AM Poster #21	Molecular Mechanisms of Regeneration	10:00 AM	Louis 205	3, 61
Paulson	Andrew	Creative Arts Festival	Wabi-Sabi	6:30 PM	McCormick Aud.	20
Pinedo	Elizabeth	AM Poster #2	Recruiting Working-Class Students	10:00 AM	Louis 205	2,61
Polhamus	Bethany	AM Poster #3	Evangelical Women's Marriage Choices	10:00 AM	Louis 205	2, 62
Porter	Robert	Oral Presentation	Trans-Cellular Chaperone Signaling	11:00 AM	Lake 203	4, 62
Purrier	Morgan R.	PM Poster #8	What is Coming Out?	2:30 PM	Louis 205	8, 63
Qin	Charles	PM Poster #42	IKAP Function in Familial Dysautonomia	2:30 PM	Louis 205	10, 63
Rabinowitz	Joel	Oral Presentation	Israeli Unity Governments and the U.S.	1:00 PM	Rock 207	7,64
Rafiqi	Sophia	Creative Arts Festival	Storytelling and Creating Worlds	6:30 PM	McCormick Aud.	15
Rayala	Harika	Oral Presentation	Stuck in Transition	11:00 AM	Arch 206	4,65
Rees	Stephen Modica	PM Poster #18	Claims of Racism at Northwestern	2:30 PM	Louis 205	8, 33
Reichova	Viktorie	PM Poster #48	Cobalt Complex as Self-Reporting Prodrug	2:30 PM	Louis 205	10, 65
Richards	Lamar	AM Poster #25	Practice Interactive Surgical Knee	10:00 AM	Louis 205	3, 31
Romba	Tori	Oral Presentation	Adulthood: Roaring 20s and Sturdy 30s?	11:00 AM	Armadillo 208	5,66
Rork	A. Cummings	AM Poster #10	Enhancing Implicit Memory	10:00 AM	Louis 205	2,66
Russell	Laurie	PM Poster #22	Reward Sensitivity as Indexed by ERP	2:30 PM	Louis 205	9, 67
Sanford	Katie	PM Poster #30	The Cuneus and Empathy in Schizophrenia	2:30 PM	Louis 205	9, 67
Schmaltz	Niabi	Oral Presentation	The 2012 Québec Student Movement	11:00 AM	Armadillo 208	5,68
Scholes	Rachel	AM Poster #18	Plastic Marine Debris Analysis	10:00 AM	Louis 205	2,68
Schwartz	Rachel	Oral Presentation	Agreeing to Disagree: A Defense	1:00 PM	Rock 207	7,69
Serafin	Matthew	PM Poster #47	Creating a Green Teaching Lab	2:30 PM	Louis 205	10, 69
Shah	Aarohi	AM Poster #24	Function of Protein Kinase C in Memory	10:00 AM	Louis 205	3, 60
Shekhtman	Louis	PM Poster #41	Complex Network Backbones under Duress	2:30 PM	Louis 205	10, 70
Short	Kevin	Oral Presentation	Digital Citizen	1:00 PM	Arch 206	6, 70
Singh	Katie	PM Poster #17	Examining College Teaching of Poverty	2:30 PM	Louis 205	8, 71
Skeehan	Connor	AM Poster #29	Biases in Black Hole Parameter Estimates	10:00 AM	Louis 205	3, 30
Sladek	Mike	Oral Presentation	Validating a Measure of Male Body Talk	11:00 AM	Armadillo 208	5, 71
Slemaker	Emily	<b>Creative Arts Festival</b>	INK SPILL	6:30 PM	McCormick Aud.	15
Sloan	Rose	PM Poster #20	Labeled as Disabled?	2:30 PM	Louis 205	9, 72
Stanovici	Adriana	AM Poster #5	Effectiveness of the Arts-Based Approach	10:00 AM	Louis 205	2, 73
Straley	Alex J.	Oral Presentation	Engaging the Competitive Advantage	1:00 PM	Arch 206	6, 73
Summey	Amanda	<b>Creative Arts Festival</b>	Storytelling and Creating Worlds	6:30 PM	McCormick Aud.	15
Tannenbaum	Victoria L.	AM Poster #27	Optimization of Protein Yields in Yeast	10:00 AM	Louis 205	3, 74
Trewn	Amrit J.	AM Poster #1	Multiracialism's Postracial Fantasy	10:00 AM	Louis 205	2, 74
Tully	Daniel	PM Poster #13	With Intent to Defend	2:30 PM	Louis 205	8, 75
Tyndall	Lauren	AM Poster #25	Practice Interactive Surgical Knee	10:00 AM	Louis 205	3.31

2013 Undergraduate Research and Arts Exposition STUDENT PRESENTER DIRECTORY (Alphabetical by Last Name)						
LAST NAME	FIRST NAME	PRESENTATION TYPE	PRESENTATION TITLE	TIME	ROOM	PROGRAM PAGE #
Uzelac	Gregory	Oral Presentation	Socio-Linguistics of the Indian Diaspora	1:00 PM	Armadillo 208	7, 75
Velkoff	Lisa	PM Poster #33	Rumination, Stress, and Affect	2:30 PM	Louis 205	9, 76
Venn	Laura	PM Poster #7	Promoting Diversity	2:30 PM	Louis 205	8, 76
Viets	Kayla	AM Poster #28	Identification of GAL1 GRSs	10:00 AM	Louis 205	3, 77
Vrabec	Rachel	Oral Presentation	Political Effects of Self Help Groups	11:00 AM	Arch 206	4, 78
Walker	Serena	PM Poster #6	The Possibility of the Post-Racial	2:30 PM	Louis 205	8, 78
Wang	Maria	Oral Presentation	Pollen limitation in D. leibergii	1:00 PM	Lake 203	6, 79
Ward	Rebekah	AM Poster #15	The Processing of Backward Sluicing	10:00 AM	Louis 205	2, 79
Weber	William	PM Poster #31	Enhancing Memory By Sounds During Sleep	2:30 PM	Louis 205	9, 80
White	Meghan	PM Poster #12	A New "Multicultural Nationalism"	2:30 PM	Louis 205	8, 80
White	Tim	PM Poster #14	Explaining Violence in Protests	2:30 PM	Louis 205	8, 81
Wong	Deanna	PM Poster #43	The Role of Snail Family Zinc Fingers	2:30 PM	Louis 205	10, 81
Wozniak	Richard	PM Poster #9	Welcome to the Club	2:30 PM	Louis 205	8, 82
Xu	Ziyang	PM Poster #39	Designing inhibitors for E3 NEDD4-1	2:30 PM	Louis 205	10, 83
Yang	Effie	Oral Presentation	Expectations of Chinese Female Teenagers	1:00 PM	Armadillo 208	7, 83
Yang	Jeehee Naomi	Oral Presentation	Moral Testimonial Knowledge	1:00 PM	Arch 206	6, 84
Yang	Jeong Yun	PM Poster #38	Treating breast cancer using Nanotech	2:30 PM	Louis 205	9, 84
Zhang	Kevin	Oral Presentation	In vivo CNV imaging by OR-PAM	1:00 PM	Lake 203	6, 85
Zuckerman	Valerie	PM Poster #5	The Evolution of International Sanctions	2:30 PM	Louis 205	8, 41

# **50** Guide to Poster & Oral Presentations

# **80** Poster Session One

10:00-11:30, Louis Room (205)

#### Humanities & Arts

1. **Amrit J. Trewn**, "The End of Blackness as We Know It: Multiracialism's Postracial Fantasy"

#### Social Sciences & Journalism

- 2. Elizabeth Pinedo, "Working-Class College Students' Perspectives on University Recruitment"
- 3. **Bethany Polhamus**, "Decision Points: How Educated Evangelical Women Navigate Marital Choices"
- 4. **Parul Kathuria**, "Joining Biology and Social Science: Understanding Metabolic Syndrome in Context of the Nutrition Transition and Socioeconomic Status of the Tsimane"
- 5. Adriana Stanovici, "Determining the Effectiveness of the Arts-Based Approach in Addressing At-Risk Youth in Bolivia: A Case Study of Performing Life and its Impact on Bolivian Street Youth"
- 6. **Sarah Ahmed** and **Michael Morgan**, "Conservation Psychology Survey: Understanding How Natural Disasters Can Shift Public Perception on Climate Change"
- 7. **Claire Nelson**, "The Truth is All Over Your Face: Deception in the Legal Arena"
- 8. Roxana A. Obregon, "The Spatial Abilities of Middle Schoolers"
- 9. **Michael Hernández**, "Training Cognitive Reappraisal Skills in High Worriers via a Computerized Learning Paradigm"
- 10. A. Cummings Rork, "Training Procedures to Enhance Implicit Knowledge"
- 11. **Emily Gerst**, "Controlling Christianity: Analyzing the Experience of Religious Freedom in Contemporary China"
- 12. **Aria E. Fiat**, "Mind Your Mood: Is Self-Focused, Temporal and Task-Unrelated Thinking Related to the Onset of Adolescent Depression?"
- 13. Ann Hyunji Lee, "Ethnic Politics of Nation Building and State Preservation in Singapore"
- 14. **Prarthana Dalal**, "Comparative Study of Healthcare Infrastructure and Delivery between the United States and India"

#### Natural Sciences & Engineering

- 15. **Rebekah Ward**, "The Processing of Backward Sluicing"
- 16. Ethan Coffel, "Machine Learning in Tornado Detection"
- 17. **Peter Ilhardt**, "Investigation of Potential Microbialite Formations in Yucatán Peninsula, Mexico Cenotes"
- 18. Rachel Scholes, "Plastic Marine Debris in Sediments at Lagartillo Reef, Costa Rica"

# 80 Poster Session One, continued

- 19. **Nicolás Grosso Giordano**, "Palladium Catalysts for the Decarboxylation of Stearic Acid for Green Diesel Production: Reaction and Catalyst Deactivation"
- 20. Raul Chavez, "Safety of Barium-Containing Pottery Glazes"
- 21. **Tirth Patel**, "An RNAi-Based Approach to Identify Genes Inhibited during Planarian Regeneration"
- 22. Yuliya Bandurovych, "The Effect of Hair Growth on Wound Healing in BALB/c Mice"
- 23. Roelle Eugenio, "Stimulatory Effect of Aloe vera on Hair Growth"
- 24. **Shivon Manchanda, Aarohi Shah,** and **Melissa McSweeney**, "Function of Protein Kinase in Memory in Caenorhabditis elegans"
- 25. **Siddarth Datla, Kevin Go, Lamar Richards,** and **Lauren Tyndall**, "Practice Interactive Surgical Knee (PISK) Providing Medical Students a Realistic Training Tool with Real Time Feedback"
- 27. **Victoria L. Tannenbaum**, "Optimization of Pathway Improves Extracellular Heterologous Protein Yields of Saccharomyces cerevisiae"
- 28. **Kayla Viets**, "Identification of Gene Recruitment Sequences in the GAL1 Promoter of Saccharomyces cerevisiae"
- 29. **Scott Coughlin, John Le,** and **Connor Skeehan**, "Parameter Estimation of Numerical Relativity Binary Black Hole Gravitational Waves in Early aLIGO Noise"

# **So Lunch N' Learn: Oral Presentation Session One** 11:00-12:30

#### Advancements in Science and Engineering I Lake Room (203) Moderator: Rick Morimoto, Molecular Biosciences

Laura Grace Beckerman, "Evaluating the Role of Sulfur in the Geochemical Initiation of Ocean Anoxic Event 2"

Victor Chang, "Inhibiting Tumor Progression with Transcriptional Gene Silencing"

Michael Clark, "Building a Transcriptional Corepressor Complex One Subunit at a Time"

Karolina Kucybala, "Collagen XV: A Possible Tumor Suppressor in Pancreatic Cancer"

Neil Patel, "Function of Protein Kinase in Memory in Caenorhabditis elegans"

Robert Porter, "Trans-Cellular Chaperone Signaling Regulates Organismal Proteostasis"

#### Vulnerability & Empowerment in a Changing World Arch Room (206) Moderator: Jeff Rice, Weinberg Academic Advisor, History

- Molly Barstow, "Unsustainable and Insufficient: A Preliminary Analysis of Sub-Saharan Refugees' Livelihoods in Rabat, Morocco"
- **Chelsea Glenn**, "Redefining the Rational Actor in Self-Reliance Programs: Economic Opportunities in Sherkole Refugee Camp, Ethiopia"
- Nicole Amani Magabo, "Effects of Globalization among Local Social Entrepreneurs in Uganda"
- Harika Rayala, "Stuck in Transition: The Impact of a Changing Geopolitical Environment on Idioms of Distress in a Himalayan Nomadic Community"
- Rachel Vrabec, "Expecting More, Accepting Less: The Political Effects of Self Help Groups in India"

# So Lunch N' Learn: Oral Presentation Session One,

#### Piety, Politics, and Process: Interpretations in Art & Literature Rock Room (207) Moderator: Jeffrey Garrett, University Library, German

Lindsay Amer, "Portraying Social Issues in British Theatre for Young Audiences"

- **Claire Dillon**, "Untitled and Undefined: The Limitations of Biographical Analysis in the Work of Félix González-Torres"
- Alina Dunbar, "The Politics of Nonsense: Subversion in the Children's Books by Argentine Writer María Elena Walsh"

Maria Kovalchuk, "Reconciling Religion in Sophocles' Antigone"

Ezra Olson, "Reading Wallace's Infinite Jest, Or: Reading, Wallace, and Infinite Jest"

#### **Emerging Adulthood: Choices in Context**

Armadillo Room (208) Moderator: Linda Garton, Henry and Leigh Bienen School of Music

Danielle R. Alcorn, "Consequences of Overhearing Objectifying Body Comments"

Janice Li North, "At the Intersection of Performing Arts and Liberal Arts Education: A New Program Design Framework and Student Initiatives Proposal"

Tori Romba, "The Roaring 20s and Sturdy 30s? How Millennials Traverse the Path from 25 to 35"

Niabi Schmaltz, "The 2012 Québec Student Movement: Understanding Activist Patterns"

Mike Sladek, ""Bulking Up": Constructing and Validating a Measure of Male Body Talk"

# **& Lunch N' Learn Oral Presentation Session Two** 1:00-2:30

#### Advancements in Science and Engineering II Lake Room (203) Moderator: Tamar Seideman, Chemistry

Nicholas Boffi, "High Harmonic Generation from Asymmetric Top Molecules"

- Mirasbek K. Kuterbekov, "Carbon-Based Nanoparticle Reinforced Hydrogels for Tissue Engineering"
- Jennifer Mills, "Sulfur Cycle Dynamics during the Early Aptian OAE1a: Implications for the Mechanisms Driving Cretaceous Ocean Anoxic Events (OAEs)"
- Melanie Nehrkorn, "Dynamics and Patterns for Competing Populations with Nonlocal Interactions"
- Maria Wang, "Sex in the Prairie: Is Pollen Limiting Reproduction in a Wind-Pollinated Prairie Grass?"
- Kevin Zhang, "In vivo Corneal Neovascularization Imaging by Optical Resolution Photoacoustic Microscopy"

### Engagement & Information in an Age of Globalization

Arch Room (206)

Moderator: Gail Berger, School of Education and Social Policy

- Alyssa Lloyd, "Examining the Political and Economic Effects of a Carbon Tax on Australian Small Businesses"
- Mauricio Maluff Masi, "World White Web"
- Kevin Short, "Digital Citizen: A Global Investigation of How Information and Communications Technology (ICT) Fosters Civic Engagement and Government Accountability"
- Alex J. Straley, "Engaging the Competitive Advantage: Perceived Interpersonal and Inter-Organizational Competition and its Effects on Employee Engagement"

Effie Yang, "The Cultural Expectations of Chinese Female Teenagers"

# So Lunch N' Learn Oral Presentation Session Two,

#### Our Political World: Discourse and Practice Rock Room (207) Moderator: Sanford C. Goldberg, Philosophy

Tim Garrett, "Alexandrian Political Graffiti: New Insights into Egypt's Ongoing Revolution"

Alexander Gunn, "The Cold War Continues: The Political Arithmetic of Cuba's Infant Mortality Rate"

Dhrumil Mehta, "Political Framing: A Machine Learning Approach to Rhetorical Analysis"

Joel Rabinowitz, "Israeli Unity Governments and Their Impact on the U.S. - Israel Relationship"

Rachel Schwartz, "Agreeing to Disagree: A Defense"

Navigating Narratives through Language & Space Armadillo Room (208) Moderator: Eugene Lowe, President's Office, Religious Studies

Tracey Haneman, "Language Symbolism in the Contemporary Turkish National Identity"

- Jasmine Jennings, "The Problem in Room 24: Racial Constructions and National Identity in the Argentine National Museum of Fine Arts"
- Eric Johnson, "A Moated Order: Space, Movement, and the Production of Authority in the Medieval Landscape"
- **Catherine Merlo**, "Changing the American Dream: Los Angeles Residential Architecture 1938-1948"

Gregory Uzelac, "Socio-Linguistic Homogenization and the Position of Standard Hindi in the Overseas Indian Diaspora"

Jeehee Naomi Yang, "Why We Can and Should Use Moral Testimonial Knowledge"

# **80** Poster Session Two

2:30-4:00, Louis Room (205)

#### Humanities & Arts

- 1. **Kathryn Cannady**, "Difference and Sameness: Beaton, Penn, and Artificiality in the Vogue Cage, 1928-1964"
- 2. **Taylor Layton**, "Deleuze and Guattari's Successes and Failures in Understanding Modern Electronic Music"

#### Social Sciences & Journalism

- 3. **Meghan Kerwin**, "A Comparative Study on Trust towards Native and Foreign Strangers in Denmark and the United States"
- 4. **Mark McLoughlin**, "The Church vs. the Media: Towards a Humanization of Gay Rights in the Republic of Ireland"
- 5. **Sam Houskeeper** and **Valerie Zuckerman**, "The Evolution of International Sanctions: The Ascent of Multilateralism"
- 6. **Serena Walker**, "The Possibility and Peril of the Post-Racial: A Comparative Analysis of Race Consciousness in the Dominican Republic, France and the United States"
- 7. **Laura Venn**, "Promoting Diversity: Mitigating the Perceived Threat of the Shifting Racial Demographic for White Americans"
- 8. Morgan R. Purrier, "What (and Who, When, Where, and How) is Coming Out?"
- 9. **Richard Wozniak**, "Welcome to the Club: Social Media, Social Status and Social Stratification"
- 10. **Sherilyn DeStefano**, "Understanding Connections between Service Work and Empathy among Premedical Students"
- 11. Christina Alexander, "Liberalism Against Itself"
- 12. **Meghan White**, "A New "Multicultural Nationalism:" How One Muslim Women's Organization in Britain Negotiates Neoliberal Ideas of Self and Citizenship through an Islamic Lens"
- Daniel Tully, "With Intent to Defend: How State Leaders Justify Their Use of State Violence against Non-State Actors, 1965-Present"
- 14. **Tim White**, "Occupy, Violence, and Individual Decision-Making"
- 15. **Jacqueline Montgomery**, "Evaluating the Numbers of Refugees from Mali during the 2012-2013 Crisis"
- 16. Kyeonggook Park, "Investigation of Factors that Influence Sunk Cost Bias"
- Katie Singh, "Politics, Poverty, and Pedagogy: An Examination of College Teaching about Poverty"
- Chase Stephen Eck and Stephen Modica Rees, "Claims of Racism at Northwestern University: 1963 to 2012"

# 80 Poster Session Two, continued

19.	Mallory Mattimore-Malan, "Narrative, Professional Identity, and Education Reform: A Qualitative Analysis of Public School Teacher's Narrative Experience of the Chicago Teacher's Union Strike"
20.	Rose Sloan, "Labeled as Disabled? The Effects of No Child Left Behind on Students with Disabilities Rates in Florida Middle Schools from 2000-2005"
22.	Laurie Russell, "Individual Differences in Reward Sensitivity and Affective Processing as Indexed by Event Related Brain Potentials (ERP)"
23.	Peter Krivicich, "Truth is the First Casualty: Media Manipulation and the Chechen Wars"
24.	Levi L. Mele, "The Mormon Effect: Exploring Religion, Family, and Class Influences on Human Capital in an Energy Industry Dependent Community"
25.	Leah North, "Moonlit Cruises with Co-Eds: Men, Women, and the Masculinity of the Victorian Middle Class at the Northwestern Lifesaving Station"
26.	James Lee, "Preterm Delivery as a Predictor of Diurnal Cortisol Profile in Adulthood: How All Men Are Not Created Equal and Its Implications for Our Biology and Health"
27.	John Castellanos, "Finding Meaning in Fantasy: Reasons for Encouraging Fantasy Beliefs in Children"
28.	Kayla Grayson, "Looking at You Looking at Women: The Association between Body Dissatisfaction and Visual Attention Patterns"
29.	Samuel Jahangir, "Are There Benefits of Social Exclusion? The Effects of Social Exclusion on Emotional Regulation"
30.	Katie Sanford, "Functional Assessment of the Cuneus and Empathy in Schizophrenia"
31.	William Weber, "Enhancing Memory through Auditory Cueing during Slow-Wave Sleep"
32.	<b>Kyle Frost</b> , "Sibling Influence on Social Cognition and Pragmatic Language Use in Children with Autism Spectrum Disorder"
33.	<b>Lisa Velkoff</b> , "The Effect of Trait Rumination and a Negative-Evaluative Trier Social Stress Test on Several Types of Affect"
34.	Paula Bernhard, "An Internet Community Survey of Men Sexually Attracted to Children"
Natı	aral Sciences & Engineering

- 35. **Gia Hallaman**, "Linking Prairie Ant Communities and Fire: The Effect of Fire on Ant Diversity in Prairie Remnants of Western Minnesota"
- 36. **Allegra Mayer**, "Geochemical Evidence for Changes in Local Redox Conditions in the Western Interior Seaway during Ocean Anoxic Event 2"
- 37. Nick Merrill, "Map-Like Spaces Yield Better Memorization than Lists"
- 38. Jeong Yun Yang, "Toward Treatment of Breast Cancer Using Graphene and Carbon Nanoparticles as Targeted Drug Delivery and Microwave-Induced Hyperthermia Agents"

# 80 Poster Session Two, continued

- Ziyang Xu, "Designing Irreversible Covalent Inhibitors for E3 Ubiquitin Ligase NEDD4-1"
- 40. **Hannah Lu**, "Trends, Outcomes, and Characteristics of Pediatric Oncology Phase I and II Studies"
- 41. Louis Shekhtman, "Changing of Complex Network Backbones under Duress"
- 42. Charles Qin, "IKAP Function in Familial Dysautonomia"
- 43. **Deanna Wong**, "The Role of Snail Family Zinc Fingers in the Neural Crest"
- 44. **Jingran Ji**, "MiR-9a Confers Robustness against Both Thermal Fluctuation and Genetic Diversity"
- 45. **Ryan Lam**, "Construction of Thromboprotective Vascular Grafts Using Tissue Decellularization"
- 46. **Joel A. Finbloom**, "pH-Sensitive Self-Assembling Peptide Amphiphiles for the Targeted Treatment of Cancer"
- 47. **Matthew Serafin**, "A Green, Guided-Inquiry, Collaborative Puzzle for the Undergraduate Teaching Lab"
- 48. **Viktorie Reichova**, "Co-Coum343Im: Cobalt Complexes as Self-Reporting pH Responsive Prodrugs"
- 49. **Alex Ayerdi**, "Investigating Runtime Optimization on the PTMCMC Gravitational Wave Algorithm Using GPU Acceleration with CUDA"

# Doing Research at the Library: A Panel and Discussion

3:30-5:00, Big Ten Room (104)

Student Panelists:

Chelsea Glenn (WCAS '13), Economics & International Studies Emily Davidson (WCAS '13), American Studies with a Minor in Classics and Anthropology Britt Banaszynski (SoC '12), Theatre

Librarian Subject Specialist Panelists:

 Charlotte Cubbage, Subject Specialist for English and Comparative Literatures, Dance, Journalism, Performance Studies, Radio/Television/Film, Theatre
 David Easterbrook, Curator, Melville J. Herskovits Library of African Studies
 Kevin Leonard, University Archivist

The Northwestern Undergraduate Research & Arts Exposition provides students with a unique opportunity to present their final, polished research projects to an audience of peers and faculty. But what does the research *process* involve? *Doing Research at the Library: A Panel and Discussion* will enrich the Exposition by demonstrating how students can get involved in research by utilizing the vast array of resources located in the University Library.

A panel of undergraduate researchers will speak at the event, and will include students who have carried out independent research projects as well as students whose work has been published in the *Northwestern Undergraduate Research Journal*. Following the presentations, Subject Specialists from the library staff will have the opportunity to comment on students' projects, and provide real examples of assisting in the research process.

The panel discussion is designed to be an event of interest to the entire Northwestern community. In addition to highlighting student research, learn about their processes, and how the Northwestern University Library can support undergraduate research.

# **50** Guide to Creative Arts Festival

### **57** Creative Arts Festival 6:30-8:30, McCormick Auditorium

#### ନ୍ଧର୍ୟ

#### Maris Maeve O'Tierney (maris maeve) and Bryce Quinn O'Tierney (bryce quinn)

#### Faculty: Nancy Gustafson

#### maeve & quinn: fusion/fission

A musical fusion of classical technique and folk/pop songwriting

maeve & quinn is a musical collaboration between identical twin sisters Maris Maeve O'Tierney (piano, guitar, vocals) and Bryce Quinn O'Tierney (violin, vocal harmonies). Born and raised in Anchorage, Alaska, Maris and Bryce are currently both dual degree students at Northwestern: Maris is pursuing degrees in vocal performance and art history & political science, Bryce in violin performance and creative writing. Both Maris and Bryce have a strong background and training as classical musicians, continuing their classical studies at Northwestern. However, their classical technique also serves as a stepping-stone to other genres: they use their classical skill-set as a basis for innovation and improvisation, composing original music of folk/pop style. Maris recently released her third CD of original music, titled "inflection point," in September 2012. She and Bryce collaborate and improvise on her song-writing in performance on campus and in the greater Chicago area; they also compose together.

#### Victoria J. Huang

#### The construction of unlivable castles

Emerging from the oral traditions of the Harlem Renaissance, beatniks, and ancient Greeks, spoken word has long been a site for creativity and narrative. As performance poetry, it harnesses wordplay and the musical influence of language as an expressive, accessible art form. This piece addresses Foucault's concept of truth produced daily by each of us, JudithButler's critique of binaries, and bell hooks' concern for education, challenging us to reflect on one of the first and most ubiquitous chains of "truth" we encounter: gender expression, and in doing so, restore our sense of agency.

#### Nadia Hlebowitsh

#### Faculty: Sheila Donohue

#### Exposure

In magical realism, the relationship between fact and fantasy is mediated by unique understandings of history and mythology. In my senior thesis, "Exposure," I explored these borders from the perspective of an American girl who immigrates to the Peruvian Amazon during World War II. She is brought there by her entrepreneurial father, who seeks his fortune in "white gold," i.e. rubber. Because I was interested in official and unofficial viewpoints, I studied both the rubber history and Amazonian mythology of the region. From my research at the National Archives, I discovered 1940s photographs of an American rubber company based in the Amazon, which inspired me to use a camera as a narrative lens. Taking pictures became a useful "tourist" tool for my protagonist to explore the foreign city, while also speaking to the technological frontier between the real and the magical. In addition, I decided to undertake field research in Iquitos, Peru, the heart of the Peruvian Amazon, in order to see how mythology interacted in everyday life. Through an Academic Grant from Northwestern, I was able to interview academics and locals about myths such as the Ayaymama bird, María and the dolphin, Yakumama, and the rubber baron version of Faust. The final manuscript uses this research in order to draw out the protagonist's own familial story and further the thematic interplay between official and unofficial perspectives.

#### Sophia Rafiqi

#### You're Invited: Storytelling and Creating Worlds

#### Performed by: Sophia Rafiqi, Sarah Morimoto, Amanda Summey

This piece of dance choreography is the final iteration of my choreographic study at Northwestern University. It was created with dancers Amanda Summey, Marisa Shimano, and Sarah Morimoto, who collaborated in character development in exploration. The movement was devised by me, as a lens through which the characters and the world they live in are best understood. I explore here a world created by these characters, which the audience comes to know through movement. This can mean body language, gesture, facial expression, intensity of movement, size of movement, where attention is paid during movement, or anything else specific to the body and its position in space. I believe the body is a primary source of characterization in creative work and want to explore how powerful of a communicator it can be through my choreographic work in the future. The use of body in characterization has implications for all fields of storytelling, and exploring its power and nuance further is in the best interest of any artist. Crucial to this process is feedback of all kinds from audience members, and I ask you to speak with me and the dancers about any and all thoughts, feelings, or ideas you may have.

#### Nicholas Merrill

Faculty: Irina Shklovski, IT University of Copenhagen

#### Lykkemat: Artificially Intelligent Meditation Trainer

This project uses a \$99 EEG headset to determine how consistent the user's brainwaves are with neural states associated with mindfulness meditation. It creates a biofeedback system using algorithmically generated music and visual stimuli to create an experience that is equally aesthetic (performative) and therapeutic. The performance consists of a user (preferably a volunteer) wearing the brain scanner while the audience watches and listens to Lykkemat's audiovisual output.

#### **Emily Slemaker**

#### **INK SPILL**

INK SPILL is an abstract short film that depicts colored ink dropped into a tank of water. In postproduction, the colors were inverted to create the ethereal look. The droning soundtrack is the song "Ambient" by See Land, who is NU alum Doug Kaplan. For INK SPILL, I want to highlight the sense of fluidity and texture that ink creates when suspended in a different medium. The mixture of colors and patterns created by the drops are reminiscent of marble, except that it is constantly evolving and dynamic. I wanted to create an abstract piece without any solid subject, and focused solely on the aesthetic properties of the ink. This piece is meant to evoke a very calming and zen state. I was inspired by 20th century abstract art, especially the color field paintings of Clyfford Still, and Hubble Space Telescope photos of nebulas and supernova remnants.

#### Parker Murphy

#### Faculty: Molly Shanahan

#### Performed by: Parker Murphy, Alex Frankenthal

#### Not Otherwise Specified

As a dedicated Dance and Psychology double major, I have become curious as to how to bridge the gap between these two areas of study. Through research funded by the Undergraduate Research Grant, I gained a deeper understanding of how the psychological state informs the work of a dancer and choreographer. The concept for "Not Otherwise Specified" began in the spring of 2012 during the height of my psychopathological studies. What started as just a desire to create a little dance, turned into an entire summer of research and development. After spending my summer immersed with Oberlin Dance Collective (ODC) of San Francisco, I found myself making connections and seeking similarities between both disciplines. Through explorations of my own creative voice and movement development, as well as interviewing professional dancers and choreographers, and my own continued psychological research, I developed ample source material and a solid foundation for the creation of this project. I came back to Northwestern with clarity of what I wanted to create and how I would do it. "Not Otherwise Specified" is the product of that growth, and culminates my research to create an art piece that takes a peek into the delicate balance of the mind. "Not Otherwise Specified" premiered in Fall Dance Concert 2012: To Be Continued, with original sound and costume design by Parker Murphy. This piece was made possible by the generous support of the Undergraduate Research Grant Program, which is administered by Northwestern University's Office of the Provost.

#### Ashley Mills

#### Faculty: Debra Tolchinsky

#### **Inside the Intersection**

Northwestern InterVarsity serves as the umbrella organization for the six Christian ministries on campus, divided along lines of ethnicity, personal interest, and more. In particular, the three ethnic-specific ministries—Asian American InterVarsity, LaFe (Latino Fellowship), and House on the Rock (African-American Fellowship)—caused me to question the need to emphasize ethnicity when speaking to God and faith, a common mission for all six groups. How does such an earthly reality play into the ethereal and spiritual? In this short documentary, I explore the intersection of God and ethnicity, and the ways in which students on campus grapple with this question. Through interviews with student InterVarsity leaders, Northwestern professors, and general InterVarsity members, Inside the Intersection unveils a range of knowledge on the subject, from complete disdain for these ministries to unconditional love. Inside the Intersection does its best to prove the need for these divisions while emphasizing the need to come together at the same time.

#### Jacob Clinton

#### Faculty: Ozge Samanci

#### **Ronnie Baitt**

I completed the bulk of this interactive narrative project in the winter of 2012, during Professor Ozge Samanci's RTVF course, "Interactive Comics." Working with Flash Animation, the class crafted comics narratives featuring animation, audio, and user participation elements. Through weekly workshop sessions, I progressively crafted Ronnie's search for his mislaid "FeralCard" student ID and for the dignity he hopes accompanies it. Project background: Enjoying "Choose Your Own Adventure" books as a child, I aimed to give my users a similar ability to navigate my narrative through key decision points. Northwestern jumped out at me for a setting, because it provided a recognizable atmosphere and symbols that I could readily manipulate. I magnified NU's existent blend of picturesque scenery combined with a hint of urban unrest, in my surreal, unhinged depiction of campus.

#### Kathryn Halpern

#### Faculty: Mark Sheldon

#### Prostitution Poetry: Seduce Me with Your Words

I looked at philosophical texts to explore the place sex work can have in our society, I need to understand whether or not our contemporary views of sex and sex work really stem from the basic concepts we have about virtuosity and living a good life-- views founded in philosophy. I found that the philosophical texts upon which Western thought is centered acknowledge the importance and continual existence of bodily needs and pleasures, which would mean that sex-- a bodily pleasure-- is not completely opposite from living a good, virtuous life. In my poetry, I explore many different sex working experiences: from the streetwalker who is brutally murdered by her pimp, to the woman who takes pride in her ability to bring joy and company to lonely men, and also to bring to light the long history issues of our rights to our bodies (especially compared to the unlimited freedom we have to our minds, our thoughts, and our ability to share those thoughts) has and the ways it appears in influential philosophical texts and the contemporary reactions to those texts. In the following work you will see the complexities engrained in the issue of sex work and can begin to think about a topic-- one that many laugh off-- as an intrinsic a part of our world from a variety of perspectives shaped by a multitude of ideas and as a subject that speaks directly to the most basic rights we-- as women or as people-- do or should have.

#### Mariam Gomaa

#### **High Heaven**

The story begins with the narrator ruminating on the idea that God takes pity on those with terminal illnesses and grants them heaven without question. It then moves into the narrator's description of her parents' love for her. She explains that she and her sister have been competing with each other for their parents' attention. The narrator is the "pretty sister" and was the object of admiration as a young child. However, her sister realizes at a young age (8-ish) that eating to the point of vomiting allowed her to gain some of that attention. This behavior leads her to become obese, and continues into her last year of high school. The narrator is clearly bit ter and disgusted by the way her sister Pia uses pity to gain attention. As the story progresses, Pia begins losing weight dramatically. The

narrator believes it is bulimia, but eventually learns that Pia has developed Crohn's disease, which destroys her digestive system. She is no longer allowed to eat whatever she likes, and should be taking medication. The narrator discovers that Pia refuses to take her medication and eats "forbidden foods" at night when no one can see her. This causes her to have f lares and be taken to the hospital, which the narrator perceives as another attempt to gain attention through pity. We learn that Pia abuses her illness to lose weight and to go to prom with the narrator's date. The narrator reaches her limit and begins making sure that Pia eats more and more of the "forbidden foods," so that she is permanently admit ted to the hospital. The story ends with the narrator expressing joy.

#### Sasha Bayan

#### Selections from the album Do I Know You?

Do I Know You? is an album of pop-rock music with a 60s and 70s aesthetic written from a classical composer's approach, imbued with jazz harmonies, and influences by the sounds of Spain, Brazil, and India. The project involves over 35 different instruments and 28 players from the NU School of Music playing on 9 original tracks that I've fully scored and orchestrated. The concept of the album is an exploration of the various permutations of love, from infatuation, to tender affection, to the love of fame and power. The lyrics I've written and set to each of the nine songs - in conjunction with recurring musical motives - collectively tie thematic material together into a comprehensive whole. I've launched a Kickstarter campaign to fund the project. Kickstarter is a web based funding organization that hosts people's ideas and gives them a platform to showcase their product and ask for resources. Kickstarter has completely changed the way Arts and Culture are funded in the US. Last year they provided more funding than the National Endowment for the Arts. Backers can get rewards for their contributions, such as copies of the album, guitar lessons, or songs written for Your support in anv form amount would be greatly appreciated. them. or http://www.kickstarter.com/projects/1082481283/do-i-know-you-sasha-bayans-debut-album

### **So Visual Arts** Daytime, Louis Room (205) Evening, Wildcat Room (101)

#### **COLLIDEscope** by Briana Nicholson-Klingerman

#### Faculty: Jonathan Marshall

During my Introduction to Photography class, I experimented with test strips I'd made when printing a photo and used them to construct a different photo. This turned out to be successful and very interesting. I also discovered an artist named Adam Pendleton who did something vaguely similar to his art piece, Larry Hinton (white). He did not take the photo but did rearrange it in different pieces. In my final project, I took the idea much further and explored the concept of taking pictures apart and putting them back together to make a new picture. I also wanted to express ideas that were important to me such as my identity, race, self-image, and a tribute to Malcolm X and Rev. Dr. Martin Luther King. By taking specific photos, ripping them apart, arranging them differently and combining more than one photo, I was able to produce compelling pictures that also pushed the limits of photography. Six photos are included in this project, all of them 8 x 10, and are mounted on black cardboard. They are all black and white photos taken with a Nikon FM10 SLR. I developed the film myself and printed all photos as well.

Individual titles of photos: Chicago Nightlife, Jacob and Esau, Mixed-up, Mulatto, Self, Starved

#### The World at My Fingertips by Gabrielle Parsons

#### Faculty: Barbara Gillespie, Retired Urbana, IL School Teacher

At the time that I completed this piece it was the summer before my freshman year of college. I was feeling very confident in who I was as a person, and optimistic that my future was going to be tremendous. This piece speaks volumes for the wealth of opportunity life offers individuals, and for the possibilities of paths one can take in life when they realize how much in this world can be dictated by individual choices. I am no artist by definition, but I pride myself on utilizing resources I have when I feel inspired to complete a piece of work. The World at My Fingertips is a simple hand-done sketch done on drawing paper, covered in acrylic paint. I sat down at my kitchen table one day and completed the whole piece in a matter of hours. When have an epiphany about what I want to complete, I usually do it in one sitting. I relied upon looking at my own hand for the hand in the piece. What I have learned most from my piece is that there is not one direction or set of paths that individuals take in life, and the fact that The World at My Fingertips is abstract solidifies that life itself is an abstract concept that individuals define for themselves through experience and choice. I believe that my piece can provide visual support for those who feel lost or unsure in their life; that from every direction opportunity and new experiences await.

# **So** Visual Arts, continued

#### Wabi-Sabi by Andrew Paulson

#### Faculty: Kelly Kaczynski

At the turn of the 20th century Mise van der Rhoe and Frank Lloyd Wright visited Japan only to find that the Japanese invented modernist architecture 400 years earlier. In a similar manner I discovered that the Japanese had anticipated my critique of minimalism by almost 600 years. Wabi-Sabi is an aesthetic based in the imperfect, impermanent and incomplete. Like my work it concerns itself with beauty in imperfection and the sincerity that is found in handcrafted objects. This show presents minimalist art unrestrained by a requirement of perfection, instead embracing the simple dignity of devoted labor. The perfect cube, an unattainable vision, has captivated artists for decades. The minimalists declared the cube an object beyond both sculpture and painting, a starting point for a new art free from the constraints of history. Working from this starting point, I investigate the possibility of explicitly connecting the legacy of minimalism to traditional forms of painting and sculpture. My process based paintings seek to complicate the relation between object and canvas while reintroducing painterly concerns to minimalism. My sculptures replicate minimalist forms while questioning the necessity for perfection and importance of fabrication. All the work shares a deep concern for both material and artistic labor. Process leaves imperfections. To remove the human mark is to remove the art.
# **So** Poster & Oral Presentation Abstracts

alphabetical by presenter's last name

#### ନ୍ଧର୍ୟ

#### Sarah Ahmed and Michael Morgan

Faculty: H. David Smith

# Conservation Psychology Survey: Understanding How Natural Disasters Can Shift Public Perception on Climate Change

The purpose of this study is to investigate to what extent, if any, natural disasters (and personal experience with a natural disaster) shifts public perception of Climate Change, Environmental Activism, Public Support of Green Legislation, etc. Our hypothesis indicates individuals from areas hit hardest by Superstorm Sandy (predominately zip codes located closest to the Atlantic Ocean) will show a higher tendency to believe in Climate Change and support environmental activism, when compared to zip codes that show lower amounts of total property damage (zip codes that were more landlocked or located along the North Shore of Long Island). The rationale for this theory stems from an understanding of the availability heuristic and factors that induce paradigm shifts. The former argues that personal experiences affect an individual's decision making process. The latter describes the conditions that can cause individuals to think differently about personal beliefs and judgments. The methodology for validating or invalidating our hypothesis will be to conduct a survey which includes questions that will gauge an individual's a.) belief in climate change, b.) perceived occurrences of climate change, c.) perceived causation of climate change, d.) perceived consequences involving of global warming, e.) support of greener legislation, f.) intent to act. Ultimately, our goal is to understand how natural disasters affects the public's perception of Climate Change. We believe this research would be valuable for environmental scientists trying to understand what factors can cause average citizen to believe in climate change, behave in an environmentally friendly way, or support environmentally friendly legislation.

#### ନ୍ଧର

# Danielle R. Alcorn

### Faculty: Renee Engeln

# **Consequences of Overhearing Objectifying Body Comments**

Every day women are treated as objects in the media, in advertisements, and when walking down the street. Men have been conceptualized as the primary objectifiers of women, however recent research indicates both men and women process images of women (but not men) like objects. The current studies examined the effect of overhearing objectified conversations on women's body dissatisfaction. We also examined whether hearing objectifying comments increased the likelihood participants would use similar appearance-conscious language when describing a model. In Study 1, women watched videos of men or women discussing fashion advertisements. In the control conditions the actors commented only on the models' clothing. In the objectifying conditions the actors made extensive comments about the models' bodies. Results suggested those who heard women reported more body dissatisfaction than those who heard men, regardless of conversation type. Study 2 added additional measures of self-objectification, objectification of others, and perspective taking. However, differences in body dissatisfaction trended in the opposite direction,

with participants who heard men reporting slightly greater body dissatisfaction. In both studies, participants who heard objectifying conversations (from men or women) were more likely to use appearance-conscious language when describing another model. While the consequences of overhearing objectified conversations remain unclear, these results suggest an objectifying style of discourse is contagious, which could result in negative outcomes for women.

# ഗ്രരു

## **Christina Alexander**

Faculty: Michael Loriaux and Lars Tonder

# Liberalism Against Itself

In the contemporary context of globalization and European integration, the virtues increasingly most valued in European countries-virtues core to the identity of liberal democratic nations-are those of tolerance, cultural diversity, and equality under the law. Yet, paradoxically, radical right European parties have been increasingly appropriating liberal values into their rhetoric, distancing themselves from their exclusivist values of the past. What is it about liberalism that has enabled its co-optation by the illiberal, radical right? To address how these exclusivist parties have managed to reframe their rhetoric in terms of liberal values (i.e. the language of tolerance), this thesis analyzes three radical right European parties: the Dutch List Pim Fortuyn, the Dutch Party for Freedom, and the French National Front. Through rhetorical analysis of party programs and speeches, party leader interviews, and field research in the Netherlands and France, this thesis exposes the inherent contradictions within liberalism: namely, the boundaries of toleration and the liberal-illiberal distinction. It argues that toleration has come to be considered today as the cause of significant social problems; conversely, a new principled liberal intolerance is seen, paradoxically, as necessary to protect the rights, values and identity of the majority. Because the liberal discourse employed by the radical right is grounded in assimilation, to fight this requires arguing for a liberal democratic politics that is not assimilationist but that instead accepts and even values difference and alterity. This thesis seeks to contribute to a heightened awareness of the fragilities within liberal democratic discoursefragilities that are meaningful in American politics, where the intolerant have similarly co-opted the language of tolerance.

#### ନ୍ଧର୍ୟ

### Lindsay Amer

### Faculty: Rives Collins

#### Portraying Social Issues in British Theatre for Young Audiences

How do theatrical performances tackle relevant controversial social issues – heavy hitters like poverty, LGBT issues, racism, and violence, to name a few? How do theatrical performances and programming targeting young audiences present these topics? This study explores the ways in which the most progressive children's theatres in London approach staging these issues. The cultural history behind British theatre is so incredibly rich and diverse with the likes of Shakespeare in its midst, that even children's theatre, a relatively new theatrical form, has a full history and tradition. Prominent children's theatres, administrators, and artists constantly struggle, balancing these important topics with appropriate presentation. These artists are successful because British theatre sees theatre as theatre. Instead of attempting to directly mirror life, they concentrate on the audience-performer relationship, engaging audiences in performance rather than presenting performance. The audience becomes an actively recognized body within the production, which automatically assume an intelligent, engaged, and informed audience, which must be challenged. Theatrical experience transforms into community experience. In theatre for young audiences, this approach connects children intimately with characters and stories, including them in outcomes, making characters' issues their issues, and instilling a deeper sense of empathy and relation to issues that at first glance might not seem accessible to children.

#### ഗ്രര

# Alex Ayerdi

# Faculty: Vicky Kalogera

# Investigating Runtime Optimization on the PTMCMC Gravitational Wave Algorithm Using GPU Acceleration with CUDA

The research goal was to optimize the running time of a parameter estimation (PE) used to estimate the masses and other parameters of colliding black holes from their gravitational waves. The challenge was that the algorithm's running time on an average CPU processor (Intel i7) would bottleneck in the loop over trig-functions *sin* and *cos*. Before optimizing, running 1,000,000 iterations with a 16384 sample rate the average runtime on the CPU was **3hrs 32min 11sec**. When the loop was converted to a CUDA algorithm (with same parameter conditions as above) for use by a GPU, the average runtime was **2hrs 4min 11sec**. CUDA allows for the removal of the loop altogether and turns it into a one line kernel execution. This kernel execution sends a piece of code to the GPU to be processed and returned. In essence, instead of running a line of code serially with the CPU, the GPU sends the same line of code to multiple *threads* on its multiprocessors and computes them in parallel. This increase in productivity averages at about 22%. Overall, using CUDA with any current GPU can easily optimize the PE algorithm because it utilizes efficient multithreading/parallelism to decrease overall processing runtime and requires minimal changes to the source code.

### ഗ്രരു

### Yuliya Bandurovych

Faculty: Luisa A. DiPietro, University of Illinois at Chicago

# The Effect of Hair Growth on Wound Healing in BALB/c Mice

Progenitor cells/stem cells residing in hair follicles (HFs) are known to contribute to wound healing. The hypothesis of this research is that mice wounded in the anagen phase of the hair cycle, a time point having more stem cells than other hair cycle phases, would show the fastest wound closure. To test whether the phases of the hair cycle affect wound healing four 6 mm full thickness excisional wounds were made on the dorsal skin of 30 female BALB/c mice, ages 30-65 days postnatal and

representing all phases of the hair cycle. To verify the hair cycle phase, normal skin samples were also obtained and then embedded, sectioned, and stained with H & E (hematoxylin and eosin). Wounds were left to heal for 14 days and the progress of wound closure recorded by photography at days 1, 2, 3, 5, 7, 10, 12, 14. The 45-day-old mice had the fastest healing wounds. The slowest healing wounds were those of the 30-day-old mice. The difference between these two groups was significant (p<0.001). The age of the mice and their corresponding hair follicle phase may influence healing rates. This effect should be taken into consideration when conducting wound healing experiments to eliminate any effect of the hair follicle phase from the effect of the treatment. The hair follicle cycle is just one of many factors that affect wound healing outcomes. Some other possible factors could be age and skin elasticity/composition.

#### ନ୍ଧର୍ୟ

# Molly Barstow

# Faculty: Wendy Pearlman

# Unsustainable and Insufficient: A Preliminary Analysis of Sub-Saharan Refugees' Livelihoods in Rabat, Morocco

Given that urban refugees have no legal right to work, how do they establish livelihoods? What assets and conditions affect whether these livelihoods are sustainable? Previous literature has sought to answer both of these questions through an anthropological lens. Most of the research, predominantly based in Cairo, Nairobi, and Kampala, finds that refugees are largely successful in establishing sustainable livelihoods through work in the informal economy. This thesis, drawing on interviews with sub-Saharan refugees in Rabat, Morocco, argues that these refugees have been largely unsuccessful in establishing sustainable livelihoods. Although some have become selfsufficient through work in the informal market, most of the sample is struggling. This thesis determines that one of the largest barriers to refugees' establishing sustainable livelihoods is their lack of residency permits. Although other factors are determined to help or hinder refugees' establishment of livelihoods as well, the residency permit is the factor that refugees perceive as the most critical to their livelihoods. Conclusions drawn in this thesis are preliminary. Due to a small sample size, no definitive conclusions can reasonably be drawn. However, the data do suggest that urban, sub-Saharan refugees in Morocco may be struggling more than refugees in other African cities. More research is needed to determine the generalizability of the conclusions of this thesis.

### ନ୍ଧର୍ୟ

### Laura Grace Beckerman

# Faculty: Matthew Hurtgen

# Evaluating the Role of Sulfur in the Geochemical Initiation of Ocean Anoxic Event 2

Ocean anoxic events (OAEs) are intervals of widespread organic carbon burial attributed to increased primary productivity and/or increased preservation under low levels of dissolved oxygen. Ocean Anoxic Event 2 (OAE2) began approximately 94.5 million years ago and lasted about one million years. Significant shifts in the carbon isotope composition of both inorganic and organic

carbon occurred during OAE2, but the exact mechanism by which the carbon cycle was disrupted remains unclear. We hypothesize that volcanic out-gassing of sulfur increased marine sulfate levels, affecting the carbon cycle through a sulfate-phosphate feedback loop. Under anoxic conditions, some microbes use sulfate to consume organic matter deep in the water column and/or sediment. This process, termed microbial sulfate reduction, reduces sulfate to hydrogen sulfide, which reacts with iron to form pyrite. Pyrite formation removes iron oxides from the ocean, enabling phosphate, a vital nutrient for photosynthesis otherwise removed by sorbtion to iron oxides, to drive primary productivity resulting in widespread anoxia. To test this hypothesis, carbonate associated sulfate (CAS) and pyrite were extracted from sediments spanning OAE2 in France. During the carbon isotope excursion associated with OAE2, CAS is enriched in the heavy isotope of sulfur and pyrite is depleted in the heavy isotope, both of which suggest increased pyrite burial. These data imply that increased marine sulfate levels affected the carbon cycle through the proposed sulfate-phosphate feedback. Furthermore, these results agree with sulfur isotope data from the Western Interior Seaway, suggesting that the oceans were well mixed with respect to sulfate during OAE2.

# ନ୍ଧର

# Paula Bernhard

# Faculty: J. Michael Bailey

# An Internet Community Survey of Men Sexually Attracted to Children

Few previous studies on men sexually attracted to children have focused on phenomena aside from childhood sexual abuse. Particularly little research has given attention to men attracted to children who do not act on their sexual feelings. The purpose of this study is to address a broad range of questions about men sexually attracted to children in order to provide a more in-depth understanding of their sexual preferences and lives. We surveyed 114 males sexually attracted to children ages 14 and younger about their sexuality and relationships, attitudes about pedophilia and child-adult sexual contact, and sexual criminal offending. Men who took the survey were much more attracted to children than to adults on average and realized their sexual feelings toward children around puberty. Participants generally had low levels of ego-dystonia, but most found child-adult sexual contact to be immoral and harmful. Only a minority of participants (19) had a record of criminal sexual offending, and those who did and did not have a record differed on several variables of interest.

### ഗ്രരു

# Nicholas Boffi

Faculty: Tamar Seideman

# High Harmonic Generation from Asymmetric Top Molecules

Being able to watch the mechanism by which a chemical reaction occurs has always been a dream of chemists. As a result, numerous procedures currently exist for the monitoring of chemical reactions, many of which follow a femtosecond  $(10^{-15} \text{ seconds})$  pump-probe scheme. These schemes probe chemical reactions on the timescale of molecular vibrations, while the motion of the electron occurs

on the attosecond (10<sup>-18</sup> seconds) timescale. Thus, probing the electron dynamics responsible for the breaking and formation of chemical bonds and the motion of electrons through condensed phases requires higher resolution. High Harmonic Generation (HHG) is a nonlinear phenomenon due to the interaction of intense laser fields with molecules that may serve as a source of attosecond laser pulses. Furthermore, HHG dynamics themselves may be a sensitive probe of electronic orbitals and their evolution with time. HHG has been studied extensively both experimentally and theoretically from simple diatomic molecules, but remains to be extended to more complex polyatomic molecules. We discuss here the theory of HHG, including the Lewenstein model and common approximations. We present computational results for HHG from the three structural isomers of iodotoluene, an asymmetric top molecule more complex than those previously studied in the literature, calculated using the discussed approximations. The resulting spectra exhibit clear differences with respect to changes in orbital structure, suggesting that HHG may indeed be used for attosecond time-resolved spectroscopy. Finally, we present a preliminary physical explanation for our results using arguments involving orbital geometry.

#### ହ୍ୟ

# Kathryn Cannady

# Faculty: S. Hollis Clayson

### Difference and Sameness: Beaton, Penn, and Artificiality in the Vogue Cage, 1928-1964

Photographs by Cecil Beaton and Irving Penn made for Vogue magazine are often defined by difference in style, approach, and time period. Beaton's work is characterized by theatricality and ornate detail used to create varying scenarios for his models. Conversely, Penn's realism is marked by an intensity and frankness that is striking in its deconstruction of what Beaton had done earlier. Their overlapping careers make the contrast clearer, but perhaps block opportunities for viewing the sameness hidden beneath differing surface "style." By using existing scholarship and investigating their works in conjunction with one another, it becomes possible to view the roots of the difference between their works - their sex, sexuality, and outside influences. It also allows consideration of their uses of artificiality in their work for Vogue, demonstrating a similarity that might otherwise be overlooked. Additionally it enables a deeper examination of artificiality as a trope of the fashion magazine photograph - and the two men's roles in establishing it. This study's spotlight on difference covers a range of topics, but focuses heavily on the outside interests of each artist. Beaton was known for his photography, but was passionate about theater, while Penn consistently produced ethnographic studies and enjoyed using printing media not publishable in Vogue. These outside interests did not, however, free them from the "Vogue cage" that forced the photographers to retain their styles and continue their work for the magazine to fund the pursuit of their outside interests.

#### ନ୍ଧର୍ୟ

# John J. Castellanos

# Faculty: Karl S. Rosengren

### Finding Meaning in Fantasy: Reasons for Encouraging Fantasy Beliefs in Children

Many parents of young children encourage their children to believe that fantasy figures are in fact real; this is especially true for figures that are viewed positively. While the ethics of lying to children about fantasy figures has been debated, there has been little investigation in to why parents choose to promote these beliefs. The goal of the present study was to examine why parents encourage or discourage beliefs in a variety of fantasy figures. Parents of children between 3 and 8 years were interviewed about their encouragement/discouragement of fantasy beliefs in their children. Questions also addressed parents' religious views and how these views might influence encouragement/discouragement of such fantasy beliefs. Similar to past research, parents generally reported encouraging belief in positive fantasy figures (e.g., Santa, Tooth Fairy) and discouraging belief in more negative fantasy figures (e.g., monsters). The majority of parents had never really considered why they encouraged fantasy beliefs in their children. Parents who encouraged fantasy belief generally viewed it as a "normal part of childhood" and/or that it played an important role in stimulating the imagination and creativity in children. The majority of the parents who reported discouraging belief in negative fantasy figures did so in order to protect their children from fear and reassure them that the world was a safe place. Overall, the majority of parents thought that encouraging fantasy beliefs was an important aspect of parenting, one that enabled them to share an enjoyable event with their children and encouraged aspects of cognitive development. This work is co-authored with Tracy Lin.

#### ହ୍ୟ

# Victor Chang

# Faculty: Erwin Goldberg and Huanghui Tang

# Inhibiting Tumor Progression with Transcriptional Gene Silencing

Inhibiting the metabolism of cancer cells has proven and continues to be a promising approach towards inducing cancer cell death. An important enzyme in the metabolic pathway of cancer cells is the glycolytic enzyme lactate dehydrogenase (Ldh). Ldha, the form of the enzyme elevated in many types of cancer cells, has been a successful target for inhibition. However, previous approaches utilize transient mechanisms, such as chemical treatments and post-transcriptional gene silencing. Recent developments in molecular biology allow for transcriptional gene silencing (TGS) through the use of double stranded RNAs (dsRNAs) to target non-coding, promoter regions of specific genes. TGS has been shown to induce long-term gene silencing in human cells through promoter DNA methylation and/or site-specific histone methylation at the chromatin level. Utilizing TGS to induce long-term inhibition of the Ldha gene transcription in cancer cells is a new approach towards deterring cancer cell growth and may prove to be a more permanent solution. This project is an attempt at applying this new technique on Ldha. Three different promoter targeting dsRNAs were designed and transfected into an aggressive line of cervical cancer cells

(HeLa). Quantitative western blots were used to detect the expression of Ldha in transfected cells. Preliminary results suggest a down-regulation of Ldha in transfected cells. Successful TGS of Ldha can result in lasting inhibition of tumor growth.

#### ହ୍ୟ

# **Raul Chavez**

Faculty: Frederick J. Northrup and Christine Rabenold, North Central College

# Safety of Barium-Containing Pottery Glazes

Pottery glazes involve complex chemistry between an aluminosilicate matrix and a variety of metal oxides used to create desired characteristics such as surface texture and color when fired at high temperatures (1200-1300 °C). Metals that are not securely bound into the glaze matrix can leach into food or drink. Due to the toxicity of lead and cadmium, two common heavy metals used in pottery, both are regulated by the FDA. This project focuses on the leaching of barium—a highly toxic metal not regulated by the FDA—and other heavy metals into a solution of 4% acetic acid representative of acidic food conditions. A wide variety of pottery glazes have been tested. Preliminary results suggest: barium leaches in greater amounts when introduced into the glaze as barium carbonate as opposed to as a pre-prepared frit; the amount of leached barium decreases with increasing firing temperature; glazes fired in an oxygen poor atmosphere; visible glaze damage after soaking in the acetic acid solution generally correlated with a greater amount of leached metal ions. Results of this experiment are further explained in the poster.

#### ହ୍ୟ

# Michael Clark

# Faculty: Ishwar Radhakrishan

# Building a Transcriptional Corepressor Complex One Subunit at a Time

Transcription regulation in Eukaryotes is a fundamental process regulated at multiple levels. The Sin3a Corepressor complex plays an essential role in transcriptional regulation by chromatin modification through the recruitment and targeting of Histone Deacetylases (HDACs). The Sin3a protein consists of multiple protein-protein interaction domains and functions as a scaffold for the assembly of the Sin3 complex. Here, the interaction of a domain of Sin3a with an evolutionarily conserved binding partner and Sin3a complex member is biochemically and structurally characterized. Minimal interaction domains for both Sin3a HID and its binding partner are characterized using affinity chromatography and size exclusion chromatography. Complex binding affinity is quantified by isothermal titration calorimetry, with a K<sub>d</sub> of roughly 400 nM. Solution NMR data is presented, including main chain and side chain assignments. NMR structural data, NOE restraints, are assigned iteratively by the program ARIA. Simulated Annealing is performed by CNS and a lowest energy structural ensemble is calculated. Finally, structural insights into the assembly of the Sin3a complex are offered.

#### ନ୍ଧର

# Ethan Coffel

# Faculty: Doug Downey

# Machine Learning in Tornado Detection

Most tornado warnings are issued due to the detection of thunderstorm rotation by Doppler radar. Warning lead-times – or the time between when a warning is issued and when a tornado strikes – have dramatically increased in the last two decades, largely due to the introduction of a national Doppler radar network. However, while nearly every tornado touchdown is covered by a tornado warning, many warnings are false alarms; in central Oklahoma, the false alarm rate has averaged nearly 80% in recent years. A high false alarm rate decreases confidence in the warning system and in some cases may cause legitimate warnings to be ignored, resulting in injury or death. Currently, forecasters have little assistance beyond radar images, on-the-ground reports, and experience when issuing tornado warnings. The task of tornado detection requires a rapid analysis of complex data, and it could be improved by increased automation. This project uses a machine learning algorithm to analyze radar images in order to identify which thunderstorms are likely to produce tornadoes, and which are not. With this method, a number of storms for which false alarm tornado warnings were issued during the 2008-2010 period by the Norman, OK forecasting office were shown, using only radar images available before the warnings were issued, to be highly unlikely to result in tornado touchdowns.

#### ନ୍ଧର

#### Scott Coughlin, John Le, and Connor Skeehan

#### Faculty: Vicky Kalogera

# Parameter Estimation of Numerical Relativity Binary Black Hole Gravitational Waves in Early aLIGO Noise

Gravitational waves are ripples in space-time predicted by the general theory of relativity. LIGO (the Laser Interferometer Gravitational-Wave Observatory) and VIRGO make up a three detector network around the globe to attempt to find these gravitational waves (GWs). One interesting class of sources for GWs is the merger of two black holes. There is a need, however, to extract the parameters of these black holes using parameter estimation (PE) algorithms that depend on approximate models of the GW signals. Recently the Numerical INJection Analysis project (NINJA) has produced a catalog of hybrid post-Newtonian/NR waveforms for black holes that are much more accurate -- and expensive -- to produce than the approximate models used for PE. We study the biases in parameter estimates from the PE analysis on these NR waveforms when using our approximate waveform models. The goal is to demonstrate the effectiveness or ineffectiveness of our current models.

#### Prarthana Dalal

# Faculty: Noelle Samia

# Comparative Study of Healthcare Infrastructure and Delivery between the United States and India

Healthcare infrastructures and delivery systems vary tremendously across the world. Global health care disparities hinge upon differences in accessibility and infrastructure development. Aspects of healthcare such as patient volume, diseases treated, and managerial methodology differ significantly between the United States and India. For this study two government clinics were observed. These clinics located in Kansas City, Missouri and Ahmedabad, India provide care to lower socioeconomic status pediatric populations. The objective of this study was to understand the existing health care systems available in both countries and identify unique health needs and barriers to improving healthcare delivery in the individual settings. The healthcare system in India must cater to a large and dense population while the United States faces different challenges. This study found that the pediatric populations in India are at higher risk for infectious and diarrheal diseases and the patient to physician ratio is significantly higher than in the United States. This is due to limitations such as the lack of access to clean water for many. Additionally, there is minimal governmental support for healthcare and cognizant of these financial limitations, doctors rely more on symptomatic feedback rather than laboratory tests. Additionally, as part of this study a basic computer-based medical record system was developed and taught to the faculty in order to be able to track disease incidences and outcomes effectively. Improved electronic record keeping also helped in better resource allocation and monitoring within the hospital.

#### ନ୍ଧର

## Siddarth Datla, Kevin Go, Lamar Richards, and Lauren Tyndall

# Faculty: Todd Murphey

# Practice Interactive Surgical Knee (PISK) – Providing Medical Students a Realistic Training Tool with Real Time Feedback

Currently, training models for knee surgery lack the fidelity and feedback necessary to provide detailed information on the forces surgeons apply to the knee. The two main models are cadavers or virtual simulations. While cadavers are the most realistic model, they are expensive and in low supply. Virtual simulations, while they are able to accurately replicate knee physiology, do not provide any quantitative feedback and lack the haptic feel which is necessary for surgery. The jump from practicing on a virtual model to practicing on a real body is also fairly large. Our Practice Interactive Surgical Knee (PISK) aims to bridge the gap by providing medical students with a high fidelity, physiologically accurate model that provides quantitative feedback via bluetooth technology. The physical model is based on the measurements of actual human knees and will be designed to replicate the geometric and material properties of the knee. Force sensors (rubber strain gages) attached to ligaments, tendons and bones will convert physical forces into voltages which will be outputted by a live graph which will detail the failure thresholds for the various knee constituents, providing medical students and surgeons with invaluable information on how their actions translate

to physical phenomena. This new connection between input and output will lead to fewer failed surgeries and more successes.

#### ୬୦୧୪

#### Sherilyn DeStefano

# Faculty: Monica Prasad and Carolyn Chen

# Understanding Connections between Service Work and Empathy among Premedical Students

Studies have shown that engagement in community service can serve as an effective method to increase empathy among individuals. While some research has been done on empathy among medical students, no research exists on empathy among premedical students, especially in relation to volunteer work. Through a self-reported empathy test, this study found that there was no significant difference between the empathy levels of premedical students who did service and those who did not. This suggests that involvement in community service is not significantly impacting empathy in premedical students. Interviews with premedical students and students who completed a civic engagement certificate (CEC) program illuminated some of the reasons behind this. Part of the problem may be the conflict between premedical students' altruistic motives and their desire to engage in service work to appeal to medical students were less likely to engage in reflection of their service experiences and were not as aware of broader social issues faced by the diverse populations they served. These components may be important factors in developing empathy through service work. Thus, changes to the way premedical students engage in service might be prudent to ensure that the premedical years help cultivate more empathetic medical professionals.

#### ഗ്രര

# **Claire Dillon**

#### Faculty: Lane Relyea

# Untitled and Undefined: The Limitations of Biographical Analysis in the Work of Félix González-Torres

Félix González-Torres (1957-1996) is a visual artist with an enduring legacy. Critical reception of González-Torres's art often focuses on its representational and biographical qualities, situating his work within the context of his personal life as a gay Cuban-American living in the United States during the 1980s and 90s. Such analyses neglect what is perhaps the most important aspect of his work: its universality. This study investigates the openness of González-Torres's creations, which often use stacks of paper, piles of candy, and strings of light bulbs to convey and complicate meaning. It is this complexity that lends the artwork its strength and popularity, rather than the artist's sexual orientation or ethnicity. The heart-breaking story of González-Torres and his partner Ross, who both succumbed to AIDS-related illness, is compelling but often overshadows analyses of the artist's work. The scholarship surrounding González-Torres also focuses on his life as a Cuban exile, though the artist often tried to distance his work from this personal history. Following the

artist's declaration, "no palm trees!" in response to interest in his Latin American heritage, this project suggests it is counterproductive to limit the interpretation of González-Torres's work to issues of sex and race. Instead, it bridges the gap between the definite and indefinite characteristics found in González-Torres's art, and aims to expand its scope beyond contemporaneous political issues and the artist's own life. This is an investigation of the work's discourse on love, loss, sentimentality, and existence within the capitalist framework of contemporary society.

### ନ୍ଧର୍ୟ

# Alina Dunbar

# Faculty: Jeff Garrett

# The Politics of Nonsense: Subversion in the Children's Books by Argentine Writer María Elena Walsh

Argentine children's author María Elena Walsh has been credited by her contemporaries as overhauling the genre of children's literature in Argentina. Examining why she is remembered in this way requires comparing her work to that of Lewis Carroll, whose book Alice in Wonderland was hailed as a watershed in children's literature largely because of its nonsensical qualities. Despite the fact that Walsh's first books for children were published nearly a century after Alice first appeared, her work bears a strong resemblance to Carroll's. Yet Walsh's experience is unique in that she lived through a series of dictatorial governments, whose authority she seeks to critique by employing subversive nonsense in her books for children. This thesis will examine the notion of subversion in children's literature, and will conclude that Walsh successfully drew upon the concept of literary nonsense but crafted it to fit her own purpose, namely, to undermine anti-democratic structures. This will be accomplished through critical analysis of Walsh's work for children, secondary research on the trajectory of children's literature in Europe and Argentina, and the study of numerous interviews conducted with the author about her views on children's literature, politics, and society. This thesis contributes to the field of children's literature by complicating the relationship between literature and the state, recognizing children's literature as an active, formative event, and bringing an as-of-yet understudied Argentine author into the conversation about children's literature that historically has focused on texts produced in the English-speaking world.

#### ନ୍ଧର୍ୟ

# **Chase Stephen Eck and Stephen Modica Rees**

### Faculty: Mary Desler

# Claims of Racism at Northwestern University: 1963 to 2012

This paper looks at the history of racism at Northwestern by cataloguing claims of racism (CRs) reported in *The Daily Northwestern* from 1963 to 2012. After cataloguing each claim we looked at the frequency of CRs occurring on campus each year to estimate the actual levels of racism at Northwestern throughout the 50-year history of our data set. Several patterns emerged from the study. First, CRs occur in cycles with certain time periods having a higher frequency of racist incidents and others experiencing local minimums. Secondly, even with this cyclicality the overall

trend of CRs is decreasing over time with peaks getting smaller in size. These results suggest that societal trends, administrative responses, cultural norms, current events, and student activism reduced overall levels of racism. Although the frequency of CRs has been decreasing over time, the type of CRs occurring on campus has changed, reflecting an increase in claims that certain behavior and practices at Northwestern are racist. The proliferation of other forms of CRs suggests the need for new forms of administrative responses to alter the recent uptick of claims of racist incidents on campus.

# ନ୍ଧର୍ୟ

# **Roelle Eugenio**

Advisor: Mario Yango, MD (Former NU Fellow)

# Stimulatory Effect of Aloe vera on Hair Growth

Hair loss is a common problem. There are few products available to help this problem, but most are not effective and are expensive. *Aloe vera* is a plant known for its regenerative and stimulatory effects on the skin and exhibits dramatic results on wound healing, skin ulcers and burns. This study looked at the possible stimulatory effect of *Aloe vera* on the hair as an appendage of the skin The study utilized guinea pigs of the same breed, approximately same size, weight and age and whose backs were shaved at intervals during the 13 week trial. One side of the study area received daily rubbing of the gel from *Aloe vera* plant while another side served as control with no gel applied. On both sides, 0.3 cm square areas were marked. Each week, the number of hair strands was counted from designated squares to determine hair density. Weekly, hair length was also measured from 20 representative strands from another set of 0.3cm square areas from the treated and untreated sides. The results showed that hair density was greater and hair length was longer in the treated versus the untreated areas. The study suggests the stimulatory effect of *Aloe vera* on hair growth. *Aloe vera*, a readily available plant could possibly provide an effective and inexpensive solution to the problem of hair loss.

### ഗ്രര

# Aria E. Fiat

# Faculty: Emma K. Adam

# Mind Your Mood: Is Self-Focused, Temporal and Task-Unrelated Thinking Related to the Onset of Adolescent Depression?

First onsets of depression commonly occur during adolescence as patterns of thinking become established. Research also suggests a relationship between thought patterns and depression during this period. Although females ruminate more than males, rumination and depression onset is positively correlated in both genders. Conversely, self-reflection, action-focused rumination, mindfulness, and "flow" have been shown to mediate depression and help individuals achieve goals. Improving understanding of adaptive and maladaptive thought patterns has important implications for depression treatment and intervention, and the present study aims to determine how these types of thinking relate to adolescent depression after accounting for gender differences. Using the Experience Sampling Method, we investigated how non-depressed, currently depressed, and future

depressed adolescents differ in their proportion of self-focused, retrospective, prospective, and taskunrelated thinking. Our data are drawn from Wave I of the Northwestern-UCLA Youth Emotion Project (YEP), and our analytic sample contains 341 seventeen year-olds from two socioeconomically and racially diverse schools. The Structured Clinical Interview for the Diagnostic and Statistical Manual for Mental Disorders-IV (SCID) was used to detect depression at two time points. Analysis of Variance tests with gender as a covariate revealed future depressed adolescents, compared to non-depressed adolescents, used a larger proportion of self-focused, prospective and retrospective thoughts. Non-depressed adolescents reported thinking about nothing significantly more than future depressed adolescents. While these findings do not support our initial hypotheses, they suggest a relationship between thought focus and onset depression, as well as a possible link between thought volume and onset depression. This project was co-authored with Lindsay T. Hoyt, Richard E. Zinbarg, Susan Mineka, Michelle G. Craske, and Emma K. Adam.

#### ହ୍ୟ

# Joel A. Finbloom

# Faculty: Samuel I. Stupp

# pH-Sensitive Self-Assembling Peptide Amphiphiles for the Targeted Treatment of Cancer

To combat poor targeting and general toxicity of chemotherapeutics, drug delivery systems need to be developed to specifically target tumor cells while leaving noncancerous cells unharmed. We report here a pH-sensitive drug delivery system that targets the acidic microenvironment of tumors using C<sub>16</sub>H<sub>6</sub>PEG<sub>4</sub> self-assembling peptide amphiphile (PA) nanofibers. The PA nanofibers assemble at physiological pH 7.4 and disassemble below pH 6.5, as characterized by cryogenic transmission electron microscopy, small angle x-ray scattering, and circular dichroism spectroscopy. The chemotherapy drug camptothecin was encapsulated into the PA nanofibers and was tested for selective release in acidic environments. The PA-camptothecin system showed significantly enhanced release by approximately 15% in acidic pH versus physiological pH as measured by dialysis release studies. The PA alone was tested for toxicity against MDA-MB 231 breast cancer cells. The PA showed some toxicity to cancer cells, with reported toxicity of up to 50% in acidic pH and 25% at physiological pH. This is likely due to the increased charge of the PA in acidic pH caused by the protonated histidine residues. The PA-camptothecin system described here is thus a dual-therapy system where both the material toxicity and the drug release rate are enhanced in below-physiological pH. This system shows potential to allow for specific targeting of the acidic tumor microenvironment, while leaving noncancerous cells unharmed.

#### ୬୦୧୪

# **Kyle Frost**

# Faculty: Molly Losh

# Sibling Influence on Social Cognition and Pragmatic Language Use in Children with Autism Spectrum Disorder

Research shows that having siblings may influence the development of social cognition, or theory of mind, in neurotypical children as well as children with autism spectrum disorder (ASD), though in different ways. The present study investigated how the sibling constellation may influence development of social cognition as well as social language use in high-functioning children with ASD. A secondary purpose of the study was to determine how pragmatic language ability relates to social-cognitive abilities in individuals with ASD. A measure of social cognition was administered to participants, and a semi-naturalistic language sample was coded to assess pragmatic language use. Among children with ASD, only-children performed better on the social cognition task than children with at least one sibling: opposite the results found in typically developing children. More specifically, only-children performed significantly better than oldest children and youngest children in families, but not middle children. Typical siblings may unintentionally detriment the social development of a child with ASD by avoiding conflict and scaffolding social interactions. Middle children, however, may benefit from having access to more varied sibling interactions. Individuals with ASD did not exemplify the theorized link between social cognition and pragmatic language use, while controls did show the expected correlation. This suggests that, while individuals with ASD may develop advanced social cognition, this understanding is not spontaneously used in social discourse.

#### ହ୍ୟ

# Tim Garrett

# Faculty: Jessica Winegar

# Alexandrian Political Graffiti: New Insights into Egypt's Ongoing Revolution

Over the course of the 2011 uprisings which dramatically reshaped the Middle East's political landscape, graffiti became one of the most recognizable symbols of the Arab revolutionary movements. This research is based on a collection of approximately 225 photographs collected during fieldwork and language study throughout the summers of 2011 and 2012 and analyzes the political graffiti scene of Alexandria, Egypt's second largest city, in the period directly following the ouster of the former president Hosni Mubarak. Through the close reading of graffiti examples and overall patterns, the paper concludes that, far from representing a unified revolutionary discourse, graffiti in the aftermath of Egypt's January 25 revolution became a medium adopted by numerous, often conflicting groups. Arguments over the appropriate roles of the government, the military, and religion factions in the state played out on the walls of Egypt's urban centers just as they played out in the rest of the country's public sphere, foreshadowing the political turmoil which Egypt faces today. By bringing together analysis of graffiti with the literature on the social, political, and economic effects of the Mubarak regime on urban areas, this research assesses both the significance and underlying causes of these divisions in modern Egyptian society and seeks to contribute to the fairly small body of academic work written on the Arab Spring.

#### ହ୍ୟ

# **Emily Gerst**

# Faculty: Arda Gucler

# Controlling Christianity: Analyzing the Experience of Religious Freedom in Contemporary China

The Chinese Constitution explicitly gives citizens the right "to believe or not to believe" in a religion, yet the actual experience of this right varies widely throughout Chinese society. Of the estimated 130 million Protestant Christians in China, over half are aligned with unofficial house churches rather than the official Protestant church, choosing to reject the legitimacy of government authority over their beliefs. My paper examines how the state copes with this divide, using religious freedom as an instrument of state manipulation, allocated to different Protestant groups according to the extent that they support state economic and patriotic interests. Using primary sources, I analyze the type of language the Communist Party (CCP) uses to describe religious activity and how news sources present and react to instances of persecution. Recently, the CCP has more openly acknowledged the growth and popularity of Protestantism. I argue that the optimism that these developments indicate a shift in governmental policies on religious freedom is premature and misguided. Instead, the CCP's engagement with Protestant Christianity is a negative development because it increases the ways in which the government is able to manipulate religious freedom, giving them the power to define the norms of religious practice and to marginalize Protestant groups deemed "evil cults". As Protestant Christianity continues to spread, the CCP consistently tailors religious freedom along the lines of its own interests. The negative impact of increased government involvement in religion raises important questions about the nature of the government's role in advancing religious freedom.

#### ഗ്രരു

#### Nicolás Grosso Giordano

#### Faculty: Justin M. Notestein

# Palladium Catalysts for the Decarboxylation of Stearic Acid for Green Diesel Production: Reaction and Catalyst Deactivation

There is currently a strong interest in developing renewable sources of hydrocarbon fuels. While biodiesel has provided a temporary solution, its high oxygen content results in undesirable properties as a fuel; thus, deoxygenation of the biomass feedstocks is necessary to produce truly "green diesel". One approach to this is the decarboxylation of long chain fatty acids, which are a major constituent of oils and fats. In view of this, the catalytic decarboxylation of stearic acid into heptadecane over supported palladium catalysts has been studied as a probe reaction. A consistent challenge has been catalyst deactivation due to deposition of organics; moreover, the activity cannot be regained by thermal regeneration due to the sintering of the dispersed catalyst nanoparticles<sup>1-3</sup>. In our study, palladium catalysts on a silica support were prepared by strong electrostatic adsorption. These catalysts were used for the decarboxylation of a 0.05M solution of stearic acid in dodecane at 300 °C and autonomous pressure for 6 h. Close to full conversion was achieved, and selectivity to n-

heptadecane product was above 85%. However, yields were of only up to 28%, which suggested strong irreversible adsorption of reactant and products on the catalyst surface. Evidence for this was provided by thermogravimetric analysis and washing of the catalyst. Our current efforts are focused on further understanding this adsorption and catalyst deactivation in order to devise methods to prevent these undesirable effects. This could result in more durable and reusable decarboxylation catalysts for a more sustainable production of green diesel.

# ହ୍ୟ

# Chelsea Glenn

# Faculty: Jeff Rice

# Redefining the Rational Actor in Self-Reliance Programs: Economic Opportunities in Sherkole Refugee Camp, Ethiopia

This project strives to contribute to our understanding of the challenges of sustainable economic development in long-term refugee camps by applying behavioral economic theory to livelihoods programs. Data was collected from interviews and surveys conducted by the researcher in Sherkole refugee camp in Ethiopia. UNHCR has promoted livelihoods strategies in protracted refugee situations since the 1970s; however, there are very few successful cases of individuals achieving longterm self-sufficiency in camps. Aid providers promote sustainable self-reliance as a solution to complex protection problems and conceptualize refugees as individual rational actors and industrious entrepreneurs. Narratives collected from long-term refugees in Sherkole Camp refute this image of the refugee. Refugees engage in seemingly impoverishing behavior by volunteering for unpaid leadership positions, sharing limited resources, offering handouts to neighbors, and providing nonproducing loans to one another. Their behavior conflicts with expected utility theory and rational choice, upon which development aid providers base their programmatic designs. As demonstrated in the case study, business failure and greater reliance on rations ensued after the removal of implementing partner resources, disproving NGOs' claims of sustainable economic development. There is a resultant conflict between self-reliance policy and the on-the-ground realities of refugees' communal survival strategies and perceptions of their own roles in the camp community. Thus, this paper aims to expound on criticism of livelihoods strategies by examining the role of social capital and applying behavioral economics-including prospect theory, future discount rates, institutions, and trust and reciprocity theory-to provide a more nuanced and accurate economic development framework.

### ഗ്രര

# Kayla Grayson

Faculty: Renee Engeln and Steven Franconeri

# Looking at You Looking at Women: The Association between Body Dissatisfaction and Visual Attention Patterns

On a daily basis, we are bombarded with images of idealized female figures. Research has shown that brief exposure to these idealized media images induces negative body image. The internalization

of these thin ideals has a direct impact on body dissatisfaction, which is related to disordered eating behaviors. The present study examined the visual attention behaviors exhibited when college women look at images of female models and explored if/how these attention behaviors correlate with scores of general and specific body dissatisfaction. The study used eye-tracking techniques to record the visual attention shifts women display when looking at images of models commonly found in advertisements. These patterns were correlated with participants' responses on measures of body dissatisfaction. Contrary to expectations, participants did not show preferential attention to the facial region and the majority of the correlations were insignificant. However, several significant findings were produced that suggest selective attention behaviors. Increased body consciousness correlated with greater fixation at the face and less fixation at the body. Greater satisfaction with the lower torso correlated with fewer fixations at the face and more fixations at the body, specifically in the waist/hip region. These findings indicate that people may protect themselves from the effects of thin-ideal images by selectively attending to areas with which they are satisfied, rather than those with which they are displeased. Nevertheless, the inconclusive nature of the study suggests that more research should be done on this topic before any substantive claims can be made.

#### ନ୍ଧର

#### Alexander Gunn

# Faculty: Caroline Bledsoe

### The Cold War Continues: The Political Arithmetic of Cuba's Infant Mortality Rate

Beginning in the 1980s, due to its sharp reductions in reported infant mortality rate (IMR), the number of infant deaths per 1000 births, Cuba's health system has drawn international attention. This apparent reduction in infant deaths has been seen as even more significant because of Cuba's low-resource setting. Following Cuba's revolution in 1959, when Fidel Castro and the Communist party took power, the country has invested heavily in health programs aimed at reducing infant deaths. Many of these interventions, like the widespread use of maternity-waiting homes, which are public health centers where expectant mothers can go receive around-the-clock care for the duration of their pregnancy, were successful in improving the country's IMR. Additionally, the Cuban government produced further reductions in IMR through other methods, like the liberal use of abortion in cases of problematic pregnancies. While scholars have debated the nature of the specific programs and policies by which Cuba has reduced its IMR, they have taken it almost as a matter of faith that these political instruments were the social version of strategies to genuinely improve healthcare, particularly for women and children. I will show, however, that the true impetus came from Cuba's efforts to overtake its superpower neighbor, the United States, especially when it suddenly found itself alone and vulnerable to military action following the fall of the Soviet Union. It would effectively compete not by threatening to kill its formidable adult enemies, as in the tone of the Cold War, but by saving the most vulnerable-babies.

# Gia Hallaman

#### Faculty: Stuart Wagenius

# Linking Prairie Ant Communities and Fire: The Effect of Fire on Ant Diversity in Prairie Remnants of Western Minnesota

Research within the field of conservation emphasizes the maintenance of diversity. The Echinacea project focuses on the diversity of several prairie remnants in Western Minnesota, specifically upon a native plant living within these remnants called Echinacea angustifolia. For my project, I joined this long term effort by delving into some of the complexities surrounding the diversities of these prairie ecosystems. I evaluated the diversity of ant communities, which interact with an aphid species that feed exclusively on this plant, in remnants affected differently by fire. Historically, the presence of fire in long grass prairies has been positively correlated with the quality of the prairie by maintaining the dominance of grasses over woody plants. Specifically, I test the hypothesis that ant communities differ between burned and unburned areas of native prairie remnants in Minnesota. I identified approximately a thousand ants, using dichotomous keys collected in 24 pit fall traps at two different sites on two separate dates during summer 2012, in order to evaluate the community composition and diversity. Preliminary analyses indicate that the diversity between the recently burned and nonburned remnants was highly unique, with a disproportionately higher morphospecies count at one remnant, and with several morphospecies of Myrmica and Formica appearing exclusively in one location. This study shows that even by studying small organisms within an ecosystem, a great deal can be discerned about the health and diversity of the overall area and adds to our knowledge of the importance of fire in maintaining quality prairies throughout the Midwest.

#### ହ୍ୟ

## Tracey Haneman

# Faculty: Elisabeth Elliott

### Language Symbolism in the Contemporary Turkish National Identity

It has been almost a century since the foundation of the Republic of Turkey and its revolutionary language reforms, and attention to the long term effects of language change and language nationalism is warranted in contemporary Turkey. After the fall of the Ottoman Empire, sweeping reforms were instated by the new Republican regime to create a unified, stronger Turkish nation. The language reform, also called the language revolution, completely changed the orthography from the incompatible Arabic and Persian script to a Latin phonetic script, as well as changed much of the lexicon of the Turkish language from the previous *Osmanlua* language that left most of the population illiterate. The change had critical effects not only on literacy and communication, but served as a tool to promote fierce nationalism for the new Turkish Republic supported by a national vilification of Turkey's Ottoman past. The language reform was a physical expression of a new national ideology, and the new Turkish language united a broken and scattered population under this symbol. Given this fierce Republican nationalism, it would be expected that the condemnation of Ottoman history would prevail throughout its history. However, over the years language and language symbolism did not remain as the Republicans intended. Seen in Turkey today are Ottoman themes arising throughout the cultural and political spheres in linguistic forms, starkly contrasting

the national vilification movement by the Republicans in the 1920s and 1930s. In tandem, there are also concerns about the inundation of Western languages in Turkish, a reversal of their concerns in the reform era when Westernization was desirable. Understanding this divergent symbolism cohabitating in the linguistic sphere has both linguistic and social significance. Examining the short and long term effects of linguistic nationalism and language engineering is crucial to understanding the power that language has to effect as not just a medium, but a tool that can influence populations and nations. Also, examining these language phenomena offers an ethnographic lens into greater understanding of the constant and conflicting influences affecting Turkey today

### ନ୍ଧର୍ୟ

# Michael Hernández

# Faculty: Richard Zinbarg

# Training Cognitive Reappraisal Skills in High Worriers via a Computerized Learning Paradigm

Cognitive reappraisal - the process through which one reevaluates negative thoughts into more realistic or positive ones - often results in the attenuation of negative emotions. This strategy has become a significant part of nearly every form of cognitive-behavioral therapy. The current experiment sought to determine if reappraisal could successfully be trained via a computerized learning paradigm. In this experiment, a group of high worriers were asked to identify three salient worries they were experiencing at that moment. Participants completed pre-paradigm assessments, which entailed a task asking them to rate how much each of the three worries distressed them, its likelihood of coming true ('probability recalibration'), and their ability to cope in the event that it did come true ('decatastrophizing'). Participants engaged in a computerized learning paradigm that trained them in the selection of balanced reappraisal statements and questions (in the topics of decatastrophizing and probability recalibration). Upon completing the reappraisal learning task, participants completed post-paradigm assessments which were identical to pre-paradigm assessments. For worries trained within the reappraisal paradigm, participants exhibited significant attenuation of distress as well as augmentation of probability recalibration overall. However, for worries not trained through the paradigm, these effects were not statistically significant. The findings provide evidence in support of the present computerized learning paradigm as a means of subsiding user-presented worries. Such outcomes suggest that the paradigm may be effectively translated into an easily-disseminated tool for use in cognitive-behavioral therapy.

# ନ୍ଧର୍ୟ

# Sam Houskeeper and Valerie Zuckerman

# Faculty: Hendrik Spruyt

# The Evolution of International Sanctions: The Ascent of Multilateralism

Sanctions have become one of the most relied upon weapons in the arsenal of foreign relations. For Western countries, diplomatic and economic sanctions are almost always the first option and often the only one considered or used during an international crisis. Today, as economic pressure is eased on Myanmar, it is slowly tightened on Syria and Iran, and remains a constant in the existence of Cuba and North Korea. In the past decade, much ink has been spilled in the evolution of "smart sanctions", but another important development has been the rise of multilateralism in sanction strategies. The continued integration of the European Union, the growth of multinational corporations, and the rise of non-Western economic powers has led to dramatically increased cooperation among Western nations in the execution of sanctioning efforts. Sanctions by coalition, punishment of multinationals, and U.N. validation have increasingly become necessities for the success of sanctions in today's globalized world. Perhaps even more than "smart sanctions", this shift in policy has radically changed the face of international sanctions. Co-authors of this work include Tianfang Cui, Ben Mandel, and Alexi Stocker.

#### ഗ്രര

# Peter Ilhardt

# Faculty: Patricia Beddows

# Investigation of Potential Microbialite Formations in Yucatán Peninsula, Mexico Cenotes

Microbialites are sedimentary carbonate rocks constructed by colonies of microorganisms. They exist deep in the ancient rock record and are among the oldest surviving evidence of life on Earth. Today these biogenic structures continue to be deposited in a wide variety of open water marine and meteoric water environments around the world. This research focuses on a recently-discovered, unique cluster of sedimentary carbonate formations from sinkholes that connect the surface of the Yucatán Peninsula in Mexico to hundreds of kilometers of caves flooded with groundwater. Mineralogical, chemical, environmental, and physical descriptions of samples are used to characterize the potential microbialites and offer an explanation of their origin. Raman spectroscopy and thin section analysis uncovers the mineralogical content and optical properties of the mineral grains. Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) of the formations and the wall rock on which they were deposited provides bulk chemical data allowing for differentiation of the formations from the substrate. Finally, Scanning Electron Microscopy (SEM) provides high-magnification images that have made micron-scale physical characteristics detectable, including mineral and potential biological features. These previously unexamined geologic formations from the Yucatán Peninsula are compared to open water marine and coastal counterparts globally, thus expanding the range of environments where microbialites exist to include semi-open groundwater systems.

### ନ୍ଧର

# Samuel Jahangir

Faculty: Wendi Gardner

# Are There Benefits of Social Exclusion? The Effects of Social Exclusion on Emotional Regulation

Most previous research has focused on the negative effects of social exclusion. The purpose of the current study was to examine one potential benefit associated with exclusion—whether social

exclusion could lead to an increased ability to regulate other people's emotions. Participants were assigned the role of either a job candidate, negotiating for a signing bonus for a job, or a negotiation coach whose role was to motivate their candidate by making them feel more confident and energized. The negotiation coaches were either primed for social rejection or social acceptance before attempting to help the job candidate by motivating him or her. As predicted, results showed that coaches primed with exclusion were better at motivating their job candidates; their candidates gave significantly more reasons for their counteroffers and showed higher implicit energized affect scores than candidates with non-excluded coaches. In other words, this study provides strong evidence that social exclusion significantly increased skill at regulating others' emotions.

#### ନ୍ଧର୍ୟ

# Jasmine Jennings

# Faculty: Huey Copeland

# The Problem in Room 24: Racial Constructions and National Identity in the Argentine National Museum of Fine Arts

My thesis, "The Problem in Room 24: Racial Constructions in the National Museum of Fine Arts in Buenos Aires" explores how the Argentine art room, of the National Museum of Fine Arts (Museo Nacional de Bellas Artes, MNBA) in Buenos Aires, reinforces racial relationships within the national culture. Two works of art, in particular, *El busto del esclavo* (The Bust of a Slave), 1882 by Francisco Cafferata and the 1892 *La vuelta de la malón* (The Return of the Raiders) by Ángel Della Valle and their relationship to the rest of the works in the room exemplify how race was and continues to be constructed in Argentina. Their position as the only two works featuring non-European descendent Argentine subjects in the National Museum of Fine Arts warrants investigation. More intriguing, the works sit next to each other in a room dedicated to exemplifying the best of Argentine art and culture. Using a combination of visual analysis, history, and museum theory, I will seek to clarify the complicated and often conflicting ways in which these works function as poles on which to orient racial discourses in the national rhetoric. Focusing on the little known history of Afro-Argentines, I will argue that Room 24 is part of a national project to organize and fortify racial hierarchy.

### ହ୍ୟ

# Jingran Ji

### Faculty: Richard Carthew

### MiR-9a Confers Robustness against Thermal Fluctuation and Genetic Diversity

Given the drastically different environments that we experience and the immense variation among our individual genomes, it is remarkable how alike we all are. One cause for this singleness of form might be the presence of microRNA (miRNA) genes that regulate the expression of protein-coding RNAs to ensure normal development. However, the mechanisms that miRNAs use to confer such robustness are not well understood. We studied one miRNA, called miR-9a, in *Drosophila melanogaster* to better understand the more general role miRNAs play to buffer against environmental variation and genetic diversity. To simulate environmental variation, we subjected miR-9a mutant flies to thermal fluctuation ranging from 18°C to 29°C and conditions oscillating between these extremes. To create genetic diversity, we obtained *Drosophila* lines from across the world and introduced a miR-9a mutation into these populations. We then measured changes in sensory neuron development between mutant and wild-type siblings. We found that MiR-9a mutants were sensitive to both temperature fluctuation and genetic diversity. Survival rates of miR-9a mutants were directly dependent on temperature when compared to the controls, which developed robustly at all temperatures. Mutants also showed a strong dependency on genetic background, which had varying effects on sensory neuron development ranging from significant changes to no effect at all. These results suggest that miRNAs orchestrate complex genetic interactions to confer robust levels of gene expression. This has important implications for the study of diseases, such as cancer, that involve prominent perturbations of the genetic landscape. This research was co-authored with Justin Cassidy.

#### ହ୍ୟ

### **Eric Johnson**

### Faculty: Matthew Johnson

# A Moated Order: Space, Movement, and the Production of Authority in the Medieval Landscape

The study of medieval moated sites is often framed in terms of the conscious motivation of moat owners; current explanations fall somewhere between moats as utilitarian defensive features and fashionable status symbols. Instead of joining the "defense vs. status" debate, the following study reconstructs the lived experience of moated sites in an effort to understand what moats *do* as active medieval landscape features. Using evidence from archaeological survey, GIS analysis can reconstruct how moats, as watery boundaries, produce stratified spaces, delineate movement, and affect visibility as they are experienced. Combined with medieval documentary and representational evidence, moated sites are viewed as part of a meaning-laden landscape functioning as a normative stage for social action; different classes of medieval society embody the spatial order of moats, naturalizing their associated ideologies and producing the authority of their owners in the process.

#### ନ୍ଧର

### Parul Kathuria

Faculty: William Leonard

# Joining Biology and Social Science: Understanding Metabolic Syndrome in Context of the Nutrition Transition and Socioeconomic Status of the Tsimane'

Metabolic syndrome is an umbrella term that refers to the cluster of symptoms that mark an individual as high risk for cardiovascular disease and for type 2 diabetes. Previous research has focused on examining the syndrome without context, but truly understanding metabolic syndrome in any population involves taking a holistic look at their socioeconomic status and at their nutritional patterns. This project integrated these variables by examining the nutrition transition, socioeconomic status, and prevalence of metabolic syndrome among the Tsimane', an indigenous

population from Beni, Bolivia. Relevant literature on metabolic syndrome, the nutrition transition, and the socioeconomic status of Bolivia's indigenous populations was reviewed in order to provide a comprehensive background for the research question. Data collected in 2009 as part of an ongoing study on the Tsimane' was then analyzed in order to determine prevalence of metabolic syndrome and its relation to socioeconomic status among this particular population. Overall prevalence of the syndrome among a small sample of the Tsimane' (n = 340) was found to be 22.06%, with 8.19% of men and 32.09% of women having the syndrome, much higher than initially expected. When an indicator of personal wealth (value in Bolivianos of all assets and animals owned by the subject) was regressed with overall metabolic syndrome score, a positive correlation initially emerged, but further analysis showed that this relationship was likely due to the confounding effect of age. At this time, therefore, no relationship appears to exist between socioeconomic status and metabolic syndrome among this sample of the Tsimane'. Knowing the prevalence of metabolic syndrome and whether or not it correlates to socioeconomic status in a group like the Tsimane' provides knowledge crucial for future prevention of the syndrome in developing populations.

### ନ୍ଧର

### Meghan Kerwin

# Faculty: Eric Schulz

# A Comparative Study on Trust towards Native and Foreign Strangers in Denmark and the United States

Seven-year-olds riding their bikes to school on busy city streets. Purses left at empty tables in coffee shops while their owners take bathroom breaks. No physical barrier preventing passengers who have not paid to take a ride on the metro. The amount of trust in Denmark is remarkable, especially compared to that in the US. But are Danes really more trusting than Americans? And if they are, how does their trust differ towards citizens and foreigners? In this study, 240 students at the University of Copenhagen and at Northwestern University were asked to play Berg, Dickhaut, and McCabe's trust game. Students were given the opportunity to entrust money to a stranger, whose citizenship was only sometimes identified, in the hopes that they would return some money out of fairness. The entrusted money served as a measure of trust towards strangers, while the returned money functioned as a measure of appreciation of trust. While about 75% of Danes entrusted the entirety of their money to their unknown partner, only 30% of Americans did the same. Results show that the amount of trust Americans have towards others varies from person to person, whereas Danes tend to be in agreement to have faith in others. And interestingly enough, while Danes tend to reward trust equitably, Americans tend to highly award trusting partners. Understanding the level of trust towards strangers in a society is extremely telling of how nations function economically, politically, and socially, and can inform how we individually encounter business decisions and social situations.

#### Maria Kovalchuk

#### Faculty: John Schafer

# Reconciling Religion in Sophocles' Antigone

This paper examines the complex nature of religion in Sophocles' Antigone. Traditional scholarship characterizes Creon as a champion of the city and Antigone as a protector of religion. With the support of Greek historical texts, I argue that piety alone is the most important concern in the play. Two different interpretations of it exist: Creon's popular version against Antigone's personal alternative. Creon recognizes gods who are worshipped in the city's festivals and temples, who support and protect the *polis*. Antigone's religious perspective falls outside of the civilized framework. Her gods, older than the *polis*, are deeply intertwined with blood relation, not the community, and are consequently different from the Olympian pantheon. While the two religious perspectives may seem to be conceptually irreconcilable, they clash only because Creon and Antigone embody and animate them in an abusive way. Tiresias and Ismene attempt to reconcile the two religious points of view, but they are hindered by the protagonists' obstinate natures. I suggest that the *oikos*, a place where the public and private realms meet and negotiate, provides a true and permanent solution to Creon's and Antigone's religious disagreement, but no character (and no scholar, to my knowledge) identifies it.

#### ୬୦୧୪

#### Peter Krivicich

#### Faculty: Jonathan Caverley

### Truth is the First Casualty: Media Manipulation and the Chechen Wars

Post-Soviet Russia's first internal war against the breakaway republic of Chechnya, from 1994-1996, was largely unpopular because of the Russian military's failures and the Russian government's missteps. The second, from 1999 to 2009, saw overwhelming support despite equally high casualties and costs, and ultimately, a similarly disappointing outcome. Why did the Russian public accept and support a second war after such an unpopular conflict? While a combination of several factors generated and sustained greater public support for the Second Chechen War, I argue that this phenomenon can be attributed primarily to a more deferential, optimistic, pro-Russian press, which itself was cultivated by the Russian government's media control policies. To investigate the relationship between these policies and public opinion, I examined thousands of headlines from four print news agencies and compared them to casualty rates, fluctuations in public support for the war, and television coverage figures. I found that Russian officials intentionally affected the amount and depth of press coverage of the Second Chechen War in order to generate and maintain public support for the war. The Kremlin's media control policies, attitudes, and practices lend insight into the nature of counterinsurgency and intra-state conflict in the modern news media environment, especially in the context of a newly free press and an increasingly autocratic government.

#### Karolina Kucybala

#### Faculty: Ann Harris

# Collagen XV: A Possible Tumor Suppressor in Pancreatic Cancer

Pancreatic cancer remains one of the deadliest cancers due to its rapid metastasis, lack of early detection methods, and few effective treatment options. Thus, there is an urgent need for more research studying the mechanisms of pancreatic cancer development. Collagen XV, a non-fibrillar collagen located in the basement membrane zone of many tissues, is lost prior to basement membrane invasion in various cancers and acts as a dose-dependent tumor suppressor in vivo. Recently, collagen XV was found to be lost in pancreatic cancer tumors, and in the pancreatic adenocarcinoma cell line, BxPC-3, was discovered to inhibit collagen I-induced epithelial to mesenchymal transition (EMT), a program that confers invasive and motile capacities to the cancer cell. My research investigated the role of collagen XV in the suppression of pancreatic tumor progression by studying its interacting partners and the effects of its overexpression on collagen-I induced EMT in the S2-013 pancreatic adenocarcinoma cell line. Co-immunoprecipitations revealed collagen XV interacting with DDR1 and E-cadherin, two cell surface receptors aberrantly expressed in many cancers and found to interact with collagen XV in the BxPC-3 cell line. The phosphorylation levels of FAK and PYK2, two downstream kinases of the collagen I pathway, were discovered not to change significantly in collagen XV-expressing cells plated on collagen I although these levels were found to increase and decrease respectively in BxPC-3. Through its interactions with cell surface receptors implicated in various cancers, collagen XV promises to be an important protein in the understanding of pancreatic cancer.

#### ୬୦୧୪

#### Mirasbek K. Kuterbekov

#### Faculty: Ramille N. Shah

#### Carbon-Based Nanoparticle Reinforced Hydrogels for Tissue Engineering

Hydrogels have demonstrated great success in tissue engineering due to properties that mimic natural extracellular matrix. However, clinical application of hydrogels is limited due to low strength. To increase mechanical stiffness, we investigated the reinforcement of gelatin hydrogels using biocompatible carbon-based nanoparticles, namely, nanodiamonds (NDs) and DNA-coated single-walled carbon nanotubes (SWCNTs). Gelatin solutions incorporated with nanoparticles maintained excellent nanoparticle dispersion and were fabricated into cross-linked hydrogels. Mechanical testing showed significant increase in elastic modulus in both compressive and tensile modes. 3D printing was also explored as a means of creating micro-patterned tissue engineering scaffolds. The printed scaffolds were seeded with human mesenchymal stem cells to evaluate cell compatibility Nanoparticle-reinforced gelatin hydrogels supported comparable cell viability to that of pure gelatin hydrogels. These results show great promise using carbon-based nanoparticles to increase mechanical stiffness of hydrogels. Future directions may include incorporating functionalized nanoparticles as platforms for drug and gene delivery.

# Ryan Lam

# Faculty: Jason A. Wertheim

# Construction of Thromboprotective Vascular Grafts Using Tissue Decellularization

Small-diameter vascular conduits (<6mm) used in cardiac bypass and organ transplantation surgeries are problematic because they are highly likely to clot. We have attempted to construct vascular grafts that will protect against clotting by decellularizing rat aortas, coating their extracellular matrices (ECM) with poly(1,8-octanediol-co-citrate) (POC) - a biocompatible, biodegradable polymer that supports the formation of a functional endothelium - and conjugating heparin to this POC. Decellularization was achieved by subjecting aortas to lateral flow in 1% Triton-X and 1.5% sodium dodecyl sulfate. POC was coated onto the decellularized aortas by submerging them in POC prepolymer and post-polymerizing at 80°C and 45°C. Heparin was then bound to the POC through a 1-ethyl-3-[3-dimethylaminopropyl] carbodiimide (EDC) cross-linker. H&E and DAPI staining confirmed decellularization of the aortas, and DNA quantification indicated that ~85% of native DNA was removed. We have also demonstrated that POC was successfully coated onto the aortas by visualizing the POC layer with an H&E stain. Moreover, we have been able to use a toluidine blue assay to demonstrate the uniformity of the heparin coating and to quantify the amount of heparin conjugated. Most notably, we have shown that using EDC to bind heparin to a POC-coated graft results in a significantly higher amount of heparin than when using EDC for a non-POCcoated graft. We are currently attempting to generate a functional endothelium on POC-coated, heparin-conjugated grafts, and are investigating the thromboresistance of these grafts in a rat model.

#### ନ୍ଧର

# **Taylor Layton**

# Faculty: Alessia Ricciardi

# Deleuze and Guattari's Successes and Failures in Understanding Modern Electronic Music

For Deleuze and Guattari (henceforth, Deleuze), art holds a special relationship to truth and chaos, comparable only to science and philosophy. They find music as the 'most powerful' art form; it begins where all others end. Although they apply their theories mostly to classical art (and rarely modern or pop music), subsequent theorists have employed Deleuze's analysis to music from many genres and cultures. In order to flesh out a theory of music and art, I juxtapose Deleuze's theories with modern electronic music. Based on secondary scholarship and my own listenings, I selected a few examples that best highlight the development of Deleuze's both philophically and artistically. These examples come largely from deep house and minimalism, though not exclusively. In line with Deleuze's project, I do not aim to create a totalizing system that comprehensively explains all examples, but rather a tool-kit of concepts that complements and enhances the experience of modern electronic music. Most notably, I seek to find the limitations in Deleuze's understanding, possibly produced by ignoring modern music like pop and conceptual art, categories where much modern electronic music falls. In addition to reworking some of their most famous and enigmatic concepts, such as 'coefficients of deterritorialization,' I problematize the tripartite division of music, science, philosophy. In a world where mixed media landscapes, conceptual art with philosophical

tendencies, and blurring between disciplines is ever more prevalent, we must break with Deleuze's schematization in order to maximize our appreciation of art, even if we borrow his vocabulary.

#### ନ୍ଧର

#### Ann Hyunji Lee

# Faculty: Jeffrey Winters

# Ethnic Politics of Nation Building and State Preservation in Singapore

The project looks at whether Singapore's political elite still views their Muslim and Malay minority as threats to national security because of its geopolitical relationship with Malaysia and Indonesia. It looked at the history of ethnic conflict and existing governmental measures to control ethnic conflict between the Chinese, Malays and Indians, and whether their policies were race-sensitive and their effects. The study was conducted by meeting with professors in sociology, political science and military studies to get expert opinions on the current relationship of the Singaporean government and the Malay population. Analysis on government publications and academic articles also constitute the majority of the study. The study reached the conclusion that the political elite do not consider the Malays as an internal threat because of the increased integration of the Malay middle class into mainstream Singaporean society. After eliminating other sources of geopolitical pressure such as mistrust of the Malay population and national defense capacity, the study identified the biggest national security threat for the political elite as the foreign influx of radicalized Islam into Malay society. Singapore's relationship with radical Islam is unique because Singaporean domestic stability relies on ethnic harmony, and Muslim terrorist acts could result in the unraveling of societal balance that the government has taken such care to construct. The conclusion is significant because it identifies the increasing radicalization of Islam as a main security dilemma in the Asia-Pacific region that concerns not only states with separatist Islamist forces but also affects neighboring states.

#### ନ୍ଧର

# James Lee

#### Faculty: Chris Kuzawa

# Preterm Delivery as a Predictor of Diurnal Cortisol Profile in Adulthood: How All Men Are *Not* Created Equal and Its Implications for Our Biology and Health

There is much evidence that fetal exposure to cortisol can lead to programming of the hypothalamic-pituitary-adrenal (HPA) axis, and thereby have long-term impacts on health. Prematurity is a condition in which fetal exposure to maternal cortisol is likely modified, but little is known about whether prematurity predicts outcomes in HPA function. This study investigates the significance of prematurity as a predictor of HPA function, indicated by diurnal cortisol profile, in a population from Cebu City, Philippines. Associations between prematurity and various cortisol measurements were analyzed in a sample population in the Cebu Longitudinal Health and Nutrition Survey. The results show that individuals born premature have lower morning cortisol, higher evening cortisol, and flatter diurnal cortisol decline compared to term-born individuals. The effects were mainly driven by males. Cortisol level and its diurnal rhythm have been shown to influence

later-life health outcomes. The hypothesis of prematurity as a predictor of modified adult HPA function can provide better understanding of mechanisms involved in HPA programming and preterm birth. The findings also have clinical implications in screening, prevention, and early intervention effort for adult diseases associated with HPA axis programming as well as in tackling the public health problem of premature births.

# ହ୍ୟ

# Alyssa Lloyd

# Faculty: Lynne Kiesling

# Examining the Political and Economic Effects of a Carbon Tax on Australian Small Businesses

Climate change is one of the most pressing challenges confronting countries today. One hotly contested, politically problematic approach that some countries have adopted in response to climate change is the implementation of a carbon tax. Australia is one of the most recent additions to this list, as its carbon tax went into effect in July of 2012. My research explores the implications of the tax in Australia immediately before and after it went into effect, focusing specifically on the experiences of small businesses. To complete this research I carried out detailed interviews with 36 small business owners in Melbourne, Australia about the anticipated and actual effects of the tax, both economic and political. I conducted interviews with owners of retail shops, restaurants, hair salons, and other businesses that ranged in size from one person to 44 employees. Based on my research I have drawn many conclusions about the effects of the carbon tax on small businesses in Melbourne that likely apply to small businesses throughout Australia. These findings are related to general economic effects, political views, and interactions with the government regarding the tax. The Australian experience is very interesting and provides important insight as to how a national carbon tax might affect small business in the United States.

# **ନ୍ଦେର୍କ** Hannah Lu

# Faculty: Seth Corey

# Trends, Outcomes, and Characteristics of Pediatric Oncology Phase I and II Studies

Abstract: Tremendous improvement in the overall survival of pediatric cancer patients has occurred over the past 40 years, but this may be slowing down. Continued progress depends on development of new drugs and their prompt evaluation in clinical trials. Because of a perceived increase due to a greater number of drugs in development in adult oncology clinical trials, we examined recent trends and outcomes of early phase clinical trials conducted in pediatric oncology. We conducted a literature review using PubMed and examined articles between January 2005 and December 2010. We identified 75 early phase trials, 64 drug and 11 immunotherapy, involving 2,286 patients below the age of 22 years. Complete or partial responses were observed for 5% (phase I) and 19% (phase II) of patients. Study-associated deaths occurred in 5% (phase I) and 20% (phase II) of patients with progressive disease accounting for the vast majority of these deaths followed by infection. Pediatric early phase drug trials demonstrated efficacy with low toxic deaths. Pediatric trials, including

immunotherapy trials, showed less industrial support and longer phase II enrollment times than adult trials. Published pediatric oncology early phase trials have not shown the same linear increase as did adult trials. Multiple causes for reduced pediatric cancer trial activity exist, and this study should encourage multiple interventions: legislative, economic, behavioral, and scientific, to close the adult-pediatric gap in cancer clinical trials.

### ହ୍ୟ

# Nicole Amani Magabo

# Faculty: Jeff Rice

# Effects of Globalization among Local Social Entrepreneurs in Uganda

This research project investigated the influences of globalization through advancing media and technology access among young social entrepreneurs in Uganda. Prior to data collection, the study focused on women entrepreneurs. However, partnerships between women and men dominated the population of these small business owners. The project aimed to document the increasing adaptation of foreign tools to promote businesses founded by youth through wide-spread use of new media and technology. The project was carried out in Kampala, Uganda, over the course of 20 days. Four young social entrepreneurs from diverse industries and socioeconomic backgrounds were interviewed, alongside a media analyst and business faculty member from a local university. Observations were done through photography and oral interviews. My research revealed that young social entrepreneurs are quickly becoming agents of change in influencing social and consumer behavior among impressionable groups in the country's population. Both genders that were interviewed expressed intent for greater business interaction, weakening cultural customs that have always upheld differing economic responsibilities for men and women. Various media platforms have allowed the perpetuation of globalization and dilution of a singular geographical culture. Increased access to advanced technology provide cost-effective marketing options and fortify communication networks across the country.

### ନ୍ଧର୍ୟ

# Mauricio Maluff Masi

Faculty: Charles W. Mills

# World White Web

My project was to challenge a utopian way of thinking about the Internet. This is the view that sees the Internet as somehow abstracting away from the social differences of the real world, such as race, class, and gender. I focused on the case of race to show that this view is incorrect, and that, instead, the Internet reproduces racial inequality, if in different ways. I used philosophical methods drawing on the tradition of Critical Theory to show that under the Internet's veil of equality, the real world's inequalities are just as present. I concluded that even when race is hidden on the Internet, racethinking shapes the way people experience online discussion, and that when race is made visible, it is all the more visible because it is often hidden. This is because we cannot forget our lived experiences in a raced world by merely putting a screen in front of our faces. While I focused on the case of race, I hope that my critique can be extended to other social inequalities, and that my research can contribute to a larger critique of this utopian way of thinking about our virtual interactions.

#### ନ୍ଧର୍ୟ

#### Mallory Mattimore-Malan

#### Faculty: Dan McAdams

# Narrative, Professional Identity, and Education Reform: A Qualitative Analysis of Public School Teacher's Narrative Experience of the Chicago Teacher's Union Strike

This study sought to understand the impacts of the Chicago Teachers' Union Strike on teacher's identity and perceptions of self-as-teacher. During a strike, teachers enter a unique context in which they must balance being accountable to the union and their peers, maintain their commitment to do what is best for students, and negotiating for a complex political agenda, all while under increased public and media scrutiny. To understand how this social context may have influenced teachers' identities, this study used the Narrative Identity Model (McAdams, 2011) to gain perspective into the striker's experience. A total of fifteen Chicago Public School teachers were asked to tell the story of themselves as teachers and to describe their experience of the CTU strike. These interviews were coded and analyzed following the grounded theory method. The results of this study indicate that public perception and discourse in the media play a major role in determining teacher's sense of legitimacy both personally and regarding the strike. The findings support existing work in the fields of identity development, coalitions and power, and education reform.

#### ନ୍ଧର୍ୟ

### Allegra Mayer

#### Faculty: Brad Sageman

# Geochemical Evidence for Changes in Local Redox Conditions in the Western Interior Seaway during Ocean Anoxic Event 2

Ocean Anoxic Event 2, which occured 94 million years ago at the transition from the Cenomanian to Turonian, is characterized by a positive excursion of both organic and inorganic carbon isotopes. This excursion is recorded in cores and outcrops around the world, indicating a global driver of the ocean anoxic event. This study measured carbon and sulfur isotope ratios from an outcrop in Bunker Hill, Kansas, on the Eastern Margin of the former Western Interior Seaway, a shallow sea stretching through Western North America. Based on geographical conditions, stratigraphy and comparison of pyrite and carbonate associated  $\mathbb{E}3$  isotope excursions with organic and inorganic  $\square^3C$  excursions, this study suggests that the Eastern Margin experienced locally more intense periods of anoxia than the western margin, prohibiting bioturbation to result in more extreme changes in the sulfur isotope record. The Bunker Hill organic carbon and carbon associated sulfur record is consistent are consistent with WIS and global trends resulting from increased ocean productivity and subsequent ocean anoxia. Some hypotheses for the drivers of OAE2 include large scale volcanic events or oceanic upwelling of nutrient rich bottom waters, and the corroboration of

these hypotheses require further exploration. The study of the drivers and effects of perturbations to the Cretaceous carbon and sulfur cycles are relevant to understanding implications of modern day climactic responses to anthropogenic elemental perturbations.

#### ନ୍ଧର୍ୟ

#### Mark McLoughlin

#### Faculty: Andrew Roberts

# The Church vs. the Media: Towards a Humanization of Gay Rights in the Republic of Ireland

Although stereotypically considered a very insular and conservative Catholic nation, the Republic of Ireland has undergone a dramatic social shift throughout the past few decades in terms of public opinion on gay rights. When the "sodomy" laws were lifted in Ireland in 1993, less than half of Ireland thought that gay sexual activity should be legal. Now, public opinion polls show that up to 75% of Irish citizens are in favor of full marriage equality for gay couples. Using the interviews I conducted all around Ireland during a three week research visit, analysis of public opinion data, and an intensive literature review on the subject, I argue that this change within Ireland is not merely the result of international influence and pressure. I see this dramatic reversal of public opinion as an internal "Irish phenomenon" that resulted from an increased media presence and a decreased Church presence. The Catholic Church, the moral pillar of Irish society for centuries before Ireland was even a nation, imploded in the 1990's and lost most of its "moral monopoly." While the media helped to bring about this, the media also humanized the lives of gay women and men in a way that was never possible while the country was under the thumb of the Catholic Church. As Irish gays and lesbians began to appear "normal" on television and radio, Irish people took to heart the innate sense of "fairness" that Irish citizens proudly assert one of their country's cornerstone values. With a binding referendum forthcoming on the issue of gay marriage, the world will soon see how fair a country Ireland is.

#### ഇരു

# Dhrumil Mehta

# Faculty: Doug Downey

### Political Framing: A Machine Learning Approach to Rhetorical Analysis

In their seminal work, *Metaphors We Live By*, George Lakoff and Mark Johnson argue that conceptual metaphors are deeply embedded in our language. A conceptual metaphor is a domain through which we can understand an idea. For example, one politician may frame speech relating to immigration using the "conceptual metaphor" of crime, whereas another may frame immigration in terms of economic development. The aim of this project is to take a computational approach to the study of rhetorical framing, especially as it pertains to 21,000 speeches in the both chambers of the US Congress in the past 15 years. I have trained a multinomial Naïve Bayes classifier to classify speeches based upon the categories assigned to them from the Capitol Words API query used to retrieve them. After ascertaining that the classifier works with a good degree of accuracy, rather than asking it to classify a novel speech, we instead ask it to classify the bag-of-words that is intended to model a

frame. Analyzing the log-likelihoods that result from the classifier, we can see how frames relate to speeches about each topic. Anomalous data points in the results can help us to find sudden shifts in the rhetoric of a politician for further investigation. This analysis can be particularly powerful when cross-referenced with bill passage, voting behavior, and campaign finance data. This research has the potential to advance political analysis by seeing the semantics of natural language as a form of data to be studied computationally.

### ନ୍ଧର

# Levi L. Mele

# Faculty: Lilah Shapiro

# The Mormon Effect: Exploring Religion, Family, and Class Influences on Human Capital in an Energy Industry Dependent Community

This study examines influences affecting an individual's choice to pursue post-secondary education for individuals living in a community dependent upon mining and oil field work. Employment in these industries can provide individuals, regardless of their educational attainment, with exceptionally well-paying jobs. Access to these jobs directly out of high school may dissuade individuals from pursuing higher education. This phenomenon has been documented in vibrant, single-industry dependent regions. However, I found that not all individuals make this choice, but instead elect to pursue higher education. What factors influence this decision? Using a single oilindustry dependent community as a case study, this research explores this economic phenomenon, with focus on the effects of religious, family and class based identities on individual choices. I argue that religion may be a confounding variable in the equation that would seem to predict a work over school choice and is functioning in surprising ways. Significant portions of the study population are members of The Church of Jesus Christ of Latter-Day Saints, a conservative Christian religion. While past scholarship tells us that participation in a conservative or fundamentalist-style religion is associated with lower levels of educational attainment and an lesser value placed on education overall, the LDS or Mormon church encourages its followers "to obtain as much education as possible." I argue that active LDS church involvement may lead individuals to strive for education in spite of potentially high economic and social cost and the appealing economic advantages of the oilfields.

### ഗ്രര

# **Catherine Merlo**

### Faculty: David Van Zanten

# Changing the American Dream: Los Angeles Residential Architecture 1938-1948

The climate and concentration of war industries caused a wave of American relocation to Los Angeles. For both private developers and the government, the problem then became how to house these new Angelenos within a twentieth century city. In 1938, community planner Clarence Stein brought his New Towns Movement to Southern California with the Baldwin Hills Village Green low-rent residential community. However, Stein's desire for low-density housing, surrounded by

greenbelt did not take hold in Los Angeles; post-war demand for individualized houses replaced community living with prefabrication and mass-production. Factory made homes were made possible by technological advances, yet often at the expense of design. The editor of *Arts and Architecture* magazine, John Entenza, sought to provide an avenue for well designed, yet mass-produced houses with his 1945 Case Study House Program. This thesis examines the development of design in Los Angeles residential architecture from 1938-1948, particularly how the Case Study House Program attempted to fulfill the post-war middle class desire for individualization. This thesis attempts to demonstrate how lower middle class housing could exist simultaneously with progressive design during the pre-war and post-war periods, and also how leading architects attempted to provide competitive housing for Los Angeles residents. Using the example of Ralph Rapson's significantly named Greenbelt House, this thesis ultimately strives to illustrate how the treatment of indoor v. outdoor and private v. public space was revolutionized through post-war residential architecture in Los Angeles.

### ନ୍ଧର

## Nick Merrill

### Faculty: Darren Gergle

# Map-Like Spaces Yield Better Memorization than Lists

When remembering something we have read, we often remember where on the page we read it. In fact, individuals "trained" in memorization have long used locational strategies (e.g. "memory palaces") as mnemonic aids. Does spatial arrangement offer an intrinsic benefit to long-term memory (LTM) encoding? 25 Northwestern undergraduates were asked to remember a set of words arranged either in a list, scattered in a two-dimensional plane, flashing one-at-a-time in a two-dimensional plane or flashing one-at-a-time in the center of the screen. Participants were subsequently asked to recall the words they studied. We found that studying information scattered in a two-dimensional space incurred better subsequent recall than did studying information arranged in a list. A cortical explanation for this phenomenon is proposed. Recommendations for students and information designers are discussed.

#### ହ୍ୟ

# Jennifer Mills

### Faculty: Brad Sageman

# Sulfur Cycle Dynamics during the Early Aptian OAE1a: Implications for the Mechanisms Driving Cretaceous Ocean Anoxic Events (OAEs)

Oceanic anoxic events (OAEs) were short-lived episodes of widespread marine organic carbon burial that occurred during the Cretaceous (145-65 Ma). Characterized by rapid onset, a geologically brief time span, and major perturbations in climate, OAEs represent some of the most profound disruptions of the global carbon cycle preserved in the sedimentary record. Several hypotheses have been proposed to explain these intervals, yet none have satisfactorily accounted for their short-term character and widespread effects. Recent work has focused on the role of sulfur in initiating and terminating OAEs, and more specifically, the potential impact that fluctuating marine sulfate levels may have had on nutrient recycling efficiency, and ultimately, photosynthetic carbon production. To further investigate the potential role that S played in regulating OAEs, we analyzed the C isotope composition of carbonate and the S isotope composition of carbonate-associated sulfate (CAS) and pyrite (FeS<sub>2</sub>) from sediments collected at Resolution Guyot (ODP Site 866) that straddle the early Aptian OAE1a, one of two major OAEs recognized in the Cretaceous. A decrease of ~5‰ in the S isotope composition of CAS is observed throughout the OAE1a interval, while TS values (indicative of marine sulfate concentration) remain high and relatively stable during the event. These results, coupled with implications from strontium isotope data, suggest that changes in the S-cycle during OAE1a were dominantly driven by increases in volcanism and hydrothermal activity, and not simply large-scale evaporite deposition that forced a drastic reduction in marine sulfate levels and associated rates of pyrite burial, as previously hypothesized.

#### ഗ്രര

# Jacqueline Montgomery

# Faculty: Bruce Spencer

#### Evaluating the Numbers of Refugees from Mali during the 2012-2013 Crisis

In emergency situations involving refugees, the United Nations High Commissioner for Refugees (UNHCR) and partner aid organizations rely heavily on statistics to understand the situation at hand, provide adequate resources to support the refugees, and ultimately help refugees return to a more stable and productive situation. In particular, refugee registration is relied upon to track refugees as they enter camps and to provide critical demographic information about the refugee population. The accuracy of refugee statistics has long been questioned and aid workers frequently report that UNHCR undercounts refugees. If UNHCR doesn't know how many refugees there are, they can't plan to adequately support them. In recent months, UNHCR has been heavily involved in assisting Malian refugees. The number of refugees in the Malian emergency is growing and the impoverished countries of asylum are straining to support them. I analyzed the available registration numbers in an effort to understand the relationship between refugee flows and the events in the Mali crisis. While general upward trends in the number of registered refugees seemed to be well explained, occasionally the numbers sharply and inexplicably decreased. Additionally, UNHCR's count of all registered Malian refugees consistently lies well below the sum of their counts from the refugee camps in the 3 countries being studied. Such anomalies in the data fuel a variety of questions about how statistics inform us about the distribution of refugees. While such numbers are considered critical to aid efforts, their true value is uncertain if their reliability is unpredictable.

ഇരു
#### Melanie Nehrkorn

#### Faculty: Alvin Bayliss

#### Dynamics and Patterns for Competing Populations with Nonlocal Interactions

We consider a model of two competing species. The model involves a linear net birth rate (birth rate minus death rate) and a quadratic augmentation of the death rate for large populations modeling competition for scarce resources. The competition term is nonlocal, i.e., for any point in space it is determined by the weighted average of the population over an interval around the point, an approach that is more realistic than just considering local competition. The result is a system of integro-partial differential equations. Nonlocality is generally destabilizing when the averages are taken over a sufficiently large interval. In this case equilibrium populations that would be stable for local competition are no longer stable and thus would not be observed in nature. The instability is studied via a linear stability analysis in which the system is linearized and conditions for a transition from stability to instability are determined. The nonlinear behavior far from the stability pattern is studied via numerical computations using a Fourier pseudospectral numerical method to solve the fully nonlinear system. We find nonlinear patterns including the formation of islands (regions of nonzero population) separated by deadzones where the species are essentially extinct. These patterns can exhibit complex behavior, including the formation of colonies where a small colony forms ahead of a parent island and then grows at the expense of the parent. These results provide a detailed analysis of the impact that nonlocality has on population evolution.

#### ନ୍ଧର

#### **Claire Nelson**

#### Faculty: Joel Peter Rosenfeld

# The Truth is All Over Your Face: Deception in the Legal Arena

The ability to detect deceit in defendants and witnesses is vital in order for juries and judges to make informed decisions and render appropriate verdicts. However, the acceptance of deception detection techniques into the courtroom is a difficult process, as scientific evidence must meet legal requirements and standards and jurors are often untrained in understanding the methods behind detection. In this analysis, I examine the role of facial expressions and facial indicators in detecting deception as well as the current state of the ability of lie catchers to detect deceit. I then analyze the existing legal standards of accepting scientific evidence into the court and whether or not admissibility of facial indicators of deception is appropriate, and, finally, how research must proceed if a condition of admissibility is to be achieved. I conclude that facial expression evidence does not yet meet the criteria necessary for legal acceptance, and future research is necessary.

#### ହ୍ୟ

# Janice Li North

# Faculty: Linda Garton and Janet Barrett

# At the Intersection of Performing Arts and Liberal Arts Education: A New Program Design Framework and Student Initiatives Proposal

This research reports the results of an investigation regarding the challenges faced by five-year music-liberal arts dual degree students at Northwestern University and those at Harvard College in collaboration with New England Conservatory. It also challenges the existing interdisciplinary framework built on prescribed academic expectations by emphasizing students' personal and intellectual growth as well as career development in the context of two distinct educational purposes- specialized, conservatory-style music training contrasted with a broad liberal arts curriculum. I interviewed 40 students, faculty, advisers, and administrators in the dual degree programs in order to better understand the program's goals and the effects on students. The interviews revealed that all dual degree students must overcome two challenges: prioritization and assessment in a multidisciplinary environment. Further, these challenges are uniquely manifested in four types of students: Dual Achievers (determined goals, undetermined alternatives and backups), Safe Players (determined goals and backups, undetermined alternatives), Non-Committers (determined alternatives, undetermined goals and backups), and Explorers (undetermined goals, alternatives, and backups). A unifying theme across the two challenges and four types of students highlights the need for students to act as their own advocates, resisting the restrictive course selection and all other constraints imposed by departmental, interschool boundaries. Ultimately, my research proposes a new program design framework that updates the scholarship about multidisciplinary education in terms of coordinating, advising, faculty mentoring, and career building in order to cater to the diversity of multidisciplinary students' passions and needs.

# ନ୍ଧର

# Leah North

# Faculty: Mark Hauser

# Moonlit Cruises with Co-Eds: Men, Women, and the Masculinity of the Victorian Middle Class at the Northwestern Lifesaving Station

This study provides an historical archaeological analysis of the lifesaving station that existed at Northwestern University in Evanston, IL which was staffed by male students from 1876-1913. Using this institution as an example of the early integration of women at a private university, this project uses the archaeological phenomenon of embodied space to assess how men reacted to women's presence at an institution that was predominantly constructed as a male space. Furthermore, it strengthens the field of the archaeology of higher education through a study of the ways in which socioeconomic class intersects with gender to affect access to higher education, how gender ideologies perpetuate inequalities between male and female education, and the ways in which these inequalities were demonstrated spatially on campus. Finally, it examines the phenomenon of social memory to see how Victorian ideals of masculinity were perpetuated in the public landscape. The body of this research evaluates the spatial distribution of gendered housing and academic buildings at Northwestern, a series of children's literature written about the lifesaving crew, as well as newspaper articles and public memorials on campus and in the surrounding community. These materials demonstrate the reassertion of Victorian masculinity through the celebration of the heroism of male students as a direct challenge to the introduction of women into a male-gendered space.

#### ହ୍ୟ

#### Roxana A. Obregon

#### Faculty: David H. Uttal

#### The Spatial Abilities of Middle Schoolers

Spatial reasoning was once believed to be a skill set that one was either inherently good at or not. Recent research, however, has demonstrated that spatial reasoning may be more malleable than was previously believed. Spatial reasoning has also been found to be uniquely predictive of success in STEM (science, engineering, technology and math). The objective of the current research is to examine the malleability of spatial ability among middle school children. A total of 20 students ranging from grades 6 through 8 were invited to participate in a 3-hour Saturday study involving hands-on engineering design activities, designed to assess and develop their spatial reasoning skills. Before the activities began, each participant was asked to complete two psychometric assessments of spatial ability—the Santa Barbara Solids Test and the Vandenberg & Kuse Mental Rotation Test. The students who scored higher on the Santa Barbara Solids Test and the Mental Rotation Test were expected to have a higher success rate with the engineering activities. For example, those students with higher scores were predicted to draw better top, front, and especially cross-section view sketches of a bridge. Additionally, the same psychometric assessments were administered at posttest to see if the engineering design activities led to gains in students' spatial reasoning abilities.

#### ହ୍ୟ

#### Ezra Olson

#### Faculty: Brian Bouldrey

#### Reading Wallace's Infinite Jest, Or: Reading, Wallace, and Infinite Jest

This project attempts to develop a theory of literature best suited to the study of David Foster Wallace's *Infinite Jest.* It draws on Wallace's annotations of two books: Leo Tolstoy's *What is Art?* and Mihalyi Csikszentmihalyi's *Flow.* In his notes to *Flow*, Wallace indicates a theory of mind and of language in which reading appears as a slow, effortful, and rewarding process. In his notes to *What is Art?* Wallace displays an intense awareness of the moral consequences of art, an interest in producing art morally suited to his contemporary context, and an openness to difficulty (which Tolstoy tends to disparage) as a morally effective aesthetic element. Combining these findings, I conclude that Wallace was aware of reading as an effortful process which both produces moral effects and constitutes a moral act. I then apply the above findings to a close reading of a portion of *Infinite Jest*, which I suggest provokes active, disciplined reading in a particularly practical and self-aware manner. Finally, I argue that this massive novel is structured similarly to a marathoner's training schedule, with chapter-lengths growing in such a way as to encourage ever-longer reading

sessions. I conclude that *Infinite Jest* represents both a moral argument for the disciplined attention that good reading requires, and a training ground for the reader to hone exactly that skill. With this research I hope to compliment the many thematic/philosophical approaches to Wallace's work burgeoning today by providing a disciplined and academic means of discussing the experience of reading his magnum opus.

#### ନ୍ଧର

# Kyeonggook Park

# Faculty: William Revelle

# Investigation of Factors that Influence Sunk Cost Bias

After paying a hefty fee at a buffet, we sometimes feel compelled to stuff down more food than we would otherwise eat had the same buffet been free. Such inclination to continue a task in which one has already made prior investment in is known as the sunk cost effect (Arkes & Blumer, 1985). Previous studies investigating the sunk cost effect have demonstrated the existence of sunk cost bias, found situational factors that affect sunk cost decisions, and highlighted the role of affective process in explaining the psychology behind sunk cost bias. The present study hypothesized personality to be a factor that affects whether one exhibits sunk cost bias or not. Also, this study investigated the existence of sunk cost bias both by utilizing hypothetical sunk cost scale items with different frameworks and by conducting an experimental study in which participants played an investment game that entailed actual monetary sunk cost and reward. Although this study failed to establish a clear relationship between personality traits and sunk cost bias, the results of the study found that people's sunk cost decisions varied from one situation to another. In other words, one person who exhibited sunk cost bias in certain framework did not necessarily display sunk cost effect in other situations. More specifically, the experimental portion of this study found that sunk cost bias is not elicited in a framework in which the initial sunk cost and the subsequent utility associated with one's decision are both in monetary units.

# ନ୍ଧର୍ୟ

# Neil Patel, Shivon Manchanda, Aarohi Shah, and Melissa McSweeney

# Faculty: Aryeh Routtenberg

# Function of Protein Kinase in Memory in Caenorhabditis elegans

To study long lasting olfactory memory in *C. elegans*, we conditioned the nematodes to form an association between the odorant benzaldehyde, an aromatic compound *C.* elegans are naturally attracted to, and a lack of food available in their environment. Assays that utilized their naïve attractive response were performed on N2 wild-type *C. elegans* and the pkc-1 mutant nj1, to determine how long the effects of the associative conditioning to these odors would last. We compared chemotaxis indices following conditioning for delay periods of 30 min, 4 hours, and 12 hours. We found that wild-type *C. elegans* form food-odor associations and retain them for at least 12 hours, which is approximately equivalent to 5.5 years of human life. Results show that nj1 mutants display less of a reduction in affinity following conditioning as compared to wild-type, which

demonstrates an impairment in memory. Interestingly, our results also showed a decreased affinity towards benzaldehyde in naïve nj1 nematodes, suggesting an impairment in the olfactory pathway. Thus, PKC mutants show not only impairments in food-odor associative memory, but potentially impairments in the olfactory pathway as well.

#### ହ୍ୟ

#### **Tirth Patel**

#### Faculty: Christian Petersen

#### An RNAi-Based Approach to Identify Genes Inhibited during Planarian Regeneration

The planarian flatworm Schmidtea mediterranea serves as an excellent model organism for studying the molecular basis of regeneration in animals due to its sequenced genome and tools enabling analysis of regenerative mechanisms. Many previous studies have identified genes that are necessary for proper regeneration in planarians. In this study, we aim to identify genes that must be inhibited for proper regeneration. Published datasets of gene expression levels before and after injury to planarians were analyzed to select a set of genes likely to be transcriptionally inhibited during regeneration. The expression patterns of these candidate genes were observed using whole-mount in situ hybridization of animals fixed before or after injury. Gene function was studied using RNA interference. RNAi animals were tested for defects in regeneration and homeostatic tissue maintenance. Of 59 candidate genes examined by in situ hybridization, six were found to be significantly down-regulated due to injury: CD63, BDP1, ESX-homeobox1, ABCB7, C12orf12, and another gene that has no known human homologues. Inhibition of these six genes did not cause visible external defects in regenerating or non-regenerating homeostatic animals. In future experiments, putative functions for such genes in regulation of stem cell number and cell cycle status will be investigated through immunostaining whole animals for markers of mitotic cells with an antiphospho-Serine10-histone H3 (H3P) antibody. More candidate genes will also be assessed by qPCR, allowing a faster, quantitative measure of gene expression to confirm down-regulation after injury. This screen may potentially identify important genes for understanding regeneration at a molecular level.

#### ହ୍ୟ

#### **Elizabeth Pinedo**

#### Faculty: Ana Aparicio

#### Working-Class College Students' Perspectives on University Recruitment

In a recent edition of National Public Radio's (NPR) daily syndication of "Morning Edition," Shankar Vedantam illustrates a contemporary paradox within the realm of education: despite increased incentives, including greater financial aid, top universities are struggling to enroll highly talented, low-income students. Though some college administrators have countered that qualified students from working class backgrounds simply do not exist in significant numbers, an analysis by Caroline Hoxby and Christopher Avery (2012) suggests otherwise. This ethnographic project seeks to explore the question: in what ways do first-generation and working class students describe their

experience applying to elite, private universities? In what ways do their narratives illuminate the under-representation of working-class students? Although an emphasis on the recruitment of racial minorities has continuously been highlighted through affirmative action policies, more attention must be paid to economically disadvantaged students. Through a combination of participant-observation at information sessions and guided tours, interviews with college administrators and students, and archival research, perspectives of both administrators and students at an elite university in the Midwest will be recognized. This combination of three methods allows for insight into how marketing efforts are perceived by administrators and experienced by students. An analysis of gathered data indicates that elite universities should increase outreach to low-income students.

#### ഗ്രര

# **Bethany Polhamus**

# Faculty: Carolyn Chen

# Decision Points: How Educated Evangelical Women Navigate Marital Choices

Since the 1960's and 1970's the United States has continued to see a delay in timing of first marriage as well as a growing acceptance of premarital sex and cohabitation. In contrast, Evangelical Christians have retained more traditional family values by encouraging couples in their congregations to marry but to abstain from sex and living together until after the wedding ceremony. Yet to what degree does adherence to these values actually affect the marital choices of highly educated women in Evangelical Christian churches? To determine this I conducted 24 in-depth interviews of college educated Evangelical women in the Chicagoland area, primarily between the ages of 24 to 36. I also observed over 30 hours of four women's Bible studies to discern the values of Evangelical Christian women outside of an interview context. I found that religious adherence played a significant role in how women made marriage decisions, primarily by marrying Christian men and abstaining from sex before marriage. My findings also supported that the level of exposure to conservative religious values at a young age, attending a Christian college, and the prevalence of divorce or other significant life stressors in a woman's life correspond to the timing of first marriage. The effect of religious belief on causing an earlier marital age and partner choice within Evangelical circles nuances the studying of marital trends within the United States.

# ନ୍ଧର୍ୟ

# **Robert Porter**

# Faculty: Richard Morimoto

# Trans-Cellular Chaperone Signaling Regulates Organismal Proteostasis

The molecular chaperone, *HSP90*, is a central component of the protein homeostasis network that regulates heat shock transcription factor *HSF-1*, and consequently the heat shock response (HSR). However, little is known about how *HSP90* functions in a multi-cellular organism at a tissue specific and organismal level. Recent work in the Morimoto lab has shown that enhanced levels of *HSP90* in only one tissue-type in *C. elegans* affects the induction of the heat shock response in distal tissues with deleterious effects on organismal health. To investigate this idea, we created transgenic lines

that endogenously express *hsp90* hairpin dsRNA to knockdown *hsp90* in specific tissues (e.g. the intestine, body wall muscle, or neuron). Here we show that tissue-specific knockdown of *hsp90* in *C. elegans* results in the compensatory and constitutive up-regulation of heat shock proteins across multiple tissues of the animal. These data suggest a feedback mechanism that allows cells in an organism to communicate their state of protein misfolding, a process that we refer to as transcellular chaperone signaling. In addition, we observed that tissue-specific knockdown of *hsp90* leads to aberrant phenotypes that are associated with dysfunctions in non-target tissues. This corroborates *HSP90*'s crucial function in the regulation of phenotypic robustness from the perspective of tissue-to-tissue communication and suggests intrinsic co-regulation of the HSR with other organismal processes. Thus, this work has shown that constitutive proteostatic perturbation in a single tissue affects not only the stress response in distal tissues but could also be implicated in signaling pathways important in development.

#### ഗ്രര

#### Morgan R. Purrier

#### Faculty: Simone Ispa-Landa

#### What (and Who, When, Where, and How) is Coming Out?

Due to a changing social discourse, what it means to be gay or lesbian in America has undergone many transformations. This research focuses on providing a glimpse into the contemporary gay and lesbian experience for gay men and lesbian women in the emerging adulthood stage. It explores how gay men and lesbian describe their coming out experiences, the ways that they rationalize their decision to come out, and how they situate themselves in larger gay and lesbian communities. This research questions traditional coming out models that assume a linear process of self-disclosure of sexual identity, and seeks to provide a more nuanced and contemporaneous analysis of how gay men and lesbian women come to disclose their sexual identity and how they navigate their membership in larger sexually-identified communities. Through the interviewing of self-identified gay men and lesbian women, this research found that gay men described a greater amount of "social cost" in rationalizing their decision to come (or not to come) out, as compared with their lesbian counterparts. Additionally, gay men were more likely to describe an individualistic identity, while lesbian women articulated a collective one. Thus this research illuminates how the coming out process is a continual, non-linear process and the differences between how men and women come to disclose and situate their sexual identity.

#### ୬୦୧୪

#### **Charles Qin**

#### Faculty: Warren Tourtellotte

#### **IKAP** Function in Familial Dsyautonomia

Familial Dysautomia (FD; Hereditary Sensory Autonomic Neuropathy; HSAN III), an autosomal recessive disease that occurs almost exclusively in the Ashkenazi Jewish population, is one of the five well-recognized genetic disorders that hinder development and promote degradation of the

sensory and autonomic nervous systems. Symptoms of peripheral nervous system deficits in FD patients include autonomic crises, gastrointestinal dysmotility, diminished pain/temperature sensation, cardiac instability, and renal failure. A highly conserved point mutation located in the donor splice site of intron 20 in the human IKBKAP gene causes Familial Dysautonomia. As a result, FD patients express tissue-specific reductions of wild-type IKBKAP mRNA transcript preferentially in nervous system tissues. In addition, the predominant cell types that are putatively depleted due to the IKAP deficits in FD derive from the neural crest. My studies aim to elucidate the mechanism by which decreased IKAP expression levels result in the developmental abnormalities of the neural crest and its derivatives. The role of IKAP in neuron survival, target tissue innervation, and transcriptional regulation has been evaluated through the conditional knockout *Ikbkap*<sup>flox/flox</sup> Wnt1Cre+ mouse model in which IKAP is ablated only in neural crest-derived cells. In the absence of IKAP in neural crest precursors, target innervation abnormalities arise while the expression of key genes and neuronal survival are not compromised, revealing that IKAP may play a role in regulating and/or mediating innervation in neural crest development. These findings support the use of neuroimaging of innervation to peripheral tissues to profile the efficacy of future treatments on improving symptoms in FD patients.

#### ନ୍ଧର

# Joel Rabinowitz

# Faculty: Eli Gilman, Foreign Policy Research Institute

# Israeli Unity Governments and Their Impact on the U.S. - Israel Relationship

The United States and Israel have remained extremely close allies for decades, and the internal dynamics of Israeli politics play an important role in shaping the contours of the alliance. Determining the effect of Israeli national unity governments on the U.S. - Israel relationship helps to explain Israel's reaction to American policy initiatives and to inform America's foreign policy. A unity government forms when all the major parties in a political system join together to form the ruling government. This study chronicled the seven unity governments in Israel's history and their ability to withstand U.S. pressure using sources ranging from newspapers to scholarly documents. From the research, the major finding is that unity gives Israel the ability to act independently of American interests because it removes much of the domestic threat that internal disagreement poses to the ruling coalition. Israeli coalition governments tend to be very fractious and prone to the threat of collapse, a tendency that unity governments mollify. The implications of this study are that an Israeli unity government is more effective at taking decisive action and opposing American political pressure than simple majority coalitions. Despite the power of American pressure, Israeli internal dynamics exert a powerful influence in determining the objectives and strength of the relationship. The reasons behind forming the unity government determine the efficacy of that particular government at maintaining consensus within the ruling coalition. Those formed in response to external threats are far more effective at maintaining unity than those formed due to political expediency.

#### Harika Rayala

#### Faculty: Helen Schwartzman

# Stuck in Transition: The Impact of a Changing Geopolitical Environment on Idioms of Distress in a Himalayan Nomadic Community

ABSTRACT This paper focuses attention on culturally-dependent modes of expressing distress and the need to analyze particular forms of distress in relation to the effect of geopolitical environments on personal and community-level narratives. I draw on ethnographic data from the Himalayan Bakarwals, a nomadic goatherding community residing along the India-Pakistan border in Jammu and Kashmir, India. The Bakarwals are defined by their migratory lifestyle of herding sheep and goats in the Himalayan plains. This mobility of their livestock is central to their identities and separates them from other pastoral and tribal groups in that region. Particular means of expressing distress specific to the Bakarwals are discussed in relation to recent geopolitical pressures along this border region such as an increased army presence, decreased availability of pastureland, and a changing climate. I will focus on how such pressures have placed the Bakarwals in a transition state between nomadism, their current lifestyle, and settlement, a lifestyle that they are increasingly beginning to desire. Through subsequent analysis, it becomes evident that the notion of being "stuck" is reflected in the way Bakarwals both live and express distress in their lives. Somatization and frequent escapes from the community are specifically analyzed as symptoms of distress. To further explore this point, I present personal narratives and discourse on their lifestyle collected through fieldwork over a few months. With the recent emergence of modern psychiatric services in that area, the changing role and significance of local healers in the community are also noted.

#### ହ୍ୟ

#### Viktorie Reichova

#### Faculty: Thomas Meade

#### Co-Coum343Im: Cobalt Complexes as Self-Reporting pH Responsive Prodrugs

Research of metal complexes as potential therapeutics has gained increasing attention in the last few decades. The Meade lab has developed a cobalt(III) Schiff base complex (Co-sb) that inhibits histidine-containing proteins through an exchange of labile axial ligands. By inhibiting the proteins, the cobalt complex can target disease processes such as cancer metastasis (spread of primary tumor to other organs). A major challenge with metal-based drugs is that they can bind to other proteins in addition to the target, thus decreasing potency and inducing harmful side effects. The development of a prodrug, or a drug that will activate only under certain conditions, could address this challenge. A complex that would activate upon changes in pH has potential as an anti-cancer agent because tumor microenvironments contain lower pH levels than surrounding tissue, thereby making selective inhibition of cancer cells easier. I have been synthesizing and characterizing a pH-responsive Co-sb prodrug that activates under a low pH but under neutral conditions remains inactive. The complex exhibits fluorescence upon activation, and thus, the activity of the drug can be measured. I have synthesized this complex, called Co-Coum343Im, and verified its identity through NMR. I used a fluorimeter and pH meter to monitor the fluorescence of the complex under various conditions, and I have shown that under acidic conditions, the fluorescence greatly increases. These results

demonstrate that Co-Coum343Im has selective activation in acidic conditions and therefore has potential as an activatable therapeutic agent.

#### ୬୦୧୪

#### Tori Romba

#### Faculty: Regina Lopata Logan and Lilah Shapiro

#### The Roaring 20s and Sturdy 30s? How Millennials Traverse the Path from 25 to 35

Emerging adulthood theory describes ages 18-25 through 30, as a distinct stage marked by uncertainty in commitments, exploration of roles, and identity development. People often talk about their 20s and 30s as distinct periods, each possessing very different expectations for adulthood. Given these expectations and an unclear end to emerging adulthood, how do individuals emerge out of emerging adulthood? How do individuals understand adulthood and their own identities in their twenties and thirties? How do these understandings evolve as one transitions from his or her mid-20s to mid-30s? For this research I conducted open-ended interviews among men and women aged 24-26 and 34-36 years old. Interviews focused on individuals' understandings of intimate relationships, work and career, personal goals, and definitions of adulthood. Data were compared between age groups and gender categories. Findings suggest the following trends: Mid-20 somethings fear stagnancy in the form of mundane daily routine, stalled career advancement, and a lack in overall fulfillment. Mid-20 somethings suggested the word "adult" seemed final, and meant a life that was no longer exciting. Meanwhile mid-30 somethings seemed to think of adulthood as a time of desirable stability and a sense of establishment in identity, relationships, and work trajectory. Mid-30 somethings referred to their 20s as a time of chaos and anxiety that was challenging but necessary to experience. This study suggests important psychological and emotional development occurs throughout the twenties and thirties. Such development may be reflected in individuals' definitions of adulthood at each age.

#### ഇരു

# A. Cummings Rork

#### Faculty: Ken Paller

#### Training Procedures to Enhance Implicit Knowledge

From riding a bicycle to making split-second decisions, people use implicit memory to guide their actions every day. We set out to determine if the mechanisms of implicit knowledge could be improved using a visual recognition training paradigm. Prior studies by Voss and colleagues (2008) characterized testing methods that could produce implicit recognition. We used variations on these methods over extended testing periods to try to increase the extent to which people use implicit knowledge, which could then improve the level of recognition accuracy. We reasoned that providing participants with trial-by-trial feedback regarding their performance would allow them to capitalize on strategies to improve implicit recognition accuracy. In Experiment 1, participants practiced over the course of eight days, with feedback given for both guess and confident responses. In Experiment 2, practice time was condensed to two days and feedback was provided for only guess

responses. Performance outcomes from participants in Experiment 1 demonstrated a trend for slight improvement, whereas results from Experiment 2 did not indicate any difference from chance. Designing training measures that disengage participants from relying on explicit memory strategies, such as verbal association, and promote implicit learning and recall strategies is essential and poses interesting challenges. This experiment has demonstrated and helped us better appreciate the nuances of the study of implicit memory.

#### ନ୍ଧର୍ୟ

#### Laurie Russell

#### Faculty: Robin Nusslock

# Individual Differences in Reward Sensitivity and Affective Processing as Indexed by Event Related Brain Potentials (ERP)

Rewards play a central role in our everyday lives. Whether we are consuming a delicious piece of chocolate cake, receiving an A on a difficult exam, or beginning a new relationship, rewards often define our existence. The current study examines Event Related Brain Potentials (ERPs) to positive, negative, and neutral stimuli in individuals with high and low self-reported reward sensitivity. Participants completed a lexical decision task in which they were asked to determine whether a given string of letters formed a word or a non-word. The task included positive, negative, and neutral words in addition to non-words. Analyses focused on the P300, which is implicated in the allocation of limited attentional resources to stimuli that are motivationally or emotionally salient, and the late positive potential (LPP), which is concerned with the distribution of increased, sustained attention to arousing or emotional stimuli. We predicted that individuals with elevated self-reported reward sensitivity would display elevated ERP amplitudes at P300 and LPP to positive, but not negative or neutral, words relative to individuals with low self-reported reward sensitivity. In line with prediction, individuals with elevated reward sensitivity displayed elevated LPP amplitude to positive words than low reward sensitivity participants. Contrary to prediction, this elevation in the LPP was also observed to neutral and negative words, indicating elevated reward sensitivity is reflected in a neurophysiological sensitivity to stimuli across valence type. The difference between groups in LPP was accounted for by hypomanic symptomatology. No effects were observed at the P300. Results have implications for understanding the neural processes of reward processing and the pathophysiology of disorders associated with abnormalities in reward processing such as depression and bipolar disorder.

#### ഗ്രരു

#### Katie Sanford

Faculty: Morris Goldman and Matthew Smith

#### Functional Assessment of the Cuneus and Empathy in Schizophrenia (FACES)

Schizophrenia is a severe mental illness that causes deficits in social functioning and social cognitive constructs such as empathy, and social functioning has been shown to have a direct connection to social cognition, including with empathy. Patients with schizophrenia have been shown to have

lower brain activity than controls during empathic tasks, except in the cuneus. The cuneus is a structure at the back of the brain that primarily serves functions with vision, but the cuneus activity during empathic tasks is seen even when visual activity has been subtracted. Many researchers have suggested that the cuneus may be serving as a compensatory mechanism, but it has yet to be studied. This study used previously collected data for 27 patients with schizophrenia who completed self-report measures of social functioning and empathy. Patients had also completed two tasks measuring two of the core components of empathy (Affective Responsiveness and Emotional Perspective-Taking) during fMRI scans. The data was reanalyzed to compare cuneus activity between lower socially function patients (LF) and higher socially functioning patients (HF). Results indicated that activity was higher in LF than in HF, and the two patient groups showed no significant difference in scores on self-report measures of empathy. The cuneus activity in LF also correlated with several of the self-reported empathy measures, which indicate that they may be compensating in emotional empathy at the cost of elevated personal distress. This study may have implications on both research and treatment of schizophrenia.

#### ഗ്രരു

# Niabi Schmaltz

# Faculty: Edward Gibson

# The 2012 Québec Student Movement: Understanding Activist Patterns

In March 2011, Québec finance minister Raymond Bachand officially announced the Liberal Cabinet's plan to raise university tuition from C\$2,168 to C\$3,793 over a period of five years beginning in the fall of 2012. Over the following 17 months, hundreds of thousands of Québec students built a mass movement in opposition to the tuition increase. However, not all students participated in the movement, and distinct, but not immediately explicable, activist patterns emerged throughout the course of the struggle; namely, activism was much stronger at Francophone universities than at Anglophone universities. This research is situated in the constructionist perspective of social movements and represents an addition to the small but growing body of research that uses the theoretical insights of social movement literature toward explaining sustained student activism. I applied a methodology that combines interviews, a novel use of social media as an information resource, data on economic and social trends in Québec, and a collection of general qualitative information. Within my case study of four Montréal universities, the evidence suggests that varied levels of activism may be attributed to differences in the relative financial impact of the tuition increase, perceived implications of the tuition increase, and organizational efficacy.

#### ഗ്രരു

# **Rachel Scholes**

# Faculty: Neal Blair

# Plastic Marine Debris in Sediments at Lagartillo Reef, Costa Rica

Plastic pollution in marine environments is a growing environmental problem, as debris is frequently transported to the ocean by numerous routes. This plastic marine debris subsequently accumulates

on beaches, where it poses environmental and health hazards. Some beaches, known as marine plastic sinks, gather extraordinary amounts of plastic due to currents and shoreline features. Previous research has quantified accumulation of such debris at various locations. In this project, samples were collected from a marine plastic sink in Costa Rica and analyzed via FTIR-ATR spectroscopy to identify their composition and degree of degradation. The FTIR spectra allowed for identification of the types of plastic present at this beach, which mostly include common plastics such as polyethylene terephthalate and polystyrene. Previous studies have also identified the mechanism of polymer degradation in common plastics as an oxidation reaction. This was observed in the current study by analysis of the FTIR results, and oxidation was found to occur on many of the collected samples. Each sample was sliced through the center to allow for analysis of both surface and bulk compositions. By comparing oxidation product peaks on the surface of the plastic as it degrades. These results indicate that marine plastics undergo oxidative degradation on beaches, and that degradation is a surface process.

#### ହ୍ୟ

#### **Rachel Schwartz**

#### Faculty: Sanford Goldberg

#### Agreeing to Disagree: A Defense

In this philosophical research I examine two arguments for peaceful toleration of those with whom one disagrees about fundamental matters like ethics and religion. First, I examine the epistemological literature about disagreement, and I argue that the most reasonable reaction to a disagreement with an epistemic equal after full disclosure of evidence is to suspend belief. This grounds peaceful toleration because when one no longer has a belief, one can no longer justify intolerant attitudes towards those who disagree. Indeed, no one disagrees any longer. Second, I discuss an ethicalpolitical argument for peaceful toleration that stems from an approach to ethics called value pluralism. I argue that value pluralism suggests a politically liberal and non-coercive government, that people should follow the laws of the government, and therefore, that they should adhere to the value of non-coerciveness. Ultimately, I conclude that of the two arguments, the ethical-political argument for peaceful toleration is better than the epistemic argument.

#### ନ୍ଧର

#### Matthew Serafin

#### Faculty: Owen Priest

#### A Green, Guided-Inquiry, Collaborative Puzzle for the Undergraduate Teaching Lab

The Passerini multicomponent reaction is a chemical reaction in which a carboxylic acid, an aldehyde, and an isocyanide react to form an  $\alpha$ -acyloxy amide. Recent findings suggest that the Passerini reaction can be carried out in water instead of traditional organic solvents, such as methylene chloride or MeOH. In fact, the rate of this reaction is accelerated when carried out in water. In an attempt to design a green, guided-inquiry, collaborative experiment for the teaching lab,

we have carried out a series of Passerini reactions in water while varying electron donating and withdrawing substituents on benzoic acid and benzaldehyde. The various combinations of reactants offer a valuable and environmentally friendly way to allow students in an advanced undergraduate chemistry lab course to identify Passerini products through various spectroscopic techniques. The lab has been designed to be a guided-inquiry, puzzle experiment that students work on in teams. Experimental procedures, spectroscopic data, and teaching results will be presented.

#### ହ୍ୟ

#### Louis Shekhtman

Faculty: Dirk Brockmann and James Bagrow

#### Changing of Complex Network Backbones under Duress

The application of mathematical graph theory to real world problems has developed into the new field of complex networks. The explosion of work in this field relates to the many real-world phenomena that can be modeled as networks. One problem with real-world networks is that they tend to contain vast amounts of data, making it difficult to analyze the network without reducing it to its key features. Further, the multi-scale structure of these networks has led to significant research in centrality measures and network skeleton and backbone methods of extracting features at all scales. We analyzed the stability of these skeletons under various levels of duress. In applying duress we use both percolation, which is removal of links or nodes, as well as switching links that currently exist to create previously non-existent links. We observe that while the size, or number of links, in the skeleton is robust to perturbation, the actual links making up the skeleton varies even for low levels of perturbation. Furthermore we analyze the impact of network hierarchy on the skeleton and how perturbing the hierarchy leads to changes in the skeleton. We find that if links in the hierarchy are perturbed the network skeleton changes faster than for random perturbation. Combined, all of these results suggest that caution must be applied when extracting the skeleton from networks with noisy data and that networks where the connections change over time will have significant changes to their skeletons.

#### ନ୍ଧର

#### **Kevin Short**

#### Faculty: Jon Marshall

# Digital Citizen: A Global Investigation of How Information and Communications Technology (ICT) Fosters Civic Engagement and Government Accountability

With the exponential rise in mobile telephony, Internet access, and merging audio-visual technologies, citizens around the world have unprecedented access to information, avenues to civic participation, and outlets to expedite government accountability. Information and Communications Technologies (ICT) are already - and will continue - shaping how citizens voice their concerns, engage their governments and fellow citizens, and ultimately develop more democratic and equitable global systems. What can civic engagement look like with 21st century technology? This research identified NGO actors in six different countries (Tanzania, Ukraine, Jordan, India, New Zealand,

Brazil) that harness the power of technology to affect positive democratic change. Synthesizing research from all six case studies, this research concludes that there are three key elements of a successful digital citizenship endeavour. Firstly, "no one size fits all." Technological solutions must be tailored to the socioeconomic realities of the target communities. Secondly, "merge the digital with the tangible. The most effective organizations couple online organizing with offline engagement. Lastly, "be the change." Organizations need to demonstrate clearly to participants and the public that user-input correlates with systemic change.

#### ନ୍ଧର

# Katie Singh

#### Faculty: Ben Page

#### Politics, Poverty, and Pedagogy: An Examination of College Teaching about Poverty

With high rates of poverty in the United States in mind, two key research questions were considered. The first was how teaching about poverty varies across different social science disciplines. The second question was what effect this teaching has on students' knowledge and attitudes toward poverty. Three intro-level social science classes at Northwestern (Sociology, Macroeconomics, American Government and Politics) were studied to see how they approached poverty. I found that the sociology class discussed poverty most broadly, while political science and economics hardly addressed poverty or inequality at all. I also examined changes in student knowledge and attitudes toward poverty by distributing a survey before and after the course. The survey indicated that NU students are generally high-SES and liberal. They overestimate the annual poverty wage, and tend to blame poverty on structural deficiencies rather than individual failings. Thus, they prefer educational remedies, such as improving public schools and funding job programs. While there were no largescale changes in student attitudes after taking the courses, support for a few key policies did change, especially in the economics and sociology classes where specific policies were mentioned. Sociology students increased support for public housing and subsidized daycare, while economics students decreased support for tax credits for the poor and increasing the minimum wage. This suggests that while courses may not have an effect on students' general political views, mentioning specific policies in class may affect students' attitudes toward those policies and others that are similar.

#### ହ୍ୟ

#### Mike Sladek

#### Renee Engeln

# "Bulking Up": Constructing and Validating a Measure of Male Body Talk

Researchers have focused on conversations involving body-related complaints among women. However, evidence suggests men are prone to their own brand of body dissatisfaction, which has been linked to eating disorders, steroid abuse, and muscle dysmorphia (or "reverse anorexia"). The present study details the validation of the recently constructed Male Body Talk (MBT) Scale, which assesses how often men talk negatively about their bodies. The MBT Scale consists of a series of body-related comments (e.g., "I need to put on more muscle"); using a 7-point Likert scale (1 = *never* 

to 7 = always), participants indicated how often they say similar comments aloud when talking to others. Exploratory and confirmatory factor analyses were conducted, followed by correlation and regression analyses to support convergent, discriminant, and incremental validity of scores on the MBT scale. Total scores on the MBT scale were positively correlated with drive for muscularity, muscle dysmorphia symptoms, body dissatisfaction, eating disordered behavior, appearance investment, and social comparison tendencies. Total scores on the MBT scale were not significantly correlated with extraversion, neuroticism, or socially desirable responding. Results suggested a two-factor structure for the newly developed MBT scale: one included 10 muscularity-focused comments and the other 6 weight-loss comments. These factors are consistent with previous body image research suggesting the male body ideal emphasizes a hypermuscular yet lean figure. Though men's body-related conversations may not be considered a social norm in the same way "fat talk" is in women, it appears to be associated with equally troublesome correlates.

#### ହ୍ୟ

#### **Rose Sloan**

#### Faculty: David Figlio

# Labeled as Disabled? The Effects of No Child Left Behind on Students with Disabilities Rates in Florida Middle Schools from 2000-2005

No Child Left Behind (NCLB) aimed to ensure that all students, including Students with Disabilities, became proficient in reading and math by 2014. Under this legislation, schools are required to report their accountability test scores in subgroups including Students with Disabilities. When NCLB was first enacted, Florida defined a subgroup as 30 students Starting in the 2004-2005 school year, Florida changed the subgroup parameters: not only must a school have 30 students in a subgroup for it to count towards adequate yearly progress (AYP), but 15% of a school's population must fall into that subgroup. Prior to NCLB, Students with Disabilities did not count towards a teacher's accountability test scores. During this period, it was advantageous for teachers to classify students as disabled, and research shows that Students with Disabilities rates increased during this time. This project shows the exact opposite: when it is advantageous for schools to decrease their Students with Disabilities rates, they do so. By using data from the Florida Education Data Warehouse and an interaction regression model, I found that compared to schools that had 0-2% Students with Disabilities rates. Schools that were just above 15% Students with Disabilities in the year prior to the rule change significantly decreased their Students with Disabilities rates after the rule change.

#### ୬୦୧୪

#### Adriana Stanovici

#### Faculty: Melissa Davis

# Determining the Effectiveness of the Arts-Based Approach in Addressing At-Risk Youth in Bolivia: A Case Study of Performing Life and its Impact on Bolivian Street Youth

The effectiveness of utilizing an arts-based approach to address the issues at-risk youth confront is a growing area of study. Previous research suggests that there are numerous benefits to exposing this population to the arts, but there is little to no research on nonprofits specifically in Latin America. In order to further investigate this issue, I use the case of Performing Life (PL), an organization dedicated to improving the lives of impoverished youth through teaching performance arts skills as a means of increasing self-sufficiency. I investigated why Performing Life developed and implemented the arts-oriented approach and to what extent it is effective in positively impacting atrisk youth and their families in Bolivia. I analyzed Performing Life's current goal metrics, interviewed key organization stakeholders, and interviewed youth participants and their families. After collecting both the perspectives of PL (the impact it *thinks* it is making) and that of the participants (the impact PL actually has), I concluded that PL is a successful model for arts-based, youth-oriented nonprofits. When asked to describe PL's impact on the lives of its participants, PL stakeholders and participant affiliates both cited 7 main benefits: general support, acquired artistic ability, improved living situation, financial, psychological, social, and familial benefits. The overlap in answers suggests that there is a significant level of compatibility between the impact PL aims to have and the impact it actually has in the lives of its participants. The findings support the success of the art-based approach in positively impacting at-risk youth in Bolivia.

#### ഗ്രര

# Alex J. Straley

#### Faculty: Gail Berger

# Engaging the Competitive Advantage: Perceived Interpersonal and Inter-Organizational Competition and its Effects on Employee Engagement

Employee engagement has been shown to positively affect organizations. However, despite the positive impact of employee engagement there is little conclusive research about how to increase engagement. This research explores an avenue that leaders can use to improve employee engagement within their organizations. Specifically, because both employee engagement and motivation are defined, at least in part, as interested involvement with meaningfulness and availability, and the relationship between competition and motivation has been demonstrated, this research examines whether or not a relationship also exists between engagement and competition. One hundred fifty two full time employees in a variety of positions, sectors and organizations were surveyed and asked questions about their levels of engagement and their perceptions of both inter-organizational and interpersonal competition. Results indicate that as perceived inter-organizational competition

increases engagement decreases. This suggests that different types of competition have different affects on employee engagement.

#### ୬୦୧୪

#### Victoria L. Tannenbaum

# Faculty: Keith E. J. Tyo

# Optimization of Pathway Improves Extracellular Heterologous Protein Yields of Saccharomyces cerevisiae

The high price of preventative and primary medical interventions is a significant global health issue. This problem has prompted research to look for alternative means of producing biopharmaceuticals and nutrient supplements. With the ability to synthesize and secrete correctly folded, biologicallyactive mammalian proteins, S. cerevisiae is a promising candidate as an alternative low-cost production source. This study focuses on optimizing the extracellular yield of target proteins synthesized and exported by S. cerevisiae. A modified Tobacco etch virus (TEV) protease Induced Protein Inactivation (TIPI) method was used to conditionally knock down the synthesis and expression of two target proteins via induction with galactose. These two candidate proteins were chosen based on their relation to prior research highlighting their roles in pathways associated with vesicle trafficking. Each cell line was transformed with optimized amylase and insulin plasmids. Quantification of a-amylase and insulin titers was used to show the effect of the target protein degradation. Results show up to 150% increase in protein titers by blocking these proteins. This research has implications for other hosts, including mammalian and fungal hosts. The results, given further applied research, should indicate a promising alternative, low-cost mechanism for producing select proteins for vaccines, protein therapeutics, small molecule drugs, and nutrient supplements by a variety of host species.

#### ഗ്രര

#### Amrit J. Trewn

#### Faculty: Nitasha Sharma and Barnor Hesse

#### The End of Blackness as We Know It: Multiracialism's Postracial Fantasy

In the millennial U.S., the media and political structures have constructed the multiracial body as a symbol of post-racialism. Contemporary popular discourses of multiracialism construct the interracial relationship as post-racial, and celebrate interracial intimacy as symbolic of love triumphing over race and racial difference. However, we must critically examine such claims of proposed racial bridging through interracial sex as they have obvious implications on how a media-consuming American citizenry views a utopian or postracial society. If race-mixing provides the greatest threat to concepts of racial purity, whiteness, and white supremacy as was and is often argued by leading race-theorists, one would assume that miscegenation, or inter-racial sexual unions, deconstructs such concepts and the phenomenon of racism itself. I argue against this theoretical argument. Through this project, I craft a genealogy of anti/miscegenation in the US and re-theorize race, whiteness, and blackness in the U.S. through the lens of interracial sexual mixing. I address the

following questions: i) How does the 'mixed-race' subject emerge in mid-nineteenth century racetheory and early-twentieth century US Law? ii) What is the relation between the event of miscegenation and the discursive formation of racial purity? and, iii) Why does the 'mixed-race' subject re-emerge as a unique and progressive racial phenomenon at the turn of the millennium? I conclude by arguing that multiracialism seeks not to post-racialize America, but to move America into a post-black society - a society in which blackness would no longer exist or, at least, black bodies would no longer be politically relevant.

#### ନ୍ଧର

# **Daniel Tully**

#### Faculty: Ian Hurd

# With Intent to Defend: How State Leaders Justify Their Use of State Violence against Non-State Actors, 1965-Present

Cases of state leaders using violence vary across a wide array of points, thereby inviting scholars to select and sort cases into categories for further study. Yet when the views of the men and women responsible for the ordering violence are taken into account, a puzzling pattern emerges: state leaders consistently explain their use of violence with a self-defense narrative. In this paper, I examine the narratives provided by Suharto, Pol Pot, Indira Gandhi, various Rwandan leaders, George W. Bush, Muammar Gaddafi, and Bashar Al-Assad to analyze their formal expressions of intent for violence against non-state actors. I use examples of rhetoric from each case to highlight the five key features of the state leaders' explanations of violence. I conclude by arguing that the self-defense narrative allows state leaders to present their violence against non-state actors as consistent with the pertinent provisions of international law while the leaders simultaneously circumvent the Genocide Convention's definition of "genocide".

#### ഗ്രര

# **Gregory Uzelac**

#### Faculty: Rami Nair

# Socio-Linguistic Homogenization and the Position of Standard Hindi in the Overseas Indian Diaspora

Populations in Diaspora have always used language as a link back to the land of their ancestors. Creoles, pidgins, and slang dialects have arisen all over the world in transplanted communities, and yet Overseas Indian populations stand out as an extraordinary, pan-continental example of cultural transformation through language. Distinct from the waves of South Asian immigration that began in the 1960s, these Indian communities descend mostly from indentured labourers who were brought to European colonies between 1834 to 1917. Analyzing linguistic differences in Standard Hindi usage outside of India, I examine the amazingly similar social trends that appear in Overseas Indian communities despite thousands of miles of distance between them. Through research and personal testimonies, I have investigated how Hindi dialects not only changed linguistically when taken abroad, but how Standard Hindi's position as a language in overseas Indian society was

elevated from vernacular to liturgical. Furthermore through analysis of directories, phonebooks, and online resources, I have gained incredible insight into the transformation in naming trends in these communities, which further give us clues into who these indentured laborers really were. Despite great distances, the similarities in linguistic transformation and usage of Indian languages in Overseas Indian communities around the world are uncanny. The position of Standard Hindi in Overseas Indian communities is a true testament to the unifying effect of language on cultural identity.

#### ହ୍ୟ

#### Lisa Velkoff

#### Faculty: Suzanne V rshek-Schallhorn and Richard Zinbarg

# The Effect of Trait Rumination and a Negative-Evaluative Trier Social Stress Test on Several Types of Affect

Individuals high in trait rumination may experience greater negative affect in response to interpersonal stress, which may in turn contribute to the development of depressive disorders. One approach to studying this question is examining whether rumination interacts with an acute, lab-induced stressor to predict negative affect. Participants completed a Trier Social Stress Test (TSST) in which they gave a speech and performed mental arithmetic, either before a negative-evaluative audience or no audience. Trait rumination was measured using the Ruminative Responses Scale, and affect was measured using the Positive and Negative Affect Scales (PANAS) and the PANAS-Expanded Form. There was a significant time x condition interaction on NA (F (1, 91) = 19.144, p = .000,  $\eta_p^2 = .174$ ) and guilt (F (1, 91) = 6.675, p = .011,  $\eta_p^2 = .068$ ); individuals in the neTSST condition showed more change in affect over time than those in the control condition. There was not a significant three-way interaction between rumination, condition, and time, either for NA (F (1, 91) = .017, p = .896,  $\eta_p^2 = .000$ ), or for guilt (F (1, 91) = 2.180, p = .143,  $\eta_p^2 = .023$ ). We cannot conclude that trait rumination predicts differences in affective response to interpersonal stress. There was a significant difference (F (1, 88) = 7.869, p = .006) in trait rumination scores between participants with a history of subthreshold affective disturbance and those without. High trait rumination is a vulnerability factor not only in MDD but also in other, subthreshold affective disorders.

#### ହ୍ୟ

#### Laura Venn

#### Faculty: Jennifer Richeson

# Promoting Diversity: Mitigating the Perceived Threat of the Shifting Racial Demographic for White Americans

According to recent Census Bureau projections, the United States will become a "majority-minority" nation by the year 2042, meaning minorities as a group will outnumber Whites. Research shows that Whites perceive this pending racial shift as a threat to their status as the majority group and subsequently respond with increased racial bias and greater endorsement of political conservatism.

However, promotion focus, a motivational mindset in which individuals approach their goals in terms of aspirations and ideals, as opposed to prevention focus, in which individuals avoid threat and seek security in pursuing their goals, has been shown to mediate the anxiety and subsequent negative effects of interracial interactions, which will become more prevalent with the increasing diversity throughout the nation. In two studies, we hypothesized that White participants primed to think with a promotion focus would feel less threatened than Whites primed to think with a prevention focus when presented with information about the pending racial shift as measured by their subsequent political endorsement and racial bias. Indeed, results showed that promotionfocused Whites endorsed less conservative ideology and reported less racial bias but only after interacting with a promotion-focused racial minority individual. Furthermore, prevention-focused Whites interacting with a prevention-focused racial minority partner and promotion-focused Whites interacting with a prevention-focused racial minority partner expressed greater endorsement of conservatism, racial bias, and intergroup threat, suggesting that not only do Whites' regulatory focus impact their views of the U.S. racial shift, but so too does the regulatory focus of minority individuals with whom those Whites may come in contact. Therefore, Whites feel the less threatened about the pending racial shift when in a promotion focus and interacting with a racial minority individual also of promotion focus.

#### ହ୍ୟ

# Kayla Viets

#### Faculty:. Jason Brickner

# Identification of Gene Recruitment Sequences in the *GAL1* Promoter of *Saccharomyces cerevisiae*

Incorrect gene transcription has been linked to many human diseases. An understanding of the mechanisms that contribute to gene transcription would assist in understanding and potentially treating these diseases. A gene's transcription can be affected by its position within the nucleus. Specifically, a gene's location either at the nuclear periphery or in the nucleoplasm may affect its transcription and expression. In the model organism Saccharomyces cerevisiae (brewer's yeast), whose genome bears many similarities to that of humans, certain genes are directed to the nuclear periphery via DNA signals called Gene Recruitment Sequences (GRS elements), which are located in gene promoters. The Brickner lab has identified GRS elements for the genes INO1, TSA2, HSP104, and ACT1. However, the mechanisms controlling the localization of other genes such as GAL1, a wellstudied, sugar-responsive gene, are not well understood. This project identified the DNA elements responsible for targeting GAL1 to the nuclear periphery in yeast. By integrating fragments of the GAL1 promoter next to a URA3 reporter gene tagged with a LacO array, whose nuclear location could be observed by confocal microscopy, it was determined that the GAL1 gene contains two small, cis-acting GRS elements upstream of the transcription start site in the promoter region. The results of this project will assist in future experiments to identify the proteins involved in GAL1 peripheral recruitment and to understand the general molecular mechanism for gene recruitment to the nuclear periphery. They will also contribute to a fuller understanding of how peripheral targeting affects gene expression.

#### **Rachel Vrabec**

#### Faculty: James Mahoney

#### Expecting More, Accepting Less: The Political Effects of Self Help Groups in India

India is one of the largest advocates of microfinance in the developing world, expanding the model to reach over 72% of its rural population. The most successful initiative began with the Self Help Group Bank Linkage Program in 1996. Since the program, Self Help Groups (SHGs) have brought women together to pool their assets and gain financial stability. Oftentimes members also participate in basic skills trainings run by local NGOs that encourage social empowerment. In this research, I investigate how SHGs lead to different degrees of political empowerment for members. On the one hand, they can raise activism through NGO training and financial independence. On the other, psychological and social structures with the group can perpetuate societal norms and conservative values common in rural and low-income communities. My observations from fieldwork in Udaipur suggest that SHG members' relationships within the SHG may limit the progressive influence from a supporting NGO. To support this fieldwork, I conducted a survey of SHG members in Rajasthan to understand their political ideology and behavior. The data suggests that the current structure of SHGs encourages political empowerment in many ways. However, some results suggest that the SHG may impede political empowerment for members. These results help to explain the political effectiveness of the SHG movement as a whole and the progress of women's empowerment in India.

#### ନ୍ଧର

#### Serena Walker

#### Faculty: Mary Pattillo

# The Possibility and Peril of the Post-Racial: A Comparative Analysis of Race Consciousness in the Dominican Republic, France and the United States

Can we stop talking about race? Can and does the post-racial exist? Are race-based policies now unnecessary? Through an extensive literature review, I investigate these questions and explore the legal definitions and social meanings of blackness, the historical racial frameworks and the (in)existence governmental racial policies in the Dominican Republic, France and the United States. I ask such questions in light of the election of President Obama and resulting claims of a post-racial era. I argue that the supposed race-neutral France and the nonracial Dominican Republic illuminate the possibility and the peril of the post-racial and the need for policy makers to engage in conversations about race. Moreover, I find that the comparatively rigid construction of race (blackness, in particular) in the United States made race more salient and the need for race-conscious policy more urgent. In the Dominican Republic and France, where blackness has been more fluid, and discussion of race has remained largely taboo, no major mass civil rights movements have occurred nor has their been serious policy to address historic inequalities. Each of these countries differ in there racial ideology and approaches to addressing and recognizing racial inequality. However, in the present moment the undesirable social location of blacks (those considered to be black in the place at hand) remains constant. Moving forward, I plan to collect ethnographic data

highlighting the gap between racial rhetoric and reality by interviewing policymakers and individuals in the respective countries and work to find effective strategies for race-based public policy.

#### ନ୍ଧର୍ୟ

#### Maria Wang

#### Faculty: Stuart Wagenius

#### Sex in the Prairie: Is Pollen Limiting Reproduction in a Wind-Pollinated Prairie Grass?

Pollen limitation occurs when insufficient quantity or quality of pollen hampers plant reproductive success. Pollen limitation is widely studied in animal-pollinated plants, but less so in wind-pollinated plants. According to theory, pollen limitation is not expected in wind-pollinated plants, but evidence suggests that it might be more prevalent than previously thought, especially in fragmented populations. I quantified pollen limitation using a pollen addition and exclusion experiment in a small and isolated remnant prairie population of Dichanthelium leibergii, a wind-pollinated native prairie grass. I hypothesized that seed set (proportion of ovules that developed into seeds) differed among inflorescences receiving different treatments on the same plant: 1) supplemented with outcross pollen from istant plants (pollen-added); 2) excluded from external pollen (self-pollen only); or 3) open-pollinated (unmanipulated). Seed set differed among treatments after accounting for differences among individual plants (generalized linear mixed model with binomial response, N = 77inflorescences on 32 plants, p = 0.014). The model predicted higher seed set for pollen-added and self-pollinated inflorescences than open-pollinated inflorescences on the same plants. However, density and indicators of plant resource status such as plant height and diameter, did not explain variance in natural seed set among plants. My results provide evidence that pollen quantity, but not quality, limited reproduction in this D. leibergii population. This suggests that wind-pollination may be less effective in fragmented populations of native grasses. My study provides insight into habitat fragmentation in remnant D. leibergii populations, which will inform prairie conservation and improve understanding of pollen limitation in wind-pollinated species.

#### ନ୍ଧର

#### Rebekah Ward

#### Faculty: Masaya Yoshida

#### The Processing of Backward Sluicing

Backward Sluicing (BwS), as shown in (1a), is a construction in which a clausal-ellipsis ([S $\Delta$ ]) in an embedded wh-interrogative precedes the antecedent-clause ([SANT]), which provides the content of [S $\Delta$ ]. In BwS, the parser must find the antecedent-clause for the ellipsis and then "recover" the content of the elided clause from the antecedent. This study aims to uncover the mechanism behind this online ellipsis resolution process. We specifically show that the parser's active search for the antecedent clause drives the active search for the licensing verb of wh-phrases, similar to wh-filler-gap (WhFG) dependency formation as shown in (1b). However, the active search for the licensing verb of wh-phrases in BwS is not constrained by islands as it is in WhFG dependency formation. This finding argues against processing-capacity accounts of island effects since these accounts do

not predict the plausibility effects (which are a mark of dependency formation) that were found in the island domain of BwS. Processing-capacity accounts of island effects cannot account for the divergence between BwS and WhFG regarding the presence or absence of plausibility effects inside of island domains. (1a) I don't remember which writer [S $\Delta$ ], but [SANT the editor notified a writer about a new project]. (1b) I don't remember which writer the editor notified <u>\_\_\_</u> about a new project. This research was co-authored with Masaya Yoshida, Lauren Ackerman, and Morgan Purrier.

#### ହ୍ୟ

#### William Weber

#### Faculty: Ken Paller

# Enhancing Memory through Auditory Cueing during Slow-Wave Sleep

Humans must encode thousands of pieces of information to long-term memory each day. When this process is not completed, people forget things such as the location of our keys or the name of the new client. A way to strengthen select memories could help alleviate these issues of memory encoding. The process of memory encoding is especially active during slow-wave (deep) sleep (SWS). Recent experiments show that auditory cues during naps in the lab can assist in memory encoding. In this experiment, 16 participants learned object locations linked to sounds. Over a three-day period, participants were cued with the half of the sounds in-home, during SWS to stimulate memory encoding. They were then tested at 24- and 72-hour timepoints to determine strength of their encoded memories. Overall, participants showed lower error on cued sounds as compared with uncued sounds. Subjects who learned the original object locations with smaller error showed higher response to nightly auditory cueing at both timepoints. This suggests that in-home, auditory cueing during SWS can enhance retention of memories, especially for those who learned the original locations more accurately. Our results also indicate that these effects are sustained or even enhanced by increased cueing. The technology used in this experiment could foreseeably serve consumers as a memory aid to help people remember those memories that are important.

#### ନ୍ଧର୍ୟ

# Meghan White

#### Faculty: Jessica Winegar and Rebecca Johnson

# A New "Multicultural Nationalism:" How One Muslim Women's Organization in Britain Negotiates Neoliberal Ideas of Self and Citizenship through an Islamic Lens

In August 2006, police under Prime Minister Tony Blair's Labour government undertook anti-terror raids in High Wycombe, a town in Southeast England, in an attempt to foil a suspected terrorist attack. Following the investigation, police and High Wycombe residents, including Muslims, worked together in a campaign to promote 'community cohesion.' Catalyzed by these events, the organization Muslimah was created in 2007. According to its founder, the initial idea was to empower women to become involved in the community in order to positively respond to and engage in discussions and issues stemming from prevalent Islamophobia. This paper, based on

research conducted in the summer of 2012 through a Northwestern University Summer Undergraduate Research Grant, addresses how the Muslimah program appropriates ideas of neoliberalism in its course structure and pairs them with religious content to debunk prevailing perceptions about Islam and Muslim women. Over the course of six weeks in England, I conducted individual interviews and participant-observation with eight Muslimah directors (called consultants) and nineteen Muslimah participants (called delegates), and these interviews and field notes serves as the basis my ethnographic analysis. Considering Britain's long and complex history of 'multiculturalism' and race relations with Muslims living in England, my research shows that Muslimah presents a new approach that both works within and attempts to reconfigure the political trend of 'community cohesion' that has dominated discussions of multiculturalism in Britain since 2001. As Muslimah seeks to prepare delegates to participate in wider British society through its focus on a "professional ethos," it simultaneously founds its principles of engaged citizenship in an Islamic framework, creatively resisting white British notions of the oppressed and unengaged Muslim woman.

#### ହ୍ୟ

#### Tim White

#### Faculty: Andrew Roberts

#### Occupy, Violence, and Individual Decision-Making

This project attempts to answer the following research question: why do protesters choose to engage in or refrain from violence against the police in response to police repression? A historical analysis of the Occupy Wall Street and Occupy Oakland movements and a survey experiment are used to test macro- and micro-level explanations for decisions regarding the use of violence. It is ultimately concluded that social movement structure cannot determine the likelihood of violence being committed by individual protesters, and a past history of protest participation is the strongest predictor of violence, being associated with a higher incidence of decisions to use violence. Feelings of anonymity in the crowd of participants also seems to have an effect on the proclivity to use violence, reducing the likelihood that a participant will engage in violence. Lethal methods of repression also see a clear "fight or flight" response from protesters, with many choosing to flee or to use lethal force in return. The possible effects of ideology, feelings of solidarity, and age are also investigated, but of these variables, those variables which are statistically significant do not show substantial effects.

#### ହ୍ୟ

#### Deanna Wong

#### Faculty: Carole LaBonne

#### The Role of Snail Family Zinc Fingers in the Neural Crest

Most cancer deaths are due to metastasis – a process in which tumor cells spread to new locations in the body to generate secondary tumors. Therefore, understanding the mechanisms through which metastatic cells obtain their invasive properties is of great interest. Neural crest cells share many of

the phenotypic and molecular characteristics of metastatic tumor cells. They are a stem cell population that migrates extensively before giving rise to a diverse set of derivatives. My work involves the Snail family proteins, which are essential for neural crest development. Notably, many studies have shown that Snail family proteins control the process by which cancer cells become invasive. The protein Snail2 is a member of the Snail family of zinc-finger transcriptional repressors. By utilizing different mutations of Snail2 constructs, my data suggest individual Snail2 zinc fingers may play different functional roles in neural crest development. I will show that specific zinc fingers are not necessary for binding to scaffolding proteins LMO4 and Ajuba, both of which are important for Snail2 function in the neural crest. In addition, close examination of the phenotypic consequences of deleting zinc fingers suggest that only certain zinc fingers are required for normal Snail2 function in the neural crest. The other zinc fingers may have a different supporting role in protein interactions. In characterizing the different roles of the Snail family zinc fingers, this work provides a better understanding of neural crest development, as well as the overall role and regulation of Snail proteins in tumor formation and metastasis.

#### ହ୍ୟ

#### **Richard Wozniak**

# Faculty: Douglas Medin

# Welcome to the Club: Social Media, Social Status and Social Stratification

Social media has become a pervasive part of our lives in recent years and while increasing numbers of interpersonal interactions occur through this medium, impacts on interpersonal perceptions have not been fully evaluated. This project explores whether social status perception through social media differs from perceptions through natural modes. It also seeks to determine the impact of these judgments on social exclusion. This project addresses two questions: Do judgments of social class of individuals viewed through social media differ from judgments of social class through more natural modes of presentation? Can viewing individuals of different social classes through social media lead to different levels of social stratification along social class boundaries when compared with more natural modes of presentation? Online surveys were used to address the research questions. The surveys displayed various individuals to participants by presenting Twitter feeds and audio files from each individual. The first survey utilized a common scale of socioeconomic status on which participants made status judgments. The second survey placed participants in a gatekeeping role, asking them whether they would accept the same set of individuals into a defined social group. The results found that social media information led to less sensitive status judgment than audio information. Status-based social stratification occurred through both social media and audio information. These results provide insight into how different modes of presentation affect status judgments and status-based social stratification.

#### ഇന്ദ

# Ziyang Xu

#### Faculty: Alexander Statsyuk

#### Designing Irreversible Covalent Inhibitors for E3 Ubiquitin Ligase NEDD4-1

NEDD4-1, a part of the human ubiquitin-proteasome system, is a HECT E3 ubiquitin ligase that forms a thioester intermediate with the ubiquitin molecule, before transferring the ubiquitin tag onto its substrates. NEDD4-1 is known to be overexpressed in prostate and bladder cancers, although its oncogenic functions still remain controversial. To elucidate its functions, we have designed small molecular probes that covalently modify its catalytic cysteine residue to cause irreversible enzymatic inhibition. Our probes are customized to incorporate a nonpolar ring-based fragment coupled to an electrophilic moiety. Ideally, such arrangement allows the probe to bind specifically to the active site of NEDD4-1, before it reacts irreversibly with the catalytic cysteine in NEDD4-1 via the Michael reaction. To increase our opportunity of discovering a selective probe, we have selected a diverse range of fragments with appropriate pharmacological properties and carefully constructed an electrophilic warhead which demonstrates moderate reactivity with cysteine regardless of the fragment it is coupled to. To date, a library of hundred probes has been synthesized. We are currently working on characterizing the reactivity of the probes with N-acetyl-cysteine-methyl-ester via NMR spectroscopy. The probes of similar reactivity will be grouped for screening at the physiological temperature against NEDD4-1 and analyzed with ESI/MS to identify labeling of the catalytic cysteine. We plan to obtain an X-ray crystal structure of the active site of NEDD4-1 bound to the inhibitor, which will allow us to understand the mechanism of the protein ubiquitination and fine-tune our inhibitor to develop a potential anticancer drug.

#### ନ୍ଧର

#### Effie Yang

#### Faculty: Lauren Scissors

#### The Cultural Expectations of Chinese Female Teenagers

Research indicates that globalization standardizes the way people digest advertising. In other words, people adjust their own cultural beliefs to conform with the global consumer culture. Recent studies point to the contrary, that residents in global countries utilize interpretative strategies that combine global standard beliefs with local cultural beliefs. This theory is known as glocalization. The Chinese female teenager population is interesting because it is an emerging group at the center of the global and local dichotomy. My research investigates how the glocalization of magazine advertisements influences the physical and non-physical self-identity of Chinese female teenagers. Over the summer, I traveled to Beijing, gathered, and coded advertisements from popular female Chinese magazines. I came to the conclusion that Chinese female teenagers are predominantly exposed to a "global" image and a "local" image. The global image includes advertisements from American and European brands that promote tan skin, fit figures, and expressive looks. The local image includes advertisements from mostly Asian brands that promote pale skin, frail figures, and controlled looks. My summer study supports the glocalization theory. My data shows a higher percentage of advertisements that fit the local image than the global image, yet more of the models are non-Asian and represent the global model. This spring, I selected and interviewed a sample of my population,

15 Chinese female teenagers who study at Northwestern. By studying their cultural backgrounds and reactions to selected magazine advertisements, I hope to provide more definition to the emerging Chinese female teenager concept and further evidence of glocalization behavior.

# ନ୍ଧର୍ୟ

# Jeehee Naomi Yang

# Faculty: Jennifer Lackey

# Why We Can and Should Use Moral Testimonial Knowledge

A large amount of our knowledge comes from testimony, that is, from other people's words. When someone tells us that his name is Mike, or when a history teacher tells us that World War I broke out in 1914, we believe that we know these propositions based on testimony. However, for moral knowledge, relying on testimony seems counter-intuitive: for example, it seems bizarre to say that we know that eating animals is wrong because someone told us so. In my project, I investigate the cause and the significance of this counter-intuitiveness. Classifying moral issues into two general categories, controversial and uncontroversial moral issues, I conclude that there is no fundamental problem compelling us to abandon the use of moral testimony altogether. In controversial moral issues, the counter-intuitiveness comes from a high degree of disagreement, a problem that can be overcome when we have sufficient justification to prefer certain sources' testimony. In uncontroversial moral issues, in which moral truths are obvious, the real problem is not the validity of moral testimony itself, but the fact that its use is redundant and therefore unnecessary for normally functioning people. However, when agents have good reasons to need moral testimony, its use is meaningful and appropriate. Based on these observations and valid examples of moral testimony, I find that moral testimony is in fact a valid and necessary source of knowledge that can guide us in difficult moral dilemmas and allow us greater knowledge to better function as moral agents.

#### ନ୍ଧର

# Jeong Yun Yang

Faculty: Balaji Sitharaman, State University of New York at Stony Brook

# Toward Treatment of Breast Cancer Using Graphene and Carbon Nanoparticles as Targeted Drug Delivery and Microwave-Induced Hyperthermia Agents

Oxidized-graphene nanoplatelets (O-GNR) and single-walled carbon nanotubes (SWCNT) are sub-100nm particles, or nanoparticles, possessing unique properties that attract research due to their possible use in various biomedical applications like gene delivery, drug delivery imaging and photodynamic therapy. These nanoparticles can be modified to be water-solubilized and target tumors through a process called functionalization; therefore, their efficacies and efficiencies can be optimized. O-GNR has high capacity for loading aromatic anti-cancer drugs like Doxorubicin (DOX). SWCNT have dielectric properties that facilitate localization of malignant breast tissue and treatment with microwave hyperthermia. With such properties and possibilities of functionalization, O-GNR and SWCNT are promising, future candidates for combating breast cancer. The optimal loading concentration for 1mg of O-GNR was determined to be 200  $\mu$ g of DOX with 91.727% loading efficiency. The optimal pH for the release of DOX was pH of 4 and a positive relationship between time and release of DOX was observed. The efficiency of drug delivery on representative mammalian carcinoma cells was assessed by conducting lactate dehydrogenase and Presto Blue cell viability assays. The novel solubilizing of SWCNT was accomplished through acid treatment and functionalization with a negatively charged molecule: dextran. The highest concentration of stable SWCNT in water was 15 mg SWCNT/ml H<sub>2</sub>O.

#### ନ୍ଧର

#### **Kevin Zhang**

#### Faculty: Hao F. Zhang

# *In vivo* Corneal Neovascularization Imaging by Optical Resolution Photoacoustic Microscopy

Recent shifts in clinical medicine have placed a heavier emphasis on preventative and diagnostic sciences, particularly those of a noninvasive practice. Our project utilizes photoacoustic (PA) imaging to delineate microvasculature and hemodynamics noninvasively *in vivo*. In this study, we propose an examination of a vascular pathology called corneal neovascularization (CNV) in the eye of C57BL6/J inbred mice by optical resolution photoacoustic microscopy (OR-PAM). We chose to study CNV as it is a well-understood but poorly modeled vascular disease in the eye, with limited treatment and therapy options following diagnosis. CNV characterization was accomplished by deliberate alkali burn injuries made to the cornea, and subsequent imaging efforts by means of PA microscopy were conducted two weeks later. Whole eye maximum amplitude projection (MAP) PA images of the anterior chambers of the eye were acquired with and without corneal alkali burn injury, where clear signs of CNV were present in the injured eye, corroborated by post-mortem histological examination. Consequently, OR-PAM's noninvasive and high-resolution imaging of optical absorption proved ideal for elucidating injury-induced CNV *in vivo*, and holds promise in the longitudinal monitoring of progression, inhibition, and normalization of angiogenesis in CNV rodent models.

# **So** Guide to Undergraduate Research Programs at Northwestern University

Below is a partial listing of current Northwestern programs supporting independent undergraduate research and creative projects; more are available on the UR@NU web site. Many departments and programs may also have other opportunities that are not widely advertised. External agencies also fund a number of programs, such as the National Science Foundation or the Fulbright IIE government grants. The Office of Fellowships (www.northwestern.edu/fellowships) can help students identify these external opportunities.

# UR@NU-Undergraduate Research at Northwestern University

undergradresearch.northwestern.edu facebook.com/URatNU

# Undergrad ARCH- Search Engine

undergradresearch.northwestern.edu/research-opportunities

# Office of Undergraduate Research Programs

Academic Year Undergraduate Research Grants (AY URG) undergradresearch.northwestern.edu/ayurg Summer Undergraduate Research Grants (Summer URG) undergradresearch.northwestern.edu/summerurg Conference Travel Grants undergradresearch.northwestern.edu/ctg Undergraduate Language Grants undergradresearch.northwestern.edu/ulg Circumnavigators Travel-Study Grant undergradresearch.northwestern.edu/circumnavigators Undergraduate Engagement Grants undergradresearch.northwestern.edu/ueg Undergraduate Research Assistant Program undergradresearch.northwestern.edu/urap

# **Other University-Wide Programs**

Residential Colleges Fellow Assistant Researcher Award (FARA): Nancy Anderson (res-colleges@northwestern.edu) Institute for Policy Research: www.northwestern.edu/ipr/ugradresearch.html Center for Global Engagement: www.bcics.northwestern.edu/grants/cge/ Office of International Program Development: www.ipd.northwestern.edu/fellowships/index.html

# Weinberg College of Arts and Sciences

WCAS Awards: www.weinberg.northwestern.edu/advising/honors/funding/ African Studies: www.northwestern.edu/african-studies/undergraduate-studies/awards.html Anthropology: www.anthropology.northwestern.edu/about/labs.html Astrophysics: ciera.northwestern.edu/Research/undergraduate\_research\_opportunities.php

# So Guide to Undergraduate Research Programs at Northwestern University, continued

# Biochemistry-Morimoto Laboratory Undergraduate Research Seminars:

www.biochem.northwestern.edu/ibis/morimoto/morimotolab/murs.html Biological Sciences: www.biosci.northwestern.edu/undergraduate/research.html Chemistry: www.clp.northwestern.edu/education/student-programs Chicago Field Studies Program: www.wcas.northwestern.edu/cfs/ History: Leopold Fellows of the Center for Historical Studies: www.historicalstudies.northwestern.edu/leopold.htm

 Latin American and Caribbean Studies: www.wcas.northwestern.edu/lacs/grants/udggp.html Mathematics: www.math.northwestern.edu/undergraduate/summer.html
Physics and Astronomy: www.physics.northwestern.edu/undergraduate/research.html
Political Science: www.polisci.northwestern.edu/undergraduate/ginsberg.html
Psychology: www.wcas.northwestern.edu/psych/undergraduate\_studies/research\_opportunities/

# School of Communications

Film & Theatre Projects: Rick Morris (r-morris@northwestern.edu) Undergraduate Research Grants and Fellowships: Jane Rankin (j-rankin@northwestern.edu)

# School for Education and Social Policy

Research in SESP: www.sesp.northwestern.edu/ugrad/opportunities/research.html

# McCormick School of Engineering and Applied Science

# McCormickOpportunities:

www.mccormick.northwestern.edu/undergraduates/research/index.html Biomedical Engineering: http://www.bme.northwestern.edu/undergraduate/research.html Chemical & Biological Engineering:

www.chem-biol-eng.northwestern.edu/undergraduate/current/research/index.html

# Electrical Engineering and Computer Science:

www.eecs.northwestern.edu/research/undergraduate-research.html

# Materials Research Science and Engineering Center:

www.mrsec.northwestern.edu/content/educational\_programs/index.htm

McCormick Office of Corporate Relations, Corporate Partner Undergraduate Research Grants: http://www.mccormick.northwestern.edu/companies/index.html

Nanoscale Science and Engineering Center: www.nsec.northwestern.edu/REU.htm

# Medill School of Journalism

Eric Lund Global Reporting and Research Fund: www.medill.northwestern.edu/journalism/undergrad/page.aspx?id=60867

# **So** The Afterlife of Research

The most important step in research, and often the most over-looked for undergraduate researchers, is sharing the research findings. This final step allows for the vital process of peer review and contributes to the ongoing development of our knowledge about the world. Moreover, research is a cumulative process that grows from one project to another. Another aspect of the afterlife of your research is how you transform it into new and related projects. Below are some examples of programs that have been developed at both Northwestern and nationally to help undergraduate researchers participate in and learn from the final step in the research process.

# Present Your Research

Northwestern's Annual Undergraduate Research and Arts Exposition: undergradresearch.northwestern.edu/expo

Chicago Area Undergraduate Research Symposium: www.caurs.com

Academic Conferences: consult with your advisor for major conferences in your field and apply for funding through the Conference Travel Grant program: undergradresearch.northwestern.edu/ctg

Undergraduate Awards: www.undergraduateawards.com

# Publish Your Research

# Northwestern Undergraduate Research Journal: www.northwestern-urj.org/

Nanoscape (Journal of Undergraduate Research in Nanoscience): www.nanoscape.northwestern.edu/

Directory of Undergraduate Research Journals (UNC Office for Undergraduate Research): www.unc.edu/depts/our/students/students\_publish.html

# Transform Your Research

Apply for National & International Research Grants: www.northwestern.edu/fellowships

**Apply for Graduate School:** consult with your advisor for the best programs in your field and apply for funding through the Office of Fellowships: www.northwestern.edu/fellowships