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LETTER FROM THE PRESIDENT

DEAR PARTICIPANTS, JUDGES AND GUESTS:

WELCOME TO THE 15TH ANNUAL GRADUATE RESEARCH SYMPOSIUM. WE ARE PROUD TO SHARE WITH THE TUFTS COMMUNITY THIS SCHOLARLY EVENT THAT TRULY CROSSES TRADITIONAL ACADEMIC BOUNDARIES. FOR MANY OF US, THIS SYMPOSIUM REPRESENTS A HIGHLIGHT IN OUR ADVANCED EDUCATION. IT IS A PLACE WHERE WE CAN SHARE AND ACQUIRE TRANSDISCIPLINARY KNOWLEDGE THAT WILL POTENTIALLY HAVE UNEXPECTED IMPACTS ON OUR OWN KNOWLEDGE BASE. THESE CAN BE PRACTICAL - BY OFFERING NEW RESEARCH STRATEGIES - BUT ALSO MORE PHILOSOPHICAL, BY ENRICHING OUR WORLD VIEW.

IN THIS WAY, THE GRS INTENDS TO ADD SPECIAL FLAVOR AND VALUE TO OUR TUFTS EDUCATION AND AT THE SAME TIME HIGHLIGHT THE EXCEPTIONALITY OF OUR TUFTS GRADUATE COMMUNITY. THIS YEAR WE ARE EXCITED TO INCLUDE AN INTERDISCIPLINARY PLENARY SESSION WITH INVITED SPEAKERS FROM OUR STUDENT BODY ON THE THEME "PLANNING FOR A CHANGING WORLD," FOLLOWED BY A KEYNOTE BY OUTGOING TUFTS UNIVERSITY PRESIDENT LARRY BACOW. WITH THE ADDITION OF PLENARY AND KEYNOTE SPEAKERS AND THE NEW EMPHASIS ON FOCUSED AND ORGANIZED INTERDISCIPLINARY KNOWLEDGE-SHARING, WE ARE EAGER TO SEE THE GRS GROW AND DEVELOP INTO AN ESTEEMED INTELLECTUAL ARENA WHERE MINDS MEET IN UNTRADITIONAL AND OPEN FASHIONS TO ADDRESS MODERN CHALLENGES IN MANY DISCIPLINES.

WITH THESE EXCITING CHANGES, THE SYMPOSIUM STILL STAYS TRUE TO ITS FUNDAMENTAL GOALS: PROVIDING STUDENTS WITH A PUBLIC FORUM FOR PRESENTING AND DISCUSSING THEIR WORK WITH AN AUDIENCE OF DIVERSE ACADEMIC BACKGROUNDS, ALLOWING STUDENTS AND FACULTY TO APPRECIATE THE GREAT BREADTH OF SCHOLARLY WORK THAT TAKES PLACE ON OUR CAMPUS, AND FOSTERING A HEALTHY ENVIRONMENT FOR COMPETITION IN PUBLIC-SPEAKING. WE HOPE THAT THIS IS A TRADITION THAT CONTINUES AND GROWS FOR MANY YEARS TO COME.

I WOULD LIKE TO EXTEND SPECIAL THANKS TO THE GRADUATE STUDENT COUNCIL OF THE COLLEGES OF ARTS & SCIENCES AND ENGINEERING FOR PLANNING THIS EVENT AS WELL AS THE OFFICE OF GRADUATE STUDIES, NAMELY DEAN LYNNE PEPALL, DEAN LEW EDGERS, AND DR SINAIA NATHANSON FOR THEIR CO-SPONSORSHIP AND UNWAVERING SUPPORT. I WOULD ALSO LIKE TO THANK OUR SPEAKERS, PRESIDENT LARRY BACOW, AND OUR JUDGES, WHO HAVE CONTRIBUTED TO THIS EVENT. TODAY WE HAVE OVER 50 PRESENTATIONS ARRANGED IN PARALLEL ORAL SESSIONS AND A POSTER SESSION. I ENCOURAGE YOU TO PLEASE TAKE SOME TIME TO READ THE ABSTRACTS AND FAMILIARIZE YOURSELVES WITH THE PRESENTATIONS THAT ARE ABOUT TO TAKE PLACE.

KINDEST REGARDS,

JOANNA XYLAS
PRESIDENT 2010-2011, GRADUATE STUDENT COUNCIL

PROGRAM

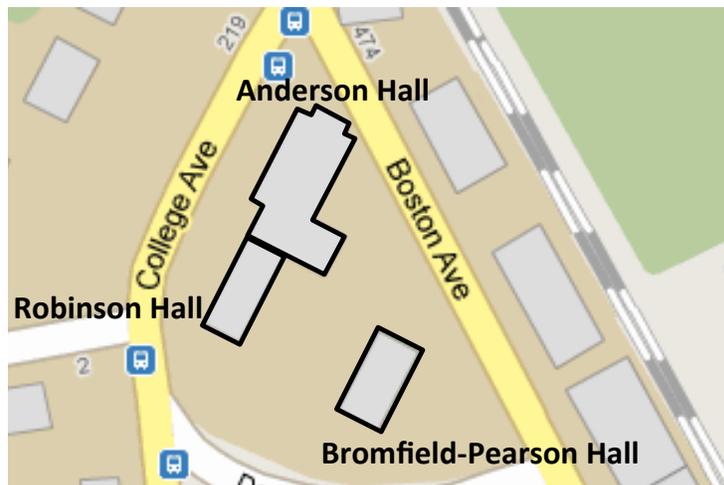
3:00 PM – 3:10 PM **WELCOME ADDRESS**
BURDEN LOUNGE, ANDERSON HALL

3:10 PM – 4:10 PM **PARALLEL SESSION I**
ART & HISTORY: BURDEN LOUNGE, ANDERSON HALL
SOCIAL SCIENCES: ROOM 153, ROBINSON HALL
STEM: ROOM 06, BROMFIELD-PEARSON HALL

4:15 PM – 5:15 PM **PARALLEL SESSION II**
ART & HISTORY: BURDEN LOUNGE, ANDERSON HALL
SOCIAL SCIENCES: ROOM 153, ROBINSON HALL
STEM: NELSON AUDITORIUM, ANDERSON HALL

5:20 PM – 6:30 PM **PLENARY SESSION**
NELSON AUDITORIUM, ANDERSON HALL

6:30 PM – 8:00 PM **POSTER SESSION & LIGHT DINNER**
BURDEN LOUNGE, ANDERSON HALL



PARALLEL SESSION I

ART & HISTORY: BURDEN LOUNGE, ANDERSON HALL

- 3:10 PM **MERON LANGSNER** (DRAMA, PHD CANDIDATE)
'CHOREOGRAPHING KARATE UP CLOSE AND PERSONAL: MARTIAL ARTS ON THE MAINSTREAM AMERICAN STAGE'
- 3:25 PM **C. DANIEL REDMOND** (ENGLISH, PHD CANDIDATE)
'TAKING IT BACK: PAULINE HOPKINS'S *WINONA* AS A RECUPERATION OF AFRICAN AMERICAN SEXUALITY'
- 3:40 PM **BETSY FELDMAN** (DRAMA, PHD CANDIDATE)
"'DYBBUK SHMYBBUK, I SAID MORE THEATRE": HASKALAH, DAVID KESSLER, AND THE DETACHMENT OF THE JEWISH SOUL FROM EARLY 20TH CENTURY YIDDISH AMERICAN THEATRE'
- 3:55 PM **SHANNON O'HEARN** (DRAMA, MA CANDIDATE)
"'MANNING UP": THE SOLDIER AS MALE CONSTRUCT IN WWI DRAMA'

SOCIAL SCIENCES: ROOM 153, ROBINSON HALL

- 3:10 PM **JILL PLEVINSKY** (CHILD DEVELOPMENT, MA CANDIDATE)
'YOUNG PATIENTS WITH INFLAMMATORY BOWEL DISEASE: FACEBOOK AS A TOOL FOR SOCIAL SUPPORT'
- 3:25 PM **MARIAH CONTRERAS** (CHILD DEVELOPMENT, MA CANDIDATE)
'SOCIAL CAPITAL AND SCHOOL INVOLVEMENT IN IMMIGRANT FAMILIES: UNDERSTANDING PARENTING SOCIAL PRACTICES BEFORE AND AFTER MIGRATION'
- 3:40 PM **MARISOL PIERCE-QUINONEZ** (URB. & ENVIRON. PLANNING, MS CANDIDATE)
'THE ROLE OF FOOD SYSTEM ASSESSMENTS IN THE CREATION OF SUSTAINABLE FOOD SYSTEMS'
- 3:55 PM **NINA TANDON** (FLETCHER SCHOOL OF LAW/DIPLOMACY, MS CANDIDATE)
'REGULATING THE REGULATOR: THE GOVERNANCE OF SOVEREIGN WEALTH FUNDS UNDER INTERNATIONAL LAW'

STEM: ROOM 06, BROMFIELD-PEARSON HALL

- 3:10 PM **EMILY LEWIS** (CHEMISTRY, PHD CANDIDATE), APRIL D. JEWELL, HEATHER L. TIERNEY, ERIN V. ISKI, GEORGIOS KYRIAKOU, E. CHARLES H. SYKES
'TOWARDS UNDERSTANDING THE FISCHER-TROPSCH REACTION ON MODEL COBALT NANOPARTICLES'
- 3:25 PM **BYRON WALLACE** (COMPUTER SCIENCE, PHD CANDIDATE)
'SEMI-AUTOMATED CITATION SCREENING FOR SYSTEMATIC REVIEWS'
- 3:40 PM **PRADEEP MAURYA** (CIVIL/ENVIRONMENTAL ENGINEERING, MS CANDIDATE)
'IMPEDANCE BASED MODELING FOR PREDICTION OF TRAIN INDUCED FLOOR VIBRATION'
- 3:55 PM **NAN YI** (CHEMICAL AND BIOLOGICAL ENGINEERING, PHD CANDIDATE), HOWARD SALTSBURG, MARIA FLYTZANI-STEPHANOPOULOS
'EXPLORING ALTERNATIVE ENERGY: APPLICATION OF ACTIVE GOLD SPECIES ON CERIUM OXIDE TO CATALYTIC HYDROGEN PRODUCTION PROCESSES'

PARALLEL SESSION II

ART & HISTORY: BURDEN LOUNGE, ANDERSON HALL

- 4:15 PM **MEGAN STAHL** (DRAMA, PHD CANDIDATE)
'FINDING A VOICE: REPRESENTATIONS OF ARAB WOMEN ON THE POST-9/11 AMERICAN STAGE'
- 4:30 PM **PATRICK BRADLEY** (DRAMA, PHD CANDIDATE)
'UNSPEAKABLE ACTIONS: A CONTEXTUALIZED READING OF DAVID HARROWER'S *BLACKBIRD*'
- 4:45 PM **LYDIA ABEL** (DRAMA, PHD CANDIDATE)
'THE SOVIET CLOWN: STAGING A REVOLUTION THROUGH LAUGHTER'
- 5:00 PM **MICHAEL MORRIS** (DRAMA, MA CANDIDATE)
'TRANSCENDING GENRE: BRAND EXTENSION THROUGH ADAPTATION IN THE COMMERCIAL MUSICAL THEATRE INDUSTRY'

SOCIAL SCIENCES: ROOM 153, ROBINSON HALL

- 4:15 PM **SARAH ANDERSON** (CHILD DEVELOPMENT, PHD CANDIDATE)
'WHEN AND WHERE WE LIVE: NEIGHBORHOOD SOCIOECONOMIC STATUS ACROSS DEVELOPMENT'
- 4:30 PM **SARAH GAITHER** (PSYCHOLOGY, PHD CANDIDATE)
'IMPLICIT BIAS AND SOCIAL EXCLUSION PREDICT AMBIGUOUS RACE CATEGORIZATION'
- 4:45 PM **SIMCHA LEVENTAL** (URB. & ENVIRON. PLANNING, MS CANDIDATE)
'INTERDEPENDENT: WASTEWATER MANAGEMENT BETWEEN ISRAEL AND PALESTINE'

STEM: NELSON AUDITORIUM, ANDERSON HALL

- 4:15 PM **ANDREW WILSON** (COMPUTER SCIENCE, PHD CANDIDATE)
'A CONNECTION BETWEEN ALGORITHMIC SELF-ASSEMBLY AND FORMAL LANGUAGE THEORY'
- 4:30 PM **BRANKO ZUGIC** (CHEMICAL & BIOLOGICAL ENGINEERING, PHD CANDIDATE),
MARIA FLYTZANI-STEPHANOPOULOS
'CARBON-SUPPORTED NANOCATALYSTS FOR RENEWABLE ENERGY APPLICATIONS: TOWARDS HYDROGEN PRODUCTION, BIOFUELS, AND BEYOND'
- 4:45 PM **MEGAN STRAIT** (COMPUTER SCIENCE, PHD CANDIDATE)
'(INTER)FACING THE FUTURE: FOSTERING LEARNING AND COLLABORATION THROUGH NEXT-GENERATION COMPUTER INTERFACES'
- 5:00 PM **LORIEN URBAN** (FRIEDMAN SCHOOL OF NUTRITION, PHD CANDIDATE),
MEGAN A. MCCRORY, GERARD E. DALLAL, SAI KRUPA DAS, EDWARD
SALTZMAN, JUDITH L. WEBER, SUSAN B. ROBERTS
'ACCURACY OF STATED ENERGY CONTENTS OF RESTAURANT FOODS IN A MULTI-SITE STUDY'

PLENARY SESSION

NELSON AUDITORIUM, ANDERSON HALL

- 5:25 PM** **MAREIKE STANITZKE (ENGLISH, PHD CANDIDATE)**
'READING AND THE "REAL" WORLD: THE POLITICS OF HUMANIZING LITERATURE'
Mareike Stanitzke is a PhD candidate in the English Department at Tufts. She received her BA at Earlham College and her Masters here at Tufts. Her academic interests include 20th century transatlantic and world literature, literary and critical theory.
- 5:40 PM** **JON FREEMAN (PSYCHOLOGY, PHD CANDIDATE)**
'THE BRAIN BASIS OF PERSON PERCEPTION'
Jon Freeman is a fourth-year Ph.D. student in the Psychology Department at Tufts University. He completed his B.A. in Psychology, Social & Cultural Analysis, and Neural Science at New York University, before coming to Tufts. He is a recipient of the American Psychological Association Early Researcher Award (2009) and currently supported by a National Research Service Award fellowship from the National Institutes of Health. He has authored and co-authored over 20 peer-reviewed publications. He is also the developer of software in use by over 400 researchers across the world, opening up investigations into the real-time dynamics of human cognition through people's hand movements.
- 5:55 PM** **R. JORDAN CROUSER (COMPUTER SCIENCE, PHD CANDIDATE)**
'POSSIBLE, LIKELY, AND INEVITABLE: COMPUTATIONAL METHODS FOR EXPLORING SIMULATIONS IN POLITICAL SCIENCE'
Jordan Crouser is a doctoral candidate in the Department of Computer Science. He earned his Master's in Computer Science from Tufts in 2010 with work on robotic programming languages for preschool children. His research interests include Human-Computer Interaction and Visual Analytics, and his current work focuses on using graph techniques to develop better tools for understanding large-scale political science simulations.
- 6:10 PM** **LARRY BACOW (PRESIDENT, TUFTS UNIVERSITY)**
- 6:25 PM** **CLOSING REMARKS AND AWARDS PRESENTATION**

POSTER SESSION

ART & HISTORY

MICHELLE ASHLEY (DRAMA, PHD CANDIDATE)
'SALOME AND THE INVERSION OF THE PHALLOCENTRIC GAZE: OSCAR WILDE'S *FEMME FATALE*'

SARAH BORGATTI (MUSIC, MA CANDIDATE)
'THE LEGITIMIZATION OF WOMEN CONDUCTORS'

TERENCE DETOY (ENGLISH, PHD CANDIDATE)
'SPECTERS OF TOMORROW: LANGUAGE AND THE HUMANITIES' FUNCTION IN AN EVER-CHANGING TERRAIN'

ORSOLYA MEDNYANSZKY (ART HISTORY, MA CANDIDATE)
'THE SIGN OF CHRIST, THE SIGN OF SALVATION: AN EXALTED CROSS IN A LATE MEDIEVAL ARMENIAN GOSPEL BOOK'

CATHERINE VRTIS (DRAMA, PHD CANDIDATE)
'BUILDING NEW NATIONS: MASS PERFORMANCE AND THE CREATION OF NATIONAL IDENTITY IN THE HARLEM RENAISSANCE AND THE SOVIET UNION'

SOCIAL SCIENCES

MARIA BARTH (PSYCHOLOGY, PHD CANDIDATE), FERNANDO SEMPÉRTEGUI, BERTHA ESTRELLA, DAVIDSON HAMER, KATHERINE TUCKER, ALICIA RODRIGUEZ, GERARD DALLAL, JEFFREY GRIFFITHS, SIMIN NIKBIN MEYDANI
'HEPCIDIN IN ELDERLY ECUADORIANS: A LINK BETWEEN INFLAMMATION, BMI, AND IRON STATUS'

SOOYEON BYUN (CHILD DEVELOPMENT, MA CANDIDATE), JUNA BYUN
'RELATIONSHIP BETWEEN TORTURE EXPERIENCE AND LIFE SATISFACTION OF NORTH KOREAN REFUGEES IN SOUTH KOREA'

KRISTINA CARLINI (OCCUPATIONAL THERAPY, MS CANDIDATE), TERESA CZEPIEL, CHARMIE DAVE, TIFFANY SEWELL, LINDA TICKLE-DEGNEN
'GENDER DIFFERENCES IN OLDER ADULT ROLE PARTICIPATION'

SARA EISLER (OCCUPATIONAL THERAPY, MS CANDIDATE), JOAN BERO, RONI HERBST, KELLI KRANEK, JULISSA TAVERAS, LINDA TICKLE-DEGNEN
'GENDER DIFFERENCES IN VALUES OF ROLES THROUGH ADULTHOOD'

DEVON HARRISON (CHILD DEVELOPMENT, MA CANDIDATE)
'THE EFFECT OF NEUROFEEDBACK THERAPY ON ADOLESCENT DEPRESSION'

CAMMY PETERSON (URBAN/ENVIRON. PLANNING, MS CANDIDATE)
'DEMOCRATIZING STREETSAPES: RETHINKING STREETS AS PUBLIC SPACES'

STEM

MATTHEW BECKER (CIVIL/ENVIRONMENTAL ENGINEERING), YONGGANG WANG, KURT D. PENNELL, LINDA M. ABRIOLA
'MODELING QUANTUM DOT NANOPARTICLE FATE AND TRANSPORT IN SATURATED POROUS MEDIA UNDER VARYING FLOW CONDITIONS'

GRACE BENNETT (FRIEDMAN SCHOOL OF NUTRITION, PHD CANDIDATE), KATHERINE J. STRISSEL, JASON DEFURIA, EUGENE CHANG, LINDA C. BURKLY, ANDREW S. GREENBERG, MARTIN S. OBIN

'ALTERED INFLAMMATORY PROFILE IN ADIPOSE TISSUE IS ASSOCIATED WITH PROTECTION FROM INSULIN RESISTANCE IN OBESE TWEAK KNOCK-OUT MICE'

JASON BRESSNER (BIOMEDICAL ENGINEERING, MS CANDIDATE), GUOKUI QIN, LAUREN E. KLINKER, YUJI ZHANG, DAVID L. KAPLAN, FIORENZO G. OMENETTO
'FABRICATION OF SILK FILMS VIA ELECTROGELATION'

ERIC CIAPPIO (FRIEDMAN SCHOOL OF NUTRITION, PHD CANDIDATE)
'MATERNAL B-VITAMIN SUPPLEMENTATION FROM PRECONCEPTION THROUGH WEANING SUPPRESSES INTESTINAL TUMORIGENESIS AMONG OFFSPRING IN THE APC^{+1638N} MOUSE'

MARIA CARLOTA DAO (FRIEDMAN SCHOOL OF NUTRITION, PHD CANDIDATE), JUNAIDAH B. BARNETT, DAVIDSON HAMER, RUTH KANDEL, GARY BRANDEIS, BASIL FINE, GERARD DALLAL, PAUL JACQUES, ROBERT SCHREIBER, EUNHEE KONG, SIMIN N. MEYDANI
'IMPACT OF ZINC SUPPLEMENTATION ON T CELL FUNCTION IN ZINC DEFICIENT NURSING HOME RESIDENTS'

MERVE IPLIKCIOGLU (CIVIL/ENVIRONMENTAL ENGINEERING, MS CANDIDATE)
'TEMPERATURE BASED MONITORING OF A COMPOSITE STEEL GIRDER BRIDGE'

BRADFORD LARSEN (COMPUTER SCIENCE, PHD CANDIDATE)
'OPTIMIZING APPLICATIVE ARRAY PROGRAMS FOR GRAPHICS PROCESSORS'

SIMCHA LEVENTAL (URBAN/ENVIRON. PLANNING, MS CANDIDATE)
'THE BATTIR SPRING - THE ROAD TO A SAFE WATER RESOURCE'

PHILIP MALLON (MECHANICAL ENGINEERING, MS CANDIDATE)
'CHARACTERIZATION OF Nb3Sn SUPERCONDUCTING STRANDS UNDER WIDE RANGE PURE-BENDING STRAIN'

GREGORY MEYERHOFF (MECHANICAL ENGINEERING, MS CANDIDATE)
'ARTIFICIAL INTELLIGENCE, SWARM INTELLIGENCE, PSYCHOLOGY, AND ROBOTICS'

ALI MIRVAKILI (ELECTRICAL/COMPUTER ENGINEERING, PHD CANDIDATE), VALENCIA M. JOYNER
'DUAL-MODE, INTEGRATED DRIVER CIRCUIT ARCHITECTURE FOR FUTURE ENERGY-EFFICIENT VISIBLE LIGHT COMMUNICATION'

SANA MUJAHID (BIOLOGY, PHD CANDIDATE), HEBER C. NIELSEN, MARYANN V. VOLPE
'MIR-221 AND MIR-130 IN DEVELOPING LUNG: ROLE IN HOX GENE REGULATION AND VASCULAR MORPHOGENESIS'

MATTHEW S. MURPHY (PSYCHOLOGY, PHD CANDIDATE)
'LATERAL COGNITION IN PIGEONS (*COLUMBA LIVIA*)'

LARA PARK (FRIEDMAN SCHOOL OF NUTRITION, PHD CANDIDATE)
'AGING MODIFIES SPLENOCYTE DNA METHYLATION IN RESPONSE TO INFLUENZA INFECTION'

PAUL ROSENSTRAUCH (CIVIL/ENVIRONMENTAL ENGINEERING, MS CANDIDATE)
'THE INFLUENCE OF TEMPERATURE CHANGES ON BRIDGE STRUCTURAL BEHAVIOR'

DOUGLAS WALKER (CIVIL/ENVIRONMENTAL ENGINEERING, PHD CANDIDATE), NATALIE L. CÁPIRO, EMMIE K. GRANBERY, KURT D. PENNELL
'COMPOSITION DEPENDENT EVOLUTION IN MASS FLUX FROM BINARY TRICHLOROETHENE/TETRACHLOROETHENE-DNAPL SOURCE ZONES'

ABSTRACTS

PLENARY SPEAKERS

R. JORDAN CROUSER (COMPUTER SCIENCE, PHD CANDIDATE), 'POSSIBLE, LIKELY, AND INEVITABLE: COMPUTATIONAL METHODS FOR EXPLORING SIMULATIONS IN POLITICAL SCIENCE'

Agent-based simulation has become a key technique for modeling and simulating dynamic, complicated behaviors in social and behavioral sciences. As these simulations become more complex, they generate an increasingly large amount of data. Lacking the appropriate tools and support, it has become very difficult for social scientists to interpret and analyze the results of these simulations. In my research as part of the Visualization Group in the Department of Computer Science, we begin to address this need by developing a new theoretical framework and visualization techniques for analyzing these simulations using techniques from Graph Theory and other computational methods.

JON FREEMAN (PSYCHOLOGY, PHD CANDIDATE), 'THE BRAIN BASIS OF PERSON PERCEPTION'

From a glimpse of another person, we glean an enormity of information, such as another's gender, race, emotions, or personality characteristics. These "snap" perceptions seem immediate, yet each one, our research finds, takes several hundreds of milliseconds to stabilize. I will discuss work examining those hundreds of milliseconds to understand how the brain perceives other people. This research uses a variety of techniques, including brain-imaging, electrical brain potentials, computational modeling, and a computer mouse-tracking technique. Together, this work shows that person perception is a dynamic process where many factors weigh in to shape what one sees. These include not just facial and vocal cues, but also one's stereotyped expectations, cultural values, and motivations. During this process, the brain computes multiple tentative, "hidden" perceptions, and—by gradually incorporating these various factors—rapidly resolves them into a single ultimate perception. The research and the novel mouse-tracking technique have implications not just for social behavior, but also more broadly for decision-making, language, learning, memory, clinical disorders, and a changing world.

MAREIKE STANITZKE (ENGLISH, PHD CANDIDATE), 'READING AND THE "REAL" WORLD: THE POLITICS OF HUMANIZING LITERATURE'

To assure the importance of reading literature in planning for a changing world, scholars and teachers insist on its ethical nature. The study of literature is taken to be crucially relevant to "a world in violent conflict" because narratives "arouse compassion for others' sufferings and limitations." But what is at stake in defining literature as an inclusive ethical project? What if the act of reading cannot guarantee the ethical and "human" insights we expect from it? Considering Kazuo Ishiguro's novel *The Remains of the Day*, I argue that the ethical value of literature can only be maintained by not reading it, that is, by foregoing a close reading of its literal elements in favor of asserting its ethical effects. Precisely because butler Stevens reads closely and thus cannot decide between irony's two incompatible meanings, he faces the loss of professionalism, dignity, and the warmth of human relationships.

ART & HISTORY

PARALLEL SESSION I (3:10 PM – 4:10 PM)

MERON LANGSNER (DRAMA, PHD CANDIDATE), 'CHOREOGRAPHING KARATE UP CLOSE AND PERSONAL: MARTIAL ARTS ON THE MAINSTREAM AMERICAN STAGE'

Those theatrical fight choreographers who face the task of presenting martial arts on the mainstream American stage do so in the context of two much larger social forces. The first is the representation of martial arts in Hollywood and Hong Kong Cinema, where such violence takes place in a stylized fantasy world, but is presented in great detail and with the aid of all manner of technology. The second is the existence of living martial traditions practiced by everyday people. When dramatists such as Stephen Sondheim, David Mamet, or Lanford Wilson write a fight scene in which a character is a highly skilled martial artist, they create the production problem of an actor having to learn a set of movements during a normal rehearsal process that can safely replicate the image of advanced martial skills that would be recognized as such by an audience. One musical and one drama; Stephen Sondheim's *Company* and Lanford Wilson's *Burn This*, will serve as case studies in which these problems, and the solutions various fight directors (including the presenter) have come up with in several productions. These case studies will also serve to illustrate the proliferation of fantasies surrounding violence and how they manifest on both the stage and screen. This presentation will also illustrate the relationship between theatre and film as affects body movement in general and violence in particular.

C. DANIEL REDMOND (ENGLISH, PHD CANDIDATE), 'TAKING IT BACK: PAULINE HOPKINS'S WINONA AS A RECUPERATION OF AFRICAN AMERICAN SEXUALITY'

In *Aberrations in Black: Toward a Queer of Color Critique*, Roderick A. Ferguson argues that "heteronormativity is racialized." As persons from different races joined the work force in the early twentieth century, they became racially stigmatized as they ultimately threw "the normative boundaries of race, class, and sexuality into confusion" (17). This uncertainty over normative standards of citizenship resulted in a discourse that denied African Americans the right to define who they were within the context of the early twentieth-century U.S. Reduced to the status of objects, one might even say hypersexualized objects, African Americans were viewed as deviant—that is, queer.

This paper will argue that an excellent pedagogical approach to Pauline Hopkins's *Winona: A Tale of Negro life in the South and Southwest* (1902-1903) is to embrace it as a fundamentally queer text. Invoking Eve Sedgwick's *Between Men*, I will show that Hopkins redefines African American sexuality through the "erotic triangle" she creates amongst Winona, her black stepbrother Judah, and the British solicitor Warren Maxwell and that she does so at a crucial time, when the lynching of black males was commonplace in U.S. society (27). Moreover, I contend that Hopkins further reclaims African American sexuality by setting her black protagonists up as members of an autochthonous Native American clan, another group of people deemed sexually deviant by the dominant white culture. Hopkins purposefully embraces white misrepresentations of non-white sexuality, and in doing so, she reveals them to be falsehoods. Through the near lynching of a white British abolitionist, the actual murder of Winona's father, White Eagle, and the attempted murders of several white American freedom fighters, Hopkins boldly presents a world where it is white men, not men of color, who are the true sexual threats to the civil order. Written during a time when the murder of a black man and the rape of a black woman were the norm in the U.S., Hopkins's *Winona*, I maintain, is ultimately a courageous rebuttal to white America's demonization of black sexuality.

BETSY FELDMAN (DRAMA, PHD CANDIDATE), "'DYBBUK SHMYBBUK, I SAID MORE THEATRE': HASKALAH, DAVID KESSLER, AND THE DETACHMENT OF THE JEWISH SOUL FROM EARLY 20TH CENTURY YIDDISH AMERICAN THEATRE'

There are multiple studies regarding Jewish and Yiddish theatre in Eastern Europe and North America. However, there remains a barrier between the study of Haskalah (the Jewish Enlightenment in the latter half of the eighteenth century akin to movements in France and England) and the events in New York City in the early twentieth century. I propose to explicate connections between these two. In so doing, I will draw on Haskalah, David Kessler (a star actor in the American Yiddish Theatre), and the eventual decline of exclusively Jewish theatrical practices in New York City. In articulating these previously unexplored connections, I submit Haskalah as simultaneously crucial and detrimental to Jewish theatrical expression and experimentation in the United States in the early twentieth century. David Kessler serves as a seminal example of the ideals that Haskalah advocated for, namely the concurrent promotion of Jewish artistic expression, incorporating alternative cultures into Jewish study, and the conservation and nurturing of the self as Jewish. Although Jewish immigrants in New York City found community, expressiveness, solace, and an emerging American identity through the Yiddish theatre, it expedited the assimilation process, thus stripping immigrants of their previously known selfhoods and causing confused identities. Immigrants' Jewish religion, nationality, and distinct cultural identity conflicted with the tenacious endeavor to fuse Judaism with theatre (which can seem like a religion in its own right). To employ a metaphor from *The Dybbuk* by S. Ansky, the theatre became the dead suitor—enchanted and ultimately wrong—who, in the end, pulled the hesitant young bride into the underworld with him. "*The Dybbuk* (subtitled *Between Two Worlds*) reflected [S.] Ansky's belief that Judaic tradition had grown irrelevant. He predicted that it would soon be forgotten, covered over by current events. Ritual, liturgy, worship on the High Holy Days were no longer enough; art was the key to the Jewish survival in the twentieth century." Myriad factors contributed to the downfall of the Yiddish theatre, and the suppressed traditions of the Jewish immigrants in New York City in the early 1900s. Haskalah was one of these driving forces.

SHANNON O'HEARN (DRAMA, MA CANDIDATE), "'MANNING UP": THE SOLDIER AS MALE CONSTRUCT IN WWI DRAMA'

This paper explores the soldier as an expression of masculine identity through the lens of World War I drama. The social role of the soldier in Western society is considered inherently masculine, expressing the attributes of courage, strength, violence and heterosexuality. However, the experience of World War I created a crisis of masculinity in those who served there – the disorder then known as "shell-shock" assaulted the notion of the virile, enduring man, and the front lines were often associated with homo-social behavior that subverted the expectations of male heterosexuality. Thus the subject of World War I becomes fertile ground on which to examine the idea of masculinity – whether there is truth in typical social notions of the male gender role, or if one must redefine "manliness" in a Modernist world – and this persists years after Western world passes out of the era of Modernism, for the question of the soldier's role in society still remains, and it is still judged to be a male role. In comparing the specific plays *Journey's End*, *Observe the Sons of Ulster Marching towards the Somme* and *Not About Heroes*, the image of traditional masculinity is cracked and fragmented as the soldiers have to deal with their failings as the typical male. Through their relationships with the military, violence, and their fellow servicemen, the soldiers respond to the social construct of "masculinity", and finding it lacking in the chaotic world of war, either break down, or create a new male role for themselves.

PARALLEL SESSION II (4:15 PM – 5:15 PM)

MICHAEL MORRIS (DRAMA, MA CANDIDATE), 'TRANSCENDING GENRE: BRAND EXTENSION THROUGH ADAPTATION IN THE COMMERCIAL MUSICAL THEATRE INDUSTRY'

Corporations from other cultural industries view the musical theater industry as an opportunity to profit from their core competencies—producing and marketing “content”—and to enhance their brands' value. For example, the *Beauty and the Beast* brand is used as a category to refer to products in multiple genres and product categories. The adaptation of a work in one genre into a work of musical theatre, for example, the adaptation of the *Beauty and the Beast* animated film into the stage musical is the focus of the article.

My argument is not that these musicals, created through adaptation by corporations, constitute their own genre. My suggestion is that in these instances the artistic practice of adaptation functions simultaneously as a business practice of brand extension, as a result of which the genre ceases to be the salient category. In other words, I would argue that the musical *Beauty and the Beast* appeals to people first as another instance of the *Beauty and the Beast* story and music that they know, and second as a production in the musical theatre genre.

Using the example of Disney's musicals, this paper will explore how the artistic and business practice of adaptation unfolds within the framework of intellectual property law, corporate law, management theory, and business practices.

PATRICK BRADLEY (DRAMA, PHD CANDIDATE), 'UNSPEAKABLE ACTIONS: A CONTEXTUALIZED READING OF DAVID HARROWER'S *BLACKBIRD*'

Since winning the 2007 Lawrence Oliver Award for Best New Play, David Harrower's *Blackbird* has been translated and performed around the world (including Japan, Singapore, Canada, and Prague). But despite such renown, the play is rarely discussed in American theatre scholarship. This is likely due to its disturbing and controversial subject matter.

Blackbird depicts the emotional reunion of a convicted pedophile and his former victim. In the garbage-strewn break room of an undisclosed factory, Ray and Una meet for the first time in fifteen years. As they reflect upon painful memories of the past, each finds solace in the compassionate sympathy of the other.

Clearly influenced by a tradition of contemporary “shock” theatre, Harrower does not hesitate in evoking a visceral response from the audience. The origin of Ray and Una's relationship is described in graphic detail; the traumatic aftermath of their affair is made explicit; and there is even a moment in which the two former lovers reengage their passion. Such unsettling scenes make the play difficult to discuss. However, this is no reason to overlook its dramatic value. *Blackbird* serves to remind the audience that pedophilia will not go away simply by being ignored. It thus becomes a conduit through which this unspeakable act can—and should—be confronted by society.

The goal of my presentation is to begin facilitating this discussion. By utilizing recent psychological and sociological research, this paper will contextualize some of the more challenging issues of the play. Although *Blackbird* is structured to allow for multiple readings, there are sufficient details which indicate that Una suffers from a typical pattern of child sexual abuse. In addition, although it is impossible to forget the horrific damage which he (unwittingly) inflicted upon her, Ray nevertheless demonstrates that pedophiles are not always the voracious monsters our society imagines them to be. For the typical audience member, this is perhaps the most disturbing notion of all. To empathize with such an individual is to potentially call into question all that we hold true about pedophilia.

LYDIA ABEL (DRAMA, PHD CANDIDATE), 'THE SOVIET CLOWN: STAGING A REVOLUTION THROUGH LAUGHTER'

In a rapidly shifting Soviet Russia, revolutionary sociopolitical skirmishes were waged not only on the battle front, but at home as well. However these home-front political diatribes were not solely relegated to the newspapers or other written propaganda: the battle for a new Russia was being fought in another arena as well, the circus. In a politically charged climate, the clowns and animals became agents of social change. The arena became a place to reenact these conflicts, creating a space where current political battles could be fought and won nightly. When compared to the traditional Russian theatre, which took its audience primarily from the upper and middle classes, the circus assembled individuals which spanned the cultural and economic spectrum. It was the one format that could reach across socioeconomic barriers to communicate with the masses.

The piece I will be examining is Vladimir Mayakovsky's *The Championship of the Universal Class Struggle*, comprised and performed entirely by clowns, which premiered in November 1920 at the Second State Circus in Moscow. In the performance piece, clowns take on the roles of world leaders and function as platforms for propagandistic speech to condemn Soviet enemies. In addition by demanding resolution of the conflict within the arena, the clown solicits the loyalties of its audience; begging them for their allegiances in the war. Therefore, he encourages the spectator to become more than a mere observer, but rather a politically engaged citizen with a responsibility to the Soviet people. *Championship* provides a playing field where the clown becomes the enforcer of a new regime against the people it seeks to represent.

MEGAN STAHL (DRAMA, PHD CANDIDATE), 'FINDING A VOICE: REPRESENTATIONS OF ARAB WOMEN ON THE POST-9/11 AMERICAN STAGE'

In the wake of 9/11, the world's focus shifted to a part of the globe that, for many Americans, had seemed insular and remote, an historic land shrouded in mystery that was so different from our own. But as tensions escalated between the United States and Iraq in the months leading up to the war, American curiosity—and subsequent misconceptions—about the people of the Middle East proliferated. This trend was reflected in the artistic community as well, prompting a

number of films and stage productions that explored both the conflicts in the Middle East and the social circumstances of its population. Consequently, the American perception of Arabs began to take shape in a concrete physical form on the screen and on stage, regardless of the accuracy of these representations. Arab women in particular have been consistently presented as objects of pity, an image often evoked as a justification for the war in Iraq. Whether framed within the language of political rhetoric or the parameters of artistic license, this classification positions Middle Eastern women as oppressed and voiceless, reinforcing our imperialistic notion that they need to be "saved."

Over the last several years, however, there has been a significant shift in the theatrical representation of Arab female characters, primarily due to the emergence of a number of Arab-American women playwrights. In contrast to the conventionally passive and limiting portrayals of Middle Eastern women constructed by the government or the media, plays such as *9 Parts of Desire* by Heather Raffo and *Unveiled* by Rohina Malik present female characters who possess their own agency. Rather than allow American politicians to wage war in the name of liberating the women of their faith and ancestry from beneath the veil, these writers create within their work a collective voice to revise the position of Arab women in a post-9/11 world. This paper examines the way in which these playwrights are blending trauma and testimony within performance as a means of bearing witness to the contemporary realities of Arab and Arab-American women.

SOCIAL SCIENCES

PARALLEL SESSION I (3:10 PM – 4:10 PM)

JILL PLEVINSKY (CHILD DEVELOPMENT, MA CANDIDATE), 'YOUNG PATIENTS WITH INFLAMMATORY BOWEL DISEASE: FACEBOOK AS A TOOL FOR SOCIAL SUPPORT'

The Internet's monumental influence on social connections and its impact on medical informatics is becoming increasingly controversial regarding how patients ought to obtain reliable information. The increasing rate of youth and adolescent virtual participation holds serious implications those with inflammatory bowel disease (IBD) as they transition beyond their parents' care. Researchers thus far have failed to consider the increasingly virtual society of patients fueled by the development of Facebook and social networking websites. This study assessed the degree of social interaction among participants on IBD-specific Facebook groups through evaluating responses to posts. Predictions were that individuals would seek more social interaction in response to issues regarding diet and peer acceptance compared to more stigmatized matters like drug and treatment options. Three questions were created for each category and were posted to a total of twelve sites by one female and one male adolescent with IBD. Peer acceptance posts elicited the most and the longest responses on average. Diet posts elicited the second most and second longest responses by a small margin, but resulted in the most friend requests and "likes." Drug/treatment concerns were least discussed suggesting that peer acceptance and diet take precedence over drug/treatment concerns in the search for information and social support via IBD-specific Facebook communities. Findings from this study may be useful for increasing our understanding of how to utilize disease specific social networking sites to support participating individuals in their quest to obtain valid and reliable health information to help them manage their disease.

MARIAH CONTRERAS (CHILD DEVELOPMENT, MA CANDIDATE), 'SOCIAL CAPITAL AND SCHOOL INVOLVEMENT IN IMMIGRANT FAMILIES: UNDERSTANDING PARENTING SOCIAL PRACTICES BEFORE AND AFTER MIGRATION'

New immigrant parents in the United States with school-aged children face a unique challenge in learning to adjust to the U.S. school culture and system. In the context of the diverse migration circumstances of contemporary immigrant populations, parents' capacity to navigate U.S. schools also varies widely. Yet should immigrant parents demonstrate involvement and engagement with their children's education in the U.S., evidence shows that such parenting practices are associated with optimal child outcomes across multiple domains. Scholars in the field of immigrant research have contended that parental *social capital*, or the extent to which parents *make formal and informal connections to outside individuals and organizations as a way to access resources*, is a key facilitator of children's positive outcomes in immigrant families. Using the construct of *social capital* to frame potentially advantageous social practices across migration, the purpose of the present study was to help further understand the diversity of new immigrant parents and their social practices in the U.S. and the home country. Using data from the 2003 New Immigrant Survey (Jasso, Massey, Rosenzweig, & Smith, 2006), the study examined the relationship between what new immigrant parents (N=1,215) reported practicing in the varied contexts of their religious, social, civic, and political worlds prior to migration and their reported school involvement once in the U.S. Multinomial and logistic regression analyses revealed participation in religious practice in pre-migration life was positively associated with and a significant predictor of increased odds of parental involvement both at school and at home once in the U.S., while participation in social, civic, and political practices in pre-migration life did not significantly predict either domain of parental school involvement in the U.S. Considerations regarding the influence of religious practice, human capital, and length of residency of new immigrants in the U.S. are discussed.

MARISOL PIERCE-QUINONEZ (URB. & ENVIRON. PLANNING, MS CANDIDATE), 'THE ROLE OF FOOD SYSTEM ASSESSMENTS IN THE CREATION OF SUSTAINABLE FOOD SYSTEMS'

Food systems are a nascent discipline of study. From farm to fork, food systems address the production, processing, distribution, consumption and disposal of food. Government agencies, non-profit organizations and academic institutions have begun to analyze the interdisciplinary topic of food systems through the use of food system assessments (FSAs). Cities and regions all over the country have begun conducting food system assessments to learn about their food systems and make recommendations on ways it can become more sustainable. This presentation evaluates FSAs from the last ten years on three standards: the inclusion of all five food system components in the assessment, the mention of various practices and techniques that make up a sustainable food system, and recommendations on how to make the practices and techniques a reality through policy changes, programmatic shifts or additional funding sources. Results of the initial survey of FSAs found no significant correlation between FSAs on any of the three categories, meaning that there is not yet a consensus on the definition of a food system or how to make it more sustainable. In addition to the evaluative overview of FSAs, this presentation also provides in depth analysis of a few of the most successful FSAs and explains how they were able to use their research to promote a more sustainable food system. The presentation advances the discussion of sustainable food systems through the use of quantifiable metrics, and ultimately suggests a set of standard principals to help guide future FSAs.

NINA TANDON (FLETCHER SCHOOL OF LAW/DIPLOMACY, MS CANDIDATE), 'REGULATING THE REGULATOR: THE GOVERNANCE OF SOVEREIGN WEALTH FUNDS UNDER INTERNATIONAL LAW'

Sovereign wealth funds (SWFs) have existed since the 1950s, but the rapid onset of SWF growth within the last decade has cemented their importance as economic tools. The funds are remarkable in the way they operate in that they are sovereign-controlled asset pools investing in a manner historically thought to be reserved for private investors. Due to the aspect of sovereign-control, the funds remain controversial, as critics question the possibility that they may be politically or otherwise motivated. If so, the economic influence these funds increasingly wield could be used in order to further policy objectives. Nevertheless, SWFs continue to grow and invest at an astonishing rate. The implications of their influence in the global economy naturally lead to questions of whether and how SWFs can be adequately regulated and protected. Some argue for a restrictive regulatory regime due to the political and security concerns raised by the prospect of a state sovereign investing in another host state's territory. Others warn that strict regulations could unnecessarily inhibit the growth potential of SWFs at a time when the world is recovering from a financial crisis. Whatever the concerns regarding their investments, SWFs have facilitated a transfer of money from countries with excess reserves to those with swelling deficit during a worldwide economic crisis that burgeoned in 2008. Regulatory protection of SWFs would result in benefits to both of the parties to their foreign investment transactions. For host countries in which SWFs make investments, regulations could ease concerns regarding the motivations behind these investments by requiring greater transparency. For SWFs, regulatory protection would ensure the stability of their investments and make the option of investing in host countries with such protection more attractive. Though SWFs are subject to domestic laws upon making investments in foreign states, international investment law offers advantages and coverage that domestic laws cannot. International investment law standardizes expectations of what both parties to a transaction can expect from each other and provides equitable regulation, treatment and dispute resolution standards. My research addresses the question of whether SWFs are governed and protected by any facets of international investment law. First, I identify the sources of international law – customary and treaty – and second discuss, in turn, the applicability of customary international law, international conventions and international investment treaties to SWFs, in terms of governance and protection. The research theorizes that bilateral and multilateral investment treaties present the most attractive and viable option for the governance of SWFs and concludes with recommendations for SWFs in order to ensure that their investments are protected by these treaties.

PARALLEL SESSION II (4:15 PM – 5:15 PM)**SARAH ANDERSON (CHILD DEVELOPMENT, PHD CANDIDATE), 'WHEN AND WHERE WE LIVE: NEIGHBORHOOD SOCIOECONOMIC STATUS ACROSS DEVELOPMENT'**

Evidence points to associations between the socioeconomic composition of a child's neighborhood and a range of developmental outcomes. Little work has examined if the timing of exposure to neighborhood socioeconomic status (SES) matters even though the salience of contexts, and how children interact within them, changes throughout development. For example, adolescents typically spend more time independently in the neighborhood, and this increased exposure to neighborhood institutions and individuals could impact their behavior. On the other hand, very young children may be indirectly exposed to the neighborhood through caregivers. Furthermore, exposure to neighborhood poverty and affluence have been shown to influence children in different ways such that neighborhood poverty may confer benefits in terms of academic achievement whereas neighborhood poverty may lead to more delinquent behavior.

This study uses longitudinal data from the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development, a birth cohort study in 10 sites across the US that followed children and their families over a 15-year period. We examine exposure to neighborhood affluence and poverty during early childhood, middle childhood, and adolescence and outcomes including academic achievement and internalizing and externalizing behaviors. Neighborhood poverty and affluence were indexed by composite variables using 1990 and 2000 US Census indicators.

Path analytic techniques, similar to multiple regression, indicate that exposure to greater neighborhood affluence in early childhood, middle childhood, and adolescence was significantly associated with higher reading and math scores in early childhood or adolescence whereas exposure to a neighborhood with greater poverty during early childhood was associated with lower achievement. Neighborhood affluence and poverty were not significantly associated with children's externalizing and internalizing behaviors. Findings indicate that future research should attend to the age of exposure to neighborhoods and that policies to ameliorate behavior through neighborhood-level intervention may impact particular outcomes for specific age groups.

SARAH GAITHER (PSYCHOLOGY, PHD CANDIDATE), 'IMPLICIT BIAS AND SOCIAL EXCLUSION PREDICT AMBIGUOUS RACE CATEGORIZATION'

Multiracial individuals are projected to be the fastest growing demographic in America over the next 40 years. This population challenges traditional either-or perceptions of race, and psychologists lack a complete understanding of the factors that predict how multiracial people are categorized and treated. Two studies tested the hypothesis that motivation—related to either perceivers' implicit racial bias (Study 1) or social threat evoked by social exclusion (Study 2)—would shape categorization of racially-ambiguous faces in self-serving ways. In the first study, White participants first completed the Black/White Implicit Association Test (IAT) to measure their implicit bias toward African Americans and then proceeded to categorize racially ambiguous Black/White faces as either Black or White. In the second study, White participants played *Cyberball* (Williams & Jarvis, 2006), a ball-tossing game, ostensibly with three other online-players, all of whom were preprogrammed-confederates. Based on random assignment, participants were either socially-included (receiving the ball one-third of all tosses) or socially-excluded (receiving the ball twice in the beginning of the game, but never again for the remainder of the five-minutes). This method of inducing social exclusion has been shown to be effective in many previous studies. Subsequently, participants completed the same categorization task from Study 1. As hypothesized, racial bias and social exclusion both predicted White participants' tendency to more frequently categorize racially-ambiguous faces as Black. These results demonstrate how perceivers' motivations—derived from either internal cognitive associations with the outgroup or external social contexts—can significantly predict the psychological boundaries of group membership.

SIMCHA LEVENTAL (URB. & ENVIRON. PLANNING, MS CANDIDATE), 'INTERDEPENDENT: WASTEWATER MANAGEMENT BETWEEN ISRAEL AND PALESTINE'

In the following decade Israeli and Palestinian policy makers will need to set policy regarding wastewater management in regions with proximity to each other's border. Deciding on the proper course of action for trans-boundary cooperation, when it can occur because of geographic proximity or a shared resource such as a stream or a wastewater treatment plant, will be crucial for a long lasting sustainable peace, for the prosperity of the region and for the environment. In their decision making, they will need to decide the extent of the cooperation and the form it should take. Wastewater reclamation for agriculture is significantly important due to water scarcity in the region. It has been reported that the marginal cost of wastewater treatment, beyond collection and secondary treatment of urban sewage, is significant but well below the cost of additional fresh water (Brooks & Trottier, 2010). Reclaimed water also means increase in economic welfare that can translate into higher gains from agriculture with significance on the regional level. My work will focus on the Tul-Karem – Emek Heffer region in the watershed known to Israelis as the Alexander watershed and to Palestinians as Wadi Zomar. This region has experienced some cooperation in the past decade. Though, the cooperation is limited to a local level agreement between the municipalities reached in 1996. With the funding from the German government, primary treatment was established in Tul-Karem and effluent levels are then upgraded at Yad Hana plant inside Israel. This water then serves to revitalize the Alexander River. My work considers prospects for wastewater management between Israeli and the future Palestinian State, by examining current and future cooperation in the Tulkarem / Emek Heffer region. The approach my work takes are phone interviews to with wastewater managers in both Israel and Palestine to examine attitudes and perspectives about current and future cooperation. The interviews are then analyzed, following Kvale's guidelines for a meaning interview analysis. In this analysis we will be looking for central themes of each response.

STEM

PARALLEL SESSION I (3:10 PM – 4:10 PM)

EMILY LEWIS (CHEMISTRY, PHD CANDIDATE), APRIL D. JEWELL, HEATHER L. TIERNEY, ERIN V. ISKI, GEORGIOS KYRIAKOU, E. CHARLES H. SYKES, 'TOWARDS UNDERSTANDING THE FISCHER-TROPSCH REACTION ON MODEL COBALT NANOPARTICLES'

Sustainable energy technologies are critically important in reducing our dependence on fossil fuels, as well as addressing global climate change. In this respect, the production of *synthetic fuels* has received renewed attention. Fischer-Tropsch synthesis (FTS) involves the formation of hydrocarbons via the catalytic conversion of syngas (carbon monoxide and hydrogen), which can be derived from biomass, and is itself a renewable energy resource. Currently, it accounts for the production of 200,000 barrels per day of synthetic fuel. This strategic, heterogeneous catalytic process is usually performed using cobalt-based catalysts that are greatly affected by the adsorption state of reactants, as well as nanoparticle shape and size. Previously, there has been very little surface science research on cobalt model catalysts

because of difficulties in preparing atomically clean surfaces. We have developed a new method for preparing model cobalt catalysts by depositing cobalt onto copper single crystals (an inert metal for FTS), yielding well-defined cobalt nanoparticles. Using ultra high vacuum, low-temperature scanning tunneling microscopy (UHV LT-STM), we have studied these model nanoparticles and the interaction of syngas with their surfaces on the molecular scale. It is shown for the first time that the two adsorbates segregate on the cobalt surfaces at 80 K, and we propose that atomic hydrogen blocks carbon monoxide adsorption, preventing complete overlayer formation and causing the build-up of carbon monoxide at the cobalt nanoparticle step edges. Additionally, with increasing carbon monoxide coverage, we demonstrate a two-dimensional phase compression of hydrogen by carbon monoxide, providing the *first direct nanoscale* demonstration of this long proposed phenomenon in a catalytically relevant system. These effects are indicative of a spillover mechanism in which the carbon monoxide that is physisorbed to the copper migrates to the reactive cobalt nanoparticles. Finally, as the carbon monoxide and hydrogen atoms segregate from each other, this suggests that FT reactivity must be dominated by available interface length between the two and, hence, be subject to unforeseen kinetic restraints as a function of particle size.

BYRON WALLACE (COMPUTER SCIENCE, PHD CANDIDATE), 'SEMI-AUTOMATED CITATION SCREENING FOR SYSTEMATIC REVIEWS'

Systematic reviews are a scientific approach to objectively summarizing the efficacy of existing treatments for diseases, a prerequisite for informed healthcare decision-making. They form a cornerstone of modern evidence-based medicine. For such reviews to be objective and therefore scientifically valid they must include all relevant published literature. In light of this requirement, conducting a systematic review requires that the reviewers (typically doctors) read many thousands of medical abstracts, the vast majority of which are completely irrelevant to their clinical question. This process is referred to as *citation screening*. It is hugely laborious and time consuming, and will become increasingly so due to the exponential growth of the biomedical literature. We have been collaborating with researchers at Tufts Medical Center to reduce this burden using machine learning techniques.

Our aim is to use a set of citations manually categorized as 'relevant' or 'irrelevant' to build, or train, a model capable of classifying the remaining citations. To reduce the number of documents that must be hand-categorized to induce the model, we use an interactive training strategy called *active learning* in which the model selects the citations that are to be labeled by the human. We discuss the unique machine learning problems inherent to the citation screening task, and present novel methods to overcome these. We show that our method is capable of significantly reducing the burden on systematic reviewers, thereby potentially greatly reducing the cost of robust evidence assessment, a vital component of modern healthcare.

PRADEEP MAURYA (CIVIL/ENVIRONMENTAL ENGINEERING, MS CANDIDATE), 'IMPEDANCE BASED MODELING FOR PREDICTION OF TRAIN INDUCED FLOOR VIBRATION'

Train-induced vibrations propagate through soil in the form of waves that are transmitted to buildings at the foundation level. Many facilities are located in environments with substantial ambient vibration. Floor vibrations are of concern for precision manufacturing facilities and for laboratories where sensitive experiment is carried out. These vibrations also may be of concern for human comfort in residential settings. A simple method to accurately predict the magnitude of high-frequency floor vibrations would allow detailed vibration assessment during the conceptual design phase, and provide physical insight useful for developing vibration mitigation approaches. In the mathematical model, the vibrating force is assumed to be applied only in the vertical direction at the base of the columns. Floor plates attached to the columns radiate energy as transverse bending waves. Floors attached to the columns can be modeled as energy dissipating floors slabs. The bending theory used to describe the response of the floor is thin plate theory. Thin infinite plates are totally resistive in the sense that they carry energy away from driving point (the column). This resistance is called point force impedance.

A scale model building developed at Tufts University, was excited axially at the base of the center column. The data obtained from an experiment have been used to validate the predictions. The proposed wave propagation method successfully predicted the measured velocities and impedances of the scale model building. Presentation focuses on the experimental validation of a simple wave propagation based modeling approach for the prediction of train-induced floor vibrations.

NAN YI (CHEMICAL AND BIOLOGICAL ENGINEERING, PHD CANDIDATE), HOWARD SALTSBURG, MARIA FLYTZANI-STEPHANOPOULOS, 'EXPLORING ALTERNATIVE ENERGY: APPLICATION OF ACTIVE GOLD SPECIES ON CERIUM OXIDE TO CATALYTIC HYDROGEN PRODUCTION PROCESSES'

Hydrogen is a promising source of alternative energy that can be harnessed from simple organic compounds like methanol and formic acid and transformed into a practical, industry-usable form. A catalytic process, which lowers the activation energy and promotes reactions at low temperatures, is required to extract the energy efficiently and to make the alternative energy source viable for industry use. I investigated the efficacy and practical application of a new generation catalyst for methanol steam reforming and decomposition of formic acid, two processes that convert raw organic compounds into energy. Detailed catalytic and mechanistic studies, investigating the activity, selectivity and stability of the catalyst (gold-doped ceria) have shown this catalyst is very promising for both reactions at low temperatures. The findings provide the necessary insight into gold-ceria and are a breakthrough in the efforts to generate energy cleanly and efficiently for scalable fuel cells.

PARALLEL SESSION II (4:15 PM – 5:15 PM)

ANDREW WINSLOW (COMPUTER SCIENCE, PHD CANDIDATE), 'A CONNECTION BETWEEN ALGORITHMIC SELF-ASSEMBLY AND FORMAL LANGUAGE THEORY'

Algorithmic self-assembly is the study of precisely constructing complex structures through the spontaneous attachment of simple building blocks. In the field of nano-scale manufacturing, such a process offers the potential to significantly improve our ability to produce electronics, therapeutic medicines, and materials at the nanometer scale.

In this talk we present work on self-assembling systems under the staged one-dimensional model suggested by Demaine et. al. Along the way, the *disassembly problem* in algorithmic self-assembly is discussed: given an input superstructure, compute a set of building blocks and mixing steps to deterministically produce this structure.

Surprisingly, we show that the solution to this problem in the staged 1D model is closely related to the problem in formal language theory of finding a context-free grammar generating a particular string. This connection enables us to apply known results for context-free grammars to problems in algorithmic self-assembly, including the disassembly problem.

Specifically, we prove that the staged 1D self-assembly model has asymptotically equivalent expressive power to context-free grammars, yielding an efficient algorithm for finding nearly optimal solutions to instances of the disassembly problem, as well as implying the intractability of computing optimal solutions. We then go on to show that the same equivalency does not hold for the more general staged 1D model. Finally, we briefly discuss the application of these results to the construction of a web-based software tool for solving the disassembly problem in real-time.

BRANKO ZUGIC (CHEMICAL & BIOLOGICAL ENGINEERING, PHD CANDIDATE), MARIA FLYTZANI-STEPHANOPOULOS, 'CARBON-SUPPORTED NANOCATALYSTS FOR RENEWABLE ENERGY APPLICATIONS: TOWARDS HYDROGEN PRODUCTION, BIOFUELS AND BEYOND'

It is estimated that 90% of all commercial chemical processes require catalytic processing at some stage. It also comes as no surprise that renewable resources for fuels and chemicals are quickly becoming fundamentally important for economic, environmental, and industrial security across the world. Consequently, there has been a strong push in the catalysis community towards understanding the fundamental nature of catalysts for energy applications. We at the Nano Catalysis and Energy Laboratory, with the support of the Tufts Institute for the Environment, have made strong strides in this direction by designing and probing nanomaterials for hydrogen production and biofuel applications.

We have shown that platinum-based catalysts, which are not active for the low temperature water-gas shift reaction (important for hydrogen production), can be promoted by the simple addition of alkali metals such as sodium. The resulting material – a sodium-platinum complex – is very active and stable due to the presence of hydroxyl groups that are replenished to the surface by the sodium. Furthermore, this material can be applied to a novel process for the production of bio-propane that has recently been developed in our laboratory. The methods and the nature of that active site and its potential applications are discussed.

MEGAN STRAIT (COMPUTER SCIENCE, PHD CANDIDATE) '(INTER)FACING THE FUTURE: FOSTERING LEARNING AND COLLABORATION THROUGH NEXT-GENERATION COMPUTER INTERFACES'

Computational devices have tremendous potential to harness the power of information, creation, and communication to foster collaborative work and learning. There remains however, a clear disconnect between the computer and the user. Computers cannot understand when a user is distracted, disengaged, exhausted...but what if they could?

I present an investigation of three interfaces – G-nome Surfer, PrefNIRS, and iBlink – that leverage advances in biomedical engineering and computer vision to explore the future of computational interactions. These implementations demonstrate application of tangible manipulation, neuro-imaging, and eye-tracking to enhance intuitive user-computer interaction and multi-person collaboration.

G-nome Surfer is a multi-touch tabletop interface for exploratory genomics. PrefNIRS is a functional near-infrared spectroscopy tool for detecting cognitive activation patterns of preference in the pre-frontal cortex. iBlink is an adaptive guide for classroom learning that uses eye-tracking to monitor disengagement and drowsiness.

Comparative evaluations with 129 total subjects support such techniques for future standards of interaction. Findings from both structured and in-classroom evaluations show significant improvement in student performance, reduction of cognitive workload, and increase in physical and verbal participation (collaboration).

The focus of this research is to demonstrate successful implementation of the next-generation technology, evaluation in the context of real-life application, and longitudinal investigation through classroom integration. This work is helping invent and develop the future of computer interfaces to move beyond the traditional mouse and keyboard interactions.

LORIEN URBAN (FRIEDMAN SCHOOL OF NUTRITION, PHD CANDIDATE), MEGAN A. MCCRORY, GERARD E. DALLAL, SAI KRUPA DAS, EDWARD SALTZMAN, JUDITH L. WEBER, SUSAN B. ROBERTS, 'ACCURACY OF STATED ENERGY CONTENTS OF RESTAURANT FOODS IN A MULTI-SITE STUDY'

National recommendations for prevention and treatment of obesity emphasize reducing energy intake through self-monitoring. Restaurant foods provide 35% of daily energy intake, but the accuracy of information on the energy content of these items is unknown. We used bomb calorimetry to measure the energy contents of 269 randomly selected low (<600 kcal) and high (≥ 600 kcal) energy foods obtained from quick-serve and sit-down restaurants in Massachusetts, Arkansas and Indiana. The accuracy of stated food energy contents was determined as the difference between measured and stated values after applying standard metabolizable energy conversion factors. The accuracy of stated

energy values was extremely variable, especially in sit-down restaurants (50% vs. 20%, respectively, $P < 0.001$), and on average measured energy contents were not significantly different from stated values ($+7 \pm 43\%$, $P = 0.57$). Foods with high stated energy contained more measured energy than foods with low stated energy ($P < 0.001$), but foods from sit-down restaurants with low stated energy contained more energy than stated compared to those with high stated energy, which contained less energy than stated ($+5\%$ vs. -8% , $P = 0.05$). Ten percent of foods contained much higher energy than stated in a repeated sampling protocol ($+54 \pm 28\%$ and $+44 \pm 26\%$, respectively, $P < 0.001$ for each vs. 0%), and carbohydrate-rich foods and desserts contained more energy than stated ($26 \pm 62\%$ and $8 \pm 9\%$, $P \leq 0.02$). Information on individual foods is frequently unreliable and menu choices that are appropriate for weight control tend to contain more energy than stated. These errors are likely to hamper individual efforts to self-monitor energy intake to prevent or treat obesity.