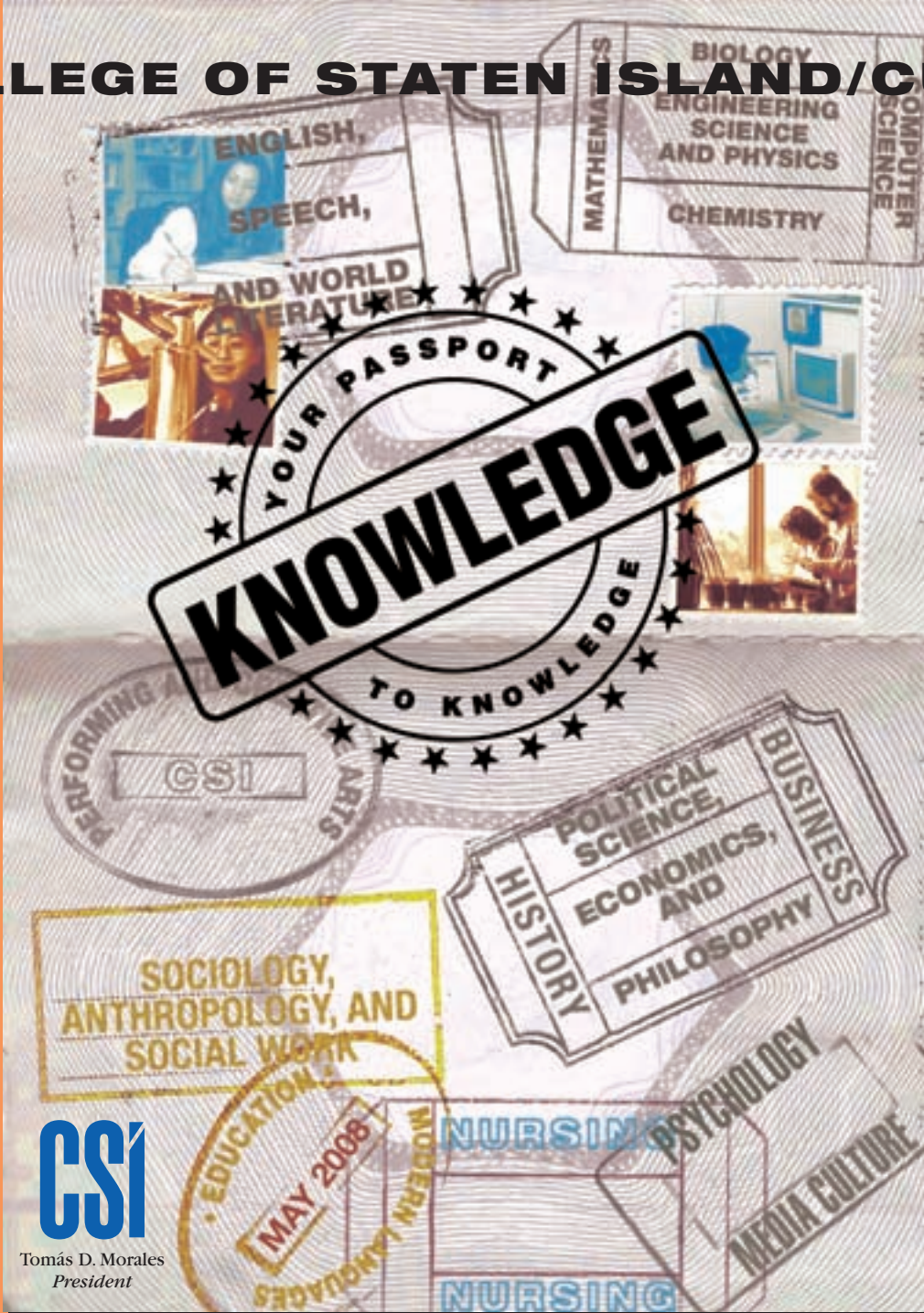


# COLLEGE OF STATEN ISLAND/CUNY



**CSI**

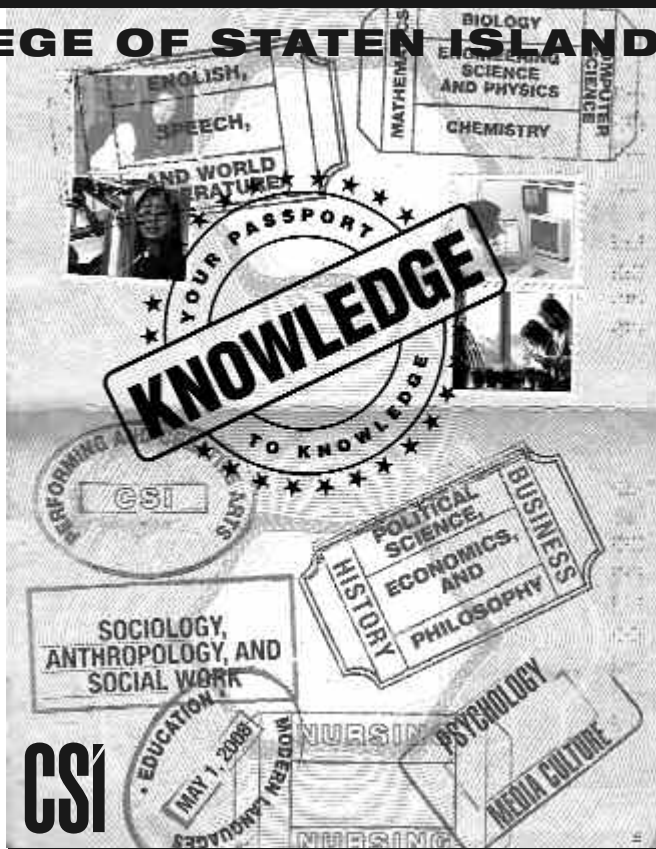
Tomás D. Morales  
President

**MAY 1, 2008**

**CSI UNDERGRADUATE CONFERENCE ON  
RESEARCH, SCHOLARSHIP, AND PERFORMANCE**



# COLLEGE OF STATEN ISLAND/CUNY



## CSI UNDERGRADUATE CONFERENCE ON RESEARCH, SCHOLARSHIP AND PERFORMANCE\*

**May 1, 2008**

**Center for the Arts, 1P-Atrium**

**1:30pm - 4:00pm**

### Conference Schedule

12:00 noon - 1:30pm	Authors and Mentors Lunch
1:15pm	Opening Remarks by President Morales 1P Second-Floor Lounge
1:30pm - 4:00pm	Poster Presentations 1P Atrium
1:30	Performance <i>Bang Bang You're Dead</i> Lab Theatre
2:30	Music Recitals Recital Hall

\*Sponsored by the Office of the Provost with funding from the CSI Student Government Academic and Curricular Affairs Commissions, and the CSI Foundation





## **CSI Undergraduate Conference on Research, Scholarship, and Performance**

### Message from the President

I am delighted to welcome each of you to CSI's 7th Annual Undergraduate Conference on Research, Scholarship, and Performance. Since the inception of this conference in 2001, its theme has been "Your Passport to Knowledge," a premise which highlights the power of the intellect and imagination to transport us beyond the familiar, and encourage our pursuit of new ideas, information, and understanding.

Such thoughtful study is a keystone of CSI's trademark world-class education, and the work presented by our students today is of a caliber rarely seen among undergraduates. CSI takes tremendous pride in the collaborations between students and faculty that we are able to support, and this year, we are proud to present a record number of projects - over 70 - all of which were formulated and executed by our students in collaboration with faculty across the academic divisions of the College. Today, you will enjoy complex musical recitals and dramatic performances; hear rigorous social, psychological, and literary analyses; and observe meticulous scientific investigations and inquiries.

And, this year, for the first time, students and faculty from area high schools have been invited to attend our conference to meet our students and faculty and to become immersed in the critical research and experimentation which defines the college experience. Further, it is very important to note that 17 of our students' research projects were supported through CSI Undergraduate Research Awards sponsored by the CSI Foundation, and, as always, we are extremely grateful for the financial support provided by our Student Government's Academic and Curricular Affairs Commission. We would also like to acknowledge our Library faculty and staff, who, also for the first time this year, provided workshops for participating students to enhance the visual components of their presentations.

As my first academic year as the president of CSI draws to a close, I continue to be impressed by the insight, imagination and dedication of the CSI family, and I am looking forward to many future events showcasing the hard work of our students. As you walk through the atrium and attend various lectures and performances today, please join me in congratulating each and every one of our participants and acknowledging the level of commitment which makes such events possible.

Sincerely,

A handwritten signature in black ink, appearing to read "TDM", written over a horizontal line.

Tomás D. Morales, PhD  
President



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The Department of Performing and Creative Arts

Presents

# Dramatic & Musical Performances

The Seventh Annual  
CSI Undergraduate Conference  
on Research, Scholarship,  
and Performance

The Lab Theatre and The Recital Hall  
Center for the Arts  
Thursday, May 1, 2008

## Dramatic & Musical Performances

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### THE LAB THEATRE

Presentation by Robert Mahoney, student director

Faculty Mentor: Prof. George Emilio Sanchez

Associate Professor of Drama

Robert (Bobby) Mahoney directed *The Sandbox* at CSI in Spring '07. He made his stage debut last semester in CSI's production of *Vinegar Tom*, earning him an Irene Ryan Nomination and the honor of competing at the Kennedy Center American College Theatre Festival. Bobby has also performed in various shows on and around Staten Island, and has been a featured soloist at Disneyland and Disney World.

### **BANG BANG YOU'RE DEAD by William Mastrosimone**

DIRECTOR .....ROBERT MAHONEY  
FACULTY SUPERVISOR .....GEORGE EMILIO SANCHEZ  
PRODUCTION STAGE MANAGER .....JESSICA SOCOL  
STAGE MANAGER .....GREGORY MUELLER  
TECHNICAL DIRECTOR .....JENNIFER STRANIERE

#### CAST

JOSH .....DANIEL COADY  
MICHAEL .....ALI SATTAR  
KATIE .....CHRISTINE VEGA  
MATT .....ANTHONY VIVIRITO  
JESSIE .....MARISSA MURRAY  
EMILY.....DANIELLE HERNANDEZ  
ACTOR 1 .....THOMAS REILLY  
ACTOR 2.....NICOLE PROTA  
ACTOR 3/5 .....NICOLE CATALANO  
ACTOR 4 .....GREG MUELLER

#### DIRECTOR'S NOTES:

*Bang Bang You're Dead* was written following the school shootings in Paducah, Jonesboro, and Springfield. Taking details from each of the shootings and meshing them into one work, the play was originally written in association with the school violence charity organization Ribbon of Promise. Later made into an HBO movie, *Bang Bang You're Dead* was used to make students and parents aware of violence in schools. After its first performance on April 9, 1999, *Bang Bang* has been performed all over the world. Coincidentally, the first performance of the play was exactly 11 days prior to the Columbine massacre and fell on the 18th birthday of one of the gunmen. Though first seen as morbid or depressing, this story exposes the audience, not only to the threat of violence in schools across the nation, but to the killer's state of mind, showing us different events that unfolded which may have driven him to open fire on his classmates.



**THE RECITAL HALL**

Presentation by Gerrianna Cardito, student composer/music director/backup singer

Faculty Mentor: Dr. William Bauer

Assistant Professor of Music

Gerrianna Cardito graduated in January 2008 with a Bachelor of Science degree, having completed a major in Music and a minor in Drama. She is a graduate of Fiorello H. La Guardia High School, where she studied vocal performance. Her artistic accomplishments include performances in *Un Ballo in Maschera* and *La Forza del Destino* with the New York Grand Opera and in the Senior Chorus with Hugh Masekela and Judy Collins at Carnegie Hall. In the Music program, Gerrianna performed as soloist in numerous Young Artists' Recitals (Fall 2004-Spring 2006) and also performed with the CSI Chorus and the CSI Guitar Ensemble. In the Drama program, she was the music director/songwriter for CSI's production of *Tartuffe*, in which she also played the character of Flipote. In Fall 2007, she received high praise for her creative work and performance as music director, songwriter, and backup singer in Caryl Churchill's *Vinegar Tom*.

**VINEGAR TOM by Caryl Churchill**

**DIRECTOR .....LEE PAPA**

**MUSICAL DIRECTOR/ COMPOSER .....GERRIANNA CARDITO**

**THE BAND**

**LEAD SINGER.....LAUREN D'AVERSA**

**BACK-UP SINGER.....GERRIANNA CARDITO**

**DRUMS.....MICHAEL SIGISMONDI**

**LEAD GUITAR .....PAUL SPINELLI**

**RHYTHM GUITAR .....NICOLE PIGNATELLI**

**BASS .....SELWYN DVORKIN**

**GUEST SINGER .....NATALIE PAPA**

**DIRECTOR'S NOTES:**

Caryl Churchill is one of the most important dramatists of the last fifty years. Her plays have tackled big issues like the sexual revolution, gender politics, the fall of communism, capital punishment, and more. A British writer, Churchill's works are linked by a common theme of how the powerful dehumanize the weak in modern culture, whether it's men enacting power over women, the wealthy over the poor, the government over the citizens. Her viewpoint is often despairing: Is there really anything the individual can do against the tides of culture, politics, and history? But her plays are immensely theatrical and, as we hope tonight's performance will demonstrate, fun, amid disturbing and dark images. That's because Churchill is influenced by the German playwright Bertolt Brecht, whose theory of epic theatre placed music and spectacle at the forefront. And that's why on stage there's a rock band. And puppets. And men dressed as women. For, if we simply despair, then we've given up. And if we just have fun, then we've given up in another way.

### THE RECITAL HALL

Presentation by Enrico Arcaro, student composer

Faculty Mentor: Dr. David Keberle

Assistant Professor of Music

Enrico Arcaro will be graduating from CSI in May 2008 with a Bachelor of Science degree in Music. He has studied guitar with Prof. Edward Brown and piano with Dr. Yoojin Oh, and currently studies composition with Dr. David Keberle. His compositions will be featured in a Senior Recital on 6 May 2008. A member of CSI's Guitar Ensemble, Enrico also plays composes original songs and performs as guitarist in the metal band Audiometry. He has been accepted to New York University's Masters' of Music in Music Theory and Composition.

**“Insomniac” for String Quartet**

**Enrico Arcaro**

**Gerald Gallardo, violin**  
**Kristina Colón, violin**  
**Carmen Montero, violin**  
**Eric Cooper, cello**

**“Om” for Piano Septet**

**Enrico Arcaro**

**Gerald Gallardo, violin**  
**Kristina Colón, violin**  
**Olivier Fluchaire, viola**  
**Carmen Montero, viola**  
**Shayne Lebron, cello**  
**Eric Cooper, cello**  
**David Glorioso, piano**

**COMPOSER'S NOTES:**

My first composition attempt in the string quartet medium, “Insomniac” was composed during the spring semester of 2006. The basis of the work, composed in a minimalist style learned in my studies with Dr. David Keberle, is the initial pitch-cell D-G#-A-D#. Rhythmic displacement is a driving force throughout the piece, as well as a high degree of chromaticism. Though based on a modern atonal idiom, traditional tonality is not abandoned. In the months leading up to this composition I had composed several fugues, and my primary influences at the time were J.S. Bach and Dmitri Shostakovich. In many ways the work is a synthesis of their influence, my roots as a player of energetic-aggressive guitar music, and techniques that I learned developed while studying with Dr. Keberle .

“Om” is my most recent chamber work, composed in Fall 2007. Its scope is directly influenced by the number of performers participating in our CSI chamber music program. I desired to create a work in complete contrast to “Insomniac,” and the influence of studying jazz harmony with Professor Michael Morreale during the compositional process cannot be overstated. Due to the large number of players, richer, more extended harmonies were a natural fit. The title and mood of the piece are influenced by my love for Hermann Hesse's novel *Siddhartha*. Like Siddhartha, hearing “Om” in the river, for me the piece is a journey through subjective human consciousness in the “sea” of life around us: from the beautiful and kind, through the demonic and oppressing, searching for enlightened peace.

**THE RECITAL HALL**

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Presentation by Ann Marie Nacchio, student composer/arranger/vocalist

Faculty Mentor: Prof. Michale Morreale

Adjunct Assistant Professor of Music

Ann Marie Nacchio is a senior at CSI, majoring in Music. She is a voice student of Prof. Elena Heimur, and has studied compositional techniques with Dr. David Keberle and Prof. Michael Morreale. She has performed in CSI's Young Artists' Recitals, Guitar Ensemble, and Chorus. As a vocalist, she has performed at The Cargo, The Vibe, Dock Street, and Martini Red. As an actress, she has performed with the Neverland Theater Company. Upon graduation, Ann Marie hopes to become a professional singer/songwriter.

**Amuse Me, Muse**

**Ann Marie Nacchio**

**Black & White**

**Ann Marie Nacchio**

**You Move Me**

**Ann Marie Nacchio**

**Alone Together**

**H. Dietz/A. Schwartz  
arr. Nacchio**

**Almost Like Being in Love**

**Lerner/Loewe arr. Nacchio**

**Ann Marie Nacchio, vocalist**

**Casey Heuler, guitar**

**Dominick Tancredi, bass**

**Mike Morreale, piano**

**Kushiah Hooper, drums**

**COMPOSER'S NOTES:**

"Amuse Me, Muse" was written before college, probably about eight years ago. At that time, all I had was an acoustic guitar, no recording equipment and a limited knowledge of music theory, so, out of necessity, most of my songs were written for voice and acoustic guitar. Now, with all the tools I have acquired at CSI, as well as the contacts I have made both within and outside the College, I am able to realize these songs as I originally intended, and it is extremely fulfilling to revisit these songs and arrange them for a full band.

"Black & White" and "You Move Me" were conceived while at CSI. "Black & White" is one of the first pieces that I composed and recorded taking instrumentation into account during the creative process. "You Move Me," a more recent work, was written after taking a jazz harmony course with Professor Michael Morreale and singing jazz weekly; both of these opened up my mind to a whole new way of looking at music.

Performing live with a jazz trio taught me important skills in arranging and instrumentation, as well as introducing me to new possibilities in interpretation, which hopefully will be heard in "Alone Together" and "Almost Like Being in Love." All these pieces will be performed on my Senior Recital program, which will take place in Fall 2008.



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# Research Poster Presentations

Center for the Arts

Atrium

1:30pm - 4:00pm



**Poster #1**

**Using Medical Sensors to Create a ‘Smart’ Home**

Kalpita Abhyankar

Faculty Mentor: Dr. Zhanyang Zhang

Department of Computer Science and Department of Biology

**Poster #2**

**Rh(I)-Catalyzed Addition Reactions of Arylboronic Acids with  $\alpha,\beta$ -Unsaturated Aldehydes and Ketones**

Jaclynn Ng and Michelle Esposito

Faculty Mentor: Dr. Qiao-Sheng Hu

Department of Chemistry

**Poster #3**

**How Does “Wood” Climate Affect Oak Trees? A Study of Climate’s Affect on Oak Trees in Palisades Park**

Caryl Stingo, Sarah Tirro, Jonathan Maltz, Goldie Lazarus and Marilyn Schulz

Faculty Mentor: Dr. Athanasios Koutavas

Department of Engineering Science and Physics

**Poster #4**

**External Stimulation of Lobular-Alveolar Nodule Morphogenesis**

Alexander Perelman

Faculty Mentor: Jimmie Fata

Department of Biology

**Poster #5**

**Pharmacological Characterization of GABA Receptors in Taurine-Fed Mice**

Candice Cruz, Ekaterina Zavyalova, Labentina Shala, and Lornenz Neuwirth

Faculty Mentor: Dr. Abdeslem El Idrissi

Department of Biology

**Poster #6**

**Rainbow Perspectives of Color: Art History, Theory, and Practice\***

Eithne Byrne McGowan and Shannon Foreshee

Faculty Mentor: Dr. Siona Wilson,

Department of Performing and Creative Arts

**Poster #7**

**Steady State Solutions for the Kuramoto Model**

Deena James Thengone

Faculty Mentor: Dr. Carlo Lancellotti

Department of Mathematics

**Poster #8**

**Excitation and Inhibition: The Effects of Extinction on Emotional Learning**

Tatyana Timashkova, Peter Tattos, and Daniela Guzman

Faculty Mentor: Dr. Edward F. Meehan

Department of Psychology

**Poster #9**

**Computer Simulation of the Conformational Behavior of Single Polyampholyte Molecules**

George Boles

Faculty Mentor: Dr. Chwen-Yang Shew

Department of Chemistry

**Poster #10**

**The Effects of Gum Chewing on Male and Female Memory Retention**

Elizabeth Boston, Laurie Lucido, Charles Mirabella and Nicole Miraglia

Faculty Mentor: Dr. Irina Sekerina

Department of Psychology

**Poster #11**

**Sexuality and Aging: The Evolution of the Sexual Self Schema**

Irina Kopeykina

Faculty Mentor: Dr. Darryl Hill

Department of Psychology

**Poster #12**

**Effects of Semantically Related Words on Picture Naming\*\***

Jennifer Mutnick, Irosha Pathirage, Urooj Syed,

Anna Pasisz and Nicola Brown

Faculty Mentor: Dr. Patricia Brooks

Department of Psychology

**Poster #13**

**When Does the Histone Protein Locate in a Chain End of a Giant DNA Molecule? Theoretical Study of the Electrostatic Interaction in the Complex of a DNA and Histone**

Andy Khoo

Faculty Mentor: Dr. Chwen-Yang Shew

Department of Chemistry

**Poster #14**

**Taurine Supplementation and Pancreatic Remodeling**

Labentina Shala, Ekaterina Zavyalova and

Candice Cruz

Faculty Mentor: Dr. Abdeslem El Idrissi

Department of Biology

### **Poster #15**

#### **Synthesis and Characterization of Copolymer-Templated Periodic Mesoporous Methylenesilicas and Phenylenesilicas Using Hydrocarbons as Micelle Expanders**

Abhishec Roka

Faculty Mentor: Dr. Michal Kruk

Department of Chemistry

### **Poster #16**

#### **Room-Temperature Ni(II)-Catalyzed Cross-Coupling Reactions of Tosylate Compounds with Phenylboronic Acid**

Irina Dolich, Jeng-Ru Li and Chun-Hui Xing

Faculty Mentor: Dr. Qiao-Sheng Hu

Department of Chemistry

### **Poster #17**

#### **Optimization of Drifter Launch Location with Genetic Algorithm**

Ismael Yacoubou Djima

Faculty Mentor: Dr. Andrew Poje

Department of Mathematics

### **Poster #18**

#### **Efficacy of Curcumin in Eliminating Cancer Cells**

Alexandra Berliner, Buddima Ranasinghe,

Sudarshana Purkaystha, and Suraj Shawn Fernando

Faculty Mentor: Dr. Probal Banerjee

Department of Chemistry, Neuroscience Program, and The MMA Institute

### **Poster #19**

#### **Effect of Nucleotides on Tau Self-Assembly**

Anum Humayun

Faculty Mentor: Dr. Alejandra Alonso

Department of Biology and Center for Developmental Neuroscience

### **Poster #20**

#### **The Electromagnetic Elevator**

Arnel Pasag and Vin Kavaja

Faculty Mentor: Dr. Alfred Levine

Department of Engineering Science and Physics

### **Poster #21**

#### **Experiments on the First Two Transmembrane Domains of a G Protein-Coupled Receptor**

Katrina Caroccia

Faculty Mentor: Dr. Fred Naider

Department of Chemistry

### **Poster #22**

#### **Simulation of Postsynaptic Inhibition Caused by GABA Neurotransmitter**

Devorah Walker

Faculty Mentor: Dr. Natacha Gueorguieva

Department of Computer Science

### **Poster #23**

#### **The Role of Expertise and Gender in Mental Rotation**

Annemarie Donachie

Faculty Mentor: Dr. Irina Sekerina

Department of Psychology

### **Poster #24**

#### **Pattern Classifiers Based on Support Vector Machines\*\***

Vyacheslav Glukh

Faculty Mentor: Dr. Natacha Gueorguieva

Department of Computer Science

### **Poster #25**

#### **Activation of Yeast INO1 Results in a SWI/SNF-Dependent, INO80-Dependent Local Nucleosome Movement\*\***

Jason Ford

Faculty Mentor: Dr. Chang-Hui Shen

Department of Biology

### **Poster #26**

#### **Learning in Neural Networks of Excitatory and Inhibitory Neurons**

Matthew Luberto

Faculty Mentor: Dr. Natacha Gueorguieva

Department of Computer Science

### **Poster #27**

#### **Analyzing Attitudes Toward Public Mobile Phone Use and Factors Related to an Increased Sense of Public Safety**

Alokika Fernandes and Laura Nicolassy

Faculty Mentor: Dr. Kathleen M. Cumiskey

Department of Psychology

### **Poster #28**

#### **Generating Synthetic Electrocardiogram Signals with Prescribed Characteristics**

Chin Ming Hui

Faculty Mentor: Dr. Natacha Gueorguieva

Department of Computer Science

### **Poster #29**

#### **The Development of a 3-Dimensional Breast Epithelial Culture Assay that Tests the Effects of Exposure to Specific Environmental Factors\*\***

Goldie Lazarus and Sarah Tirro

Faculty Mentor: Dr. Jimmie Fata

Department of Biology



**Poster #30**

**Synthesis and Characterization of Ordered Silicas with Open and Closed Spherical Nanopores\*\***

Chin Ming Hui  
Faculty Mentor: Dr. Michael Kruk  
Department of Chemistry

**Poster #31**

**Hormonal Influences on Behavior in a Population with Developmental Disabilities**

Padmi Ranasinghe  
Faculty Mentor: Dr. Dan McCloskey  
Department of Psychology and Program in Developmental Neuroscience  
Dr. Robert L. Freedland,  
Director, Center for Developmental Neuroscience and Developmental Disabilities (CDNDD)

**Poster #32**

**An Affirmative Interpretation of Case Studies on Gender Variant Youth**

Jeannemarie Leone  
Faculty Mentor: Dr. Darryl Hill  
Department of Psychology

**Poster #33**

**Computation of Lagrangian Coherent Structures in Loop Current Pinch-Off**

Jonathan Maltz  
Faculty Mentor: Dr. Andrew Poje  
Department of Mathematics

**Poster #34**

**Synthesis and Characterization of Copolymer-Templated Periodic Mesoporous Organosilicas with Very Large Pores Using Hydrocarbons as Micelle Expanders**

Kristina Foulis  
Faculty Mentor: Dr. Michal Kruk  
Department of Chemistry

**Poster #35**

**Action Research Study of Cancer Preventive Behaviors in Chinese Americans**

Jacey Li, RN  
Faculty Mentor: Dr. Margaret Lunney, RN  
Department of Nursing

**Poster #36**

**Synthesis of Copolymer-Templated 2-D Hexagonal Silicas with Very Large Mesopores Using Cyclohexane as Micelle Expander**

Benedette Adewale  
Faculty Mentor: Dr. Michal Kruk  
Department of Chemistry

**Poster #37**

**Strain-Specific Differential Morphogenetic Response**

James Steinberg  
Faculty Mentor: Dr. Jimmie Fata  
Department of Biology

**Poster #38**

**Sex and the Serious: Scandalous and Liberating\*\***

Kristie Falco  
Faculty Mentor: Matthew Solomon  
Department of Media Culture

**Poster #39**

**Dynamic Studies of Alzheimer Disease-Like Pseudophosphorylated Tau**

Sherry Browne  
Faculty Mentor: Dr. Alejandra Alonso  
Department of Biology

**Poster #40**

**Willowbrook State School Staff: "Resident Sex Uncontrollable"\*\*\***

Helen Starogiannis  
Faculty Mentor: Dr. Darryl Hill  
Department of Psychology

**Poster #41**

**Climate Sensitivity of Different Tree Species in Palisades Park**

David Di Lillo, Jennifer Blake, Victoria Porcell, Briana Vega Giordanco, Matthew Signorile, and Jolanta Smulski  
Faculty Mentor: Dr. Athanasios Koutavas  
Department of Engineering Science and Physics

**Poster #42**

**The Perception of Affective Speech Prosody in Typically Developing Children\*\***

Jessica Winder, Snigdha Banerjee, and Dan Gelardi  
Faculty Mentors: Dr. Patricia Brooks and Dr. Bertram Ploog  
Department of Psychology

**Poster #43**

**Accommodative Esotropia: Diagnosis Through Decision Tree Analysis\*\***

Stanislav Kirov  
Faculty Mentor: Dr. Susan Imberman  
Department of Computer Science

**Poster #44**

**The Effect of Alcohol Consumption and Student Living Arrangements on Collegiate GPA**

Francesca DiMarco, Jenna Emilio, Nicole Lukovsky, and Jeremy Minore  
Faculty Mentor: Dr. Irina Sekerina  
Department of Psychology

### **Poster #45**

#### **Synthesis of Novel ATRP Initiators and Polymers\*\***

Saadiah Averick, Sukanta Dolai, and Wei Shi  
Faculty Mentor: Dr. Krishnaswami Raja  
Department of Chemistry

### **Poster #46**

#### **Supersolidity of Topological Defects in Quantum Solid He<sup>4</sup>\*\***

Karamatou Yacoubou Djima  
Faculty Mentor: Dr. Anatoly Kuklov  
Department of Engineering Science and Physics  
Department of Mathematics

### **Poster #47**

#### **Dynamic Schema Updates for a Root Cause Analysis Reporting System**

Xia Ye  
Faculty Mentor: Dr. Deborah Sturm  
Department of Computer Science

### **Poster #48**

#### **Serotonin 1A Receptor Mediated Signaling Through Two Major Biochemical Cascades in Brain Derived Cells\*\***

Souleymane Diallo  
Faculty Mentor: Dr. Probal Banerjee  
Department of Chemistry

### **Poster #49**

#### **The Effects of Walking on Cognitive Resources**

Lauren Orleman and Paula Bertelli  
Faculty Mentor: Dr. Sarah Berger  
Department of Psychology

### **Poster #50**

#### **Real Costs\*\***

Michele Rose  
Faculty Mentor: Dr. Michael Mandiberg  
Department of Media Culture

### **Poster #51**

#### **Utilizing Advanced Mapping Techniques to Understand Spatial Distortion in Transportation Maps**

Jonathan Torres  
Faculty Mentor: Dr. Jonathan R. Peters  
Department of Business

### **Poster #52**

#### **Synthesis of Well-Defined Water-Soluble Fluorescent Polymer for In Vivo Imaging**

Jose Saltos  
Faculty Mentor: Dr. Abdeslem El Idrissi  
Department of Biology

### **Poster #53**

#### **Effects of Taurine on Anxiety-Like and Locomotor Behavior of Mice**

Ekaterina Zavyalova, Lorenz Neuwirth, and Latifa Boukarrou  
Faculty Mentor: Dr. Abdeslem El Idrissi  
Department of Biology

### **Poster #54**

#### **Microcontroller-Based ATM/Credit Card Reader**

Xhevair Maskuli and Yevgeniy Trofimchuk  
Faculty Mentors: Dr. Neo Antoniadis and Dr. Alfred Levine  
Department of Engineering Science and Physics

### **Poster #55**

#### **Noise Reduction of MR Brain Images Via the Use of Spatial and Frequency Filters\*\***

Troy Johnson and Nandhini Sudarsanan  
Faculty Mentor: Dr. Lihong Li  
Department of Engineering Science and Physics

### **Poster #56**

#### **Type I Palladacycle-Catalyzed Addition Reactions of Arylboronic Acids with Aromatic Aldehydes**

Mathew Israel and Yuan-Xi Liao  
Faculty Mentor: Dr. Qiao-Sheng Hu  
Department of Chemistry

### **Poster #57**

#### **Transition Metal-Catalyzed Addition Reactions of Arylboronic Acids with Aromatic Aldehydes\*\***

Jin-Rong Zheng  
Faculty Mentor: Dr. Qiao-Sheng Hu  
Department of Chemistry

### **Poster #58**

#### **A Musical Interpretation of Caryl Churchill's *Vinegar Tom***

Gerianna Cardito  
Faculty Mentor: Dr. William Bauer  
Department of Performing and Creative Arts

### **Poster #59**

#### **Motor Development of *Pan Troglodyte*, *Natsuki*\*\***

Virginia Dawkins  
Faculty Mentor: Dr. Sonia Ragir  
Department of Sociology, Anthropology, and Social Work

### **Poster #60**

#### **Aerodynamic Simulation to Reduce Drag and Increase Automotive Efficiency**

Michael Raghunath  
Faculty Mentor: Professor James Hladek, P.E.  
Department of Engineering Science and Physics

**Poster #61**

**Productivity of Song Birds After Spraying for West Nile\*\***

Allison Santora  
Faculty Mentor: Dr. Richard Veit  
Department of Biology

**Poster #62**

**Stimulation-Dependent Release of 3 H-D-Aspartate (a Glutamate Analog) from Electrically Stimulated Axons In Vitro**

Anne Gomez  
Faculty Mentor: Dr. Andrzej Wieraszko  
Department of Biology/Program in Neuroscience

**Poster #63**

**13-month-old Perseverative Behaviors**

Natasha Hernandez and Paula Bartelli  
Faculty Mentor: Dr. Sarah Berger  
Department of Psychology

**Poster #64**

**Does Store Atmosphere Affect Consumers' Behavior?**

Valentina Assenova, Julia Handel, and Sehrish Khan  
Faculty Mentor: Dr. Irina Sekerina  
Department of Psychology

**Poster #65**

**The Effect of Gender on the Behavior of Drinking Games**

Jennifer Blake, Gabriella Gomez, Staphania Nicolas, and William Schoenhardt  
Faculty Mentor: Dr. Irina Sekerina  
Department of Psychology

**Poster #66**

**The Effect of CSI Academic Learning Communities on Students' Coping Behavior**

Mayatu Cooper, Jiayi Liang, Sharmila Mohammed, and Margarita Ruiz  
Faculty Mentor: Dr. Irina Sekerina  
Department of Psychology

**Poster #67**

**Infant Communication During a Problem Solving Task**

Tara La Perla  
Faculty Mentor: Dr. Sarah Berger  
Department of Psychology

**Poster #68**

**Beginning at "I Can't": How Nina Can Learn to Soar**

Joan A. Seguin  
Faculty Mentor: Dr. Charles Liu  
Department of Engineering Science and Physics  
HON 501 Interdisciplinary Seminar

**Poster #69**

**Spectroscopic Properties of Narrow Emission Line Galaxies in the COSMOS Field**

Amy Colon, Patti Carrol, Nettie Wong, and Robin Roberts  
Faculty Mentor: Dr. Charles Liu  
Department of Engineering Science and Physics  
HON 501 Interdisciplinary Seminar

**Poster #70**

**Entropy in Postmodern Literature**

Talal Choudhury  
Faculty Mentor: Dr. Charles Liu  
Department of Engineering Science and Physics  
HON 501 Interdisciplinary Seminar

**Poster #71**

**Women: Paving the Way to Better Democracy and Development**

Reshma Shah  
Faculty Mentor: Dr. Charles Liu  
Department of Engineering Science and Physics  
HON 501 Interdisciplinary Seminar

**Poster #72**

**Becoming a Reflective Practitioner**

Susan Jaquish and Vjolca Mehmedovic  
Faculty Mentor: Dr. Judit Kerekes  
Department of Education

**Poster #73**

**Integration of Multilayer Microchannels on VCSEL Arrays**

Dana Galla  
Faculty Mentor: Professor John Hladek, P.E.  
Department of Engineering Science and Physics

**Poster #74**

**Designing and Fabricating an Intelligent Robot**

Ben Tsui  
Faculty Mentor: Professor John Hladek, P.E.  
Department of Engineering Science and Physics

**Poster #75**

**Recognizing Sleep Apnea in Infants**

Mahdi Jawad  
Faculty Mentor: Professor James Hladek, P.E.  
Department of Engineering Science and Physics

\* Sponsored by SEEK

\*\* Sponsored by the CSI Foundation, the Office of Academic Deans, and/or Faculty Grants

### **POSTER # 1**

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#### **Using Medical Sensors to Create a 'Smart' Home**

Kalpita Abhyankar

Faculty Mentor: Dr. Zhanyang Zhang  
Department of Computer Science and  
Department of Biology

As the aging population increases in our society, many seniors live a longer and more active life. But they all need a different degree of medical attention. Many prefer to stay at home; however, doing so requires that medical professionals keep close watch over their health conditions.

Monitoring their critical medical conditions without severely restricting their freedom of movement and activities is a challenging problem.

Recent advances in medical sensor, computer and wireless communication technologies made it possible to deploy tiny sensors in a person's home and attach wireless sensors to a person's body to monitor their living environment and vital signs. These health status data then can be transmitted to medical professionals for monitoring purposes. In case of critical events, these seniors can get immediate attention from their medical professionals. Homes equipped with such devices are called "Smart Homes".

The purpose of this research is to explore the possibilities of in-home wireless monitoring. The first phase of this research is to survey the current applications of medical sensor technology. The second part is to develop and demonstrate a small scale wireless sensor network prototype that shows the potential applications in "Smart Homes".

### **POSTER # 2**

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#### **Rh(I)-Catalyzed Addition Reactions of Arylboronic Acids with $\alpha,\beta$ -Unsaturated Aldehydes and Ketones**

Jaclynn Ng and Michelle Esposito

Faculty Mentor: Dr. Qiao-Sheng Hu  
Department of Chemistry

Addition reactions of arylboronic acids with  $\alpha,\beta$ -unsaturated aldehydes and ketones constitute one of the most attractive methods to access chiral alcohols and substituted ketones because arylboronic acids are readily available and air/moisture stable. These reactions were performed under different conditions to find the most efficient and more powerful catalyst systems under mild conditions. Two conditions, the first using  $K_3PO_4$  as base and THF as a solvent and the second using KOH and dioxane, were screened and compared. The amounts of catalyst and base were varied to find the highest conversion rate in the shortest amount of time. The starting materials were also varied to find the best suitable conditions for those reactions. It was found that 0.05% of the rhodium catalyst and one equivalent of KOH as compared to four equivalents of  $K_3PO_4$  yielded the highest conversion percentage.

### **POSTER # 3**

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#### **How Does "Wood" Climate Affect Oak Trees?**

##### **A Study of Climate's Affect on Oak Trees in Palisades Park**

Caryl Stingo, Sarah Tirro, Jonathan Maltz, Goldie Lazarus and Marilyn Schulz

Faculty Mentor: Dr. Athanasios Koutavas  
Department of Engineering Science and Physics

This project investigates the effect of climate on the growth of white oak trees along the Hudson River in Palisades Park. Cores were collected from one dead and four living trees. Tree-ring widths were measured and standardized to remove non-climate related trends, and averaged into a mean chronology dating back to 1825. The data were compared with regional climate records and results indicate strong sensitivity to drought as measured by the Palmer Drought Severity Index.

**POSTER # 4**

**External Stimulation of Lobular-Alveolar Nodule Morphogenesis**

Alexander Perelman

Faculty Mentor: Jimmie E. Fata

Department of Biology

Previously developed three-dimensional cultures have been used to accurately image the morphogenetic development of mammary gland branches using isolated ducts from the mouse mammary gland. I propose to utilize this assay in order to gauge the effects of specific extracellular factors such as progesterone, prolactin, estradiol, growth hormone, or RANKL on the morphogenetic development of lobulo-alveolar nodules from existing branches. This approach will seek to determine the minimal requirement for producing structures similar to mammary gland lobulo-alveoli seen during lactation *in vivo*. It also will provide evidence of factors capable of differentiating progenitor cells into milk producing structures.

**POSTER # 5**

**Pharmacological Characterization of GABA Receptors in Taurine-Fed Mice**

Candice Cruz, Ekaterina Zavyalova, Labentina Shala and Lorenz Neuwirth

Faculty Mentor: Dr. Abdeslem El Idrissi

Department of Biology

Taurine, 2 aminoethane-sulfonic acid, is one of the most abundant free amino acids especially in excitable tissues, with wide physiological actions. We have previously reported that chronic supplementation of taurine in drinking water to mice increases brain excitability mainly through alterations in the inhibitory GABAergic system. In taurine-fed mice we found that the expression level of glutamic acid decarboxylase (GAD), the enzyme responsible for GABA synthesis, is elevated. Increased expression of GAD was accompanied by increased levels of GABA. Here, we investigated pharmacologically the functional significance of increased GAD expression by determining the threshold for kainic acid-induced seizures after partial inhibition of GAD activity with isoniazide. We found that taurine-fed mice have elevated GAD expression and showed a higher threshold for seizure onset when compared to age-matched controls. Thus, taurine-fed mice have a functional increase in GAD activity *in vivo* which offers some protection against seizures. Furthermore, this pharmacological manipulation can be used to determine the level of GAD activity in other model systems that show alterations in GAD expression. Here we propose to test the sensitivity of taurine-fed mice to picrotoxin, a GABA receptor antagonist that binds to the same binding site as taurine.

**POSTER # 6**

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**Rainbow Perspectives of Color:  
Art History, Theory, and Practice**

Eithne Byrne McGowan and Shannon  
Foreshee

Faculty Mentor: Dr. Siona Wilson  
Department of Performing and Creative Arts

Our research project aims to examine the many aspects and attributes of color. This project is grounded in art history, but we will address a variety of elements in addition to visual aesthetics, namely physics and psychology. We will examine the implications of Sir Isaac Newton's seven spectral colors of light, otherwise known as the color standard. Together, we will explore a small number of theories of color, such as the theories of color-temperature, color harmony, and color meaning. Based upon the research of these various theories, we will investigate the cultural and psychological aspects of color, as well as their significance. We will explore color's three significant characteristics, its physical, psychological and chemical characteristics. Our presentation will include a few examples of creative studio works that illustrate fundamental concepts of color theory in their application. In this project we will also include the works of a few key artists such as Vincent van Gogh, George Seurat, Henri Matisse, and Piet Mondrian, whose study of color furthered the understanding of different characteristics of color such as the expressive nature of color and color harmony.

*\*Sponsored by SEEK*

**POSTER # 7**

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**Steady State Solutions for the  
Kuramoto Model**

Deena James Thengone

Faculty Mentor: Dr. Carlo Lancellotti  
Department of Mathematics

In general, synchronization is the coordination of events to keep in unison. Kuramoto constructed a mathematical model to study the dynamics of coupled oscillators. Kuramoto and other mathematicians considered two aspects of the model; a discrete model and a continuous model. The goal of my research was to find the steady state solutions for the Kuramoto-Sakaguchi model representing the synchronization of a population of coupled oscillators analytically. This required the use of distributions to find the solution. It was concluded that the time independent Kuramoto model turns to have "generalized" solutions (completely synchronized states) that are not functions but distributions. These distributions depend on the function that represents the coupling in the model. This coupling function is periodic in the oscillators phase and can be represented by a Fourier series. The results obtained from this research can be applied in many fields such as communications or biology.

**POSTER # 8****Excitation and Inhibition: The Effects of Extinction on Emotional Learning**

Tatyana Timashkova, Peter Tattos, and Daniela Guzman

Faculty Mentor: Dr. Edward F. Meehan  
Department of Psychology

The following study used a between subject design to investigate the nature of the emotional and motivational effects of extinction, utilizing two procedures. Two aspects of the emotional response to extinction are known. The first is inhibitory, which is marked by the reduction in strength of the response. The second is excitatory or dis-inhibitory, wherein response strength is increased, usually observed as agitated responding or frustration at the onset of extinction. The experiment was designed to display both aspects by means of 1) a traditional procedure demonstrating inhibitory stimulus control and 2) a novel procedure illustrating excitatory stimulus control. The traditional procedure used four line tilts, 45-degrees apart, reinforced on a Multiple (MULT) Variable Interval schedule of 15 seconds (VI-15s), followed by extinction of one of the line tilts. The novel procedure used 12 line tilts, 15-degrees apart, reinforced on a MULT VI-30s schedule, followed by extinction of one or more line tilts simultaneously. The results of the traditional procedure were predictable. A decreased rate of response was shown for the stimulus associated with extinction, thus demonstrating inhibitory stimulus control. The novel procedure demonstrated unexpected results, an increased rate of response to the stimuli associated with extinction, demonstrating excitatory effects. These procedures established a complex emotional learning baseline, which now can be used as a template to disassociate the relative involvement of different neurotransmitter groups, e.g., the glutamate NMDA system and D1 of the Dopamine group. This will be implemented in further research, through the use of specific agonist and antagonist drugs.

**POSTER # 9****Computer Simulation of the Conformational Behavior of Single Polyampholyte Molecules**

George Boles

Faculty Mentor: Dr. Chwen-Yang Shew  
Department of Chemistry

This project is motivated by our recent study to elucidate the role of polyampholytes (polymers with both positively and negatively charged groups) in a novel gene delivery system consisting of DNA/polycation/polyampholyte. Our previous work showed that polyampholytes tend to bridge DNA and polycations in the above system. This electrostatic bridging is attributed to the net dipole moment of a polyampholyte molecule. In this project, we intend to investigate the correlation between the dipole moment and chain conformation of a polyampholyte by using Monte Carlo simulation. The result will help us to design novel polyampholytes to optimize gene delivery systems. Since polyampholyte molecules interact strongly intramolecularly, a better algorithm is needed to facilitate our sampling of chain conformation in the simulation. We are currently testing two algorithms: Crank Shaft (CS) and Extended Continuum Configurational Bias (ECCB). In the former case, one bead is randomly selected and is rotated randomly around the axis connecting two adjacent beads. In the latter case, two adjacent beads are cut and are regrown within a chain. These algorithms are particularly useful for the widely used tangent hard sphere chains in which two adjacent beads (monomers) make contact at one point. Meanwhile, we are numerically solving the conformation of a tetramer to compare with the simulation results. We find that ECCB is less accurate than CS because it may trigger a greater conformational fluctuation and hinder the chain to reach its equilibrium structure.

**POSTER # 1 0**

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**The Effects of Gum Chewing on Male and Female Memory Retention**

Elizabeth Boston, Laurie Lucido,  
Charles Mirabella and Nicole Miraglia

Faculty Mentor: Dr. Irina Sekerina  
Department of Psychology

The effects of physiological arousal and its intensity on cognitive performance are of considerable interest in current cognitive psychology. Past research has uncovered a number of arousal factors such as mood and anxiety that contribute to word retention in free recall tests known as state-dependency in memory. We will study the effects of gum chewing and gender on word retention in a free word recall task. We will test memory of lists of words of two groups of 20 CSI students. During the learning phase, one group will be given chewing gum and the other will not, and both groups will be required to memorize several lists of common English words. One week later, both groups will be tested on their memory of the words presented in the learning phase. The critical manipulation will be creation of 2 match and 2 mismatch conditions: Half of the participants will be recalling words under the same state of chewing/not chewing gum as during the learning phase (the match conditions) and the other half will be recalling words under mismatch conditions. If chewing gum produces physiological arousal, it is expected to enhance memory for words in the chewing gum match group but its effect will be significantly diminished in the group that learned the words while chewing gum but was tested without it.

**POSTER # 1 1**

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**Sexuality and Aging: The Evolution of the Sexual Self Schema**

Irina Kopeykina

Faculty Mentor: Dr. Darryl Hill  
Department of Psychology

This is a study on the relationship between a woman's age and how she thinks about her self as a sexual being. I am interested in examining how a woman's perception of herself as a sexual person changes throughout her lifespan, with a special emphasis placed on post-menopausal women. An older woman faces many obstacles in her sexual expression, and these obstacles may in turn influence how she thinks about her sexual self. My hypothesis was that as women get older, since they have less opportunity for sexual expression, their sexual self schemas tend to become more negative. I administered questionnaires to women 20 years old and up. The packets consisted of the *Sexual Self Schema Scale*, the *Gender Assessment Inventory*, the *Sexual History Form*, the *Eysenck Lie Scale*, and a demographic questionnaire. Questionnaires were given to women on campus, as well as in the Staten Island mall, and in various community centers. Results of the survey, as well as implications of the research, will be further discussed in the poster.



**POSTER # 12****Effects of Semantically Related Words on Picture Naming**

Jennifer Mutnick, Irosha Pathirage,  
Urooj Syed, Anna Pasisz and Nicola Brown

Faculty Mentor: Dr. Patricia Brooks  
Department of Psychology

To speak fluently, a person has to retrieve each word to be spoken from memory, rapidly and without error. Understanding how knowledge of words and their meanings is organized in memory is fundamental to understanding the mental processes underlying speech production. In conversation, as well as in reading text, word retrieval is influenced by the words previously encountered. Words with related meanings tend to co-occur (e.g., *boy-girl, salt-pepper*), and can lead to anticipation of words to follow. Two experiments (N=32 undergraduates in each) used the picture-word interference (PWI) task to explore how semantically related words affect the speed of word retrieval in speech production. In the PWI task, participants are asked to name a series of pictures while ignoring words superimposed over the pictures (visual condition) or presented over headphones (auditory condition). Across trials, the relationship between the picture-to-be-named and the word-to-be-ignored is systematically varied. Our study compared the effects of associates (e.g., MCDONALDS presented with a picture of a hamburger) and coordinates (e.g., SAUSAGE presented with a picture of a hamburger) on picture naming latencies (reaction times) and tested whether the resultant effects varied with visual versus auditory presentation of the words. In both experiments, pictures were named faster when paired with an associate in comparison to an unrelated word (e.g., BRUSH presented with a picture of a hamburger). This associative priming effect was not affected by the modality (auditory vs. visual) of the words, which suggests that associative links between words in memory facilitate rapid word retrieval in conversation as well as in text processing. In contrast, coordinates led to slower picture naming in comparison to unrelated words. This semantic interference effect was stronger when the words were presented visually rather than aurally. That is, reading the name of an object from the same category as the picture led to slower retrieval of the name of the picture,

whereas there was less interference when the words were spoken. The weak effect of coordinate interference in the auditory condition suggests that speakers more rapidly recover from semantic errors (e.g., saying *chipmunk* when they meant to say *rabbit*) when they occur in spoken conversation.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 13**

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**When Does the Histone Protein Locate in a Chain End of a Giant DNA Molecule? Theoretical Study of the Electrostatic Interaction in the Complex of a DNA and a Histone**

Andy Khoo

Faculty Mentor: Dr. Chwen-Yang Shew  
Department of Chemistry

In genes, the giant DNA molecule forms a compact structure in the presence of oppositely charged histone proteins, through strong electrostatic interaction. The recent experiment has shown that while one histone protein binds with a giant DNA, this histone protein exhibits a greater probability to emerge at chain ends than in the middle of a DNA molecule. To have better understanding of the electrostatic interaction of such a complex, a simple lattice model is developed. First, an ionic chain, consisting of identical charged monomers, is placed in the three-dimensional cubic lattice under the dilute solution without excess salt. To model the bound histone (wrapped up by DNA), one charged monomer in this ionic chain is substituted with a monomer unit of a different charge. The exact enumeration is then conducted to calculate all the possible chain conformations, and to determine the stability of a given location of the model bound histone. Our finding shows that the net charge of a bound histone is essential for its stable position. For the bound histone containing the net charge opposite to chain monomers, the most stable location of the histone is in the middle of the ionic chain. While the net charge of the bound histone has the same sign as that of chain monomers, the histone becomes stable at near chain ends under appropriate conditions.

**POSTER # 14**

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**Taurine Supplementation and Pancreatic Remodeling**

Labentina Shala, Ekaterina Zavyalova,  
and Candice Cruz

Faculty Mentor: Dr. Abdeslem El Idrissi  
Department of Biology

Taurine is a semi-essential sulphur containing amino acid derived from methionine and cysteine metabolism. Taurine has several biological processes such as hypoglycemic action, antioxidation, and detoxification. In this study we evaluated the role of taurine in pancreatic islets development, since the endocrine pancreas undergoes significant modifications during neonatal life. Histological examination of the pancreas from taurine-fed mice revealed no histological abnormalities in the endocrine or exocrine parts of the pancreas. However, supplementation of taurine in the drinking water resulted in a drastic and significant increase in the number of islets per section. Furthermore, islets size was significantly larger. We hypothesize that supplementation of taurine, which is important for the development of the endocrine pancreas, may reduce cytokine-induced apoptosis in pancreatic beta cells.

The endocrine pancreas undergoes significant modifications during neonatal life and apoptosis is an important mechanism in this remodeling. We suggest that alteration of this remodeling process during this period of time, when a fine balance between cell replication and cell death is critical, would affect the development of the pancreatic islets of Langerhans, and could have important effects on the pancreatic cell mass and the endocrine function.

**POSTER # 15****Synthesis and Characterization of Copolymer-Templated Periodic Mesoporous Methylenesilicas and Phenylsilenicas Using Hydrocarbons as Micelle Expanders**

Abhishek Roka

Faculty Mentor: Dr. Michal Kruk  
Department of Chemistry

Surfactant-templated periodic mesoporous organosilicas (PMOs) have received much attention as well-defined periodic inorganic-organic hybrids, catalyst supports, hosts for nano-objects and media for immobilization of biomolecules. In some applications of PMOs, it would be beneficial to enlarge the pore diameter beyond 10 nm, which is a typical limiting pore size value. The project is intended to explore the opportunities in the synthesis of PMOs with methylene or phenylene bridging groups and with large cylindrical pores using micelle swelling agents (e.g., 1,3,5-triisopropylbenzene) through the modification of synthesis procedures used for the synthesis of ordered mesoporous silicas with hydrocarbons as swelling agents. First, we synthesized well-ordered PMOs with methylene or phenylene bridging groups using literature procedures. The resulting materials were characterized using thermogravimetry, gas adsorption and small-angle X-ray scattering (for methylene PMO). The synthesis of very-large-pore methylene PMO in the presence of 1,3,5-triisopropylbenzene was also attempted and the product indeed featured uniform pores of diameter about 20 nm and exhibited a large pore volume (above  $1 \text{ cm}^3 \text{ g}^{-1}$ ) and high specific surface area ( $1000 \text{ m}^2 \text{ g}^{-1}$ ), as inferred from gas adsorption.

**POSTER # 16****Room-Temperature Ni(II)-Catalyzed Cross-Coupling Reactions of Tosylate Compounds with Phenylboronic Acid**Irina Dolich, Jeng-Ru Li, and  
Chun-Hui XingFaculty Mentor: Dr. Qiao-Sheng Hu  
Department of Chemistry

Room-temperature Ni(II)-catalyzed cross-coupling reactions of tosylate compounds with phenylboronic acids are described. The Ni(0) catalyst, derived from Ni(II) Salts showed the Suzuki-Miyaura cross-coupling of tosylate compounds. The mild reaction condition, the readily availability of the catalyst, and good coupling conversions make tosylate compounds potentially useful substrates in organic synthesis.

**POSTER # 17****Optimization of Drifter Launch Location with Genetic Algorithm**

Ismael Yacoubou Djima

Faculty Mentor: Dr. Andrew Poje  
Department of Mathematics

Typically, observations of the ocean or the atmosphere are provided by drifting (Lagrangian) platforms. Given the increase in computational power over the last years, it has now become possible to attempt to predict the state of the ocean using data assimilation techniques, which combine Lagrangian observations with numerical models of ocean or atmospheric dynamics. The data gathered from drifters is strongly dependent of their launch location. This work is a preliminary attempt to find the initial tracers positions that provide optimal data for assimilation. Here we consider a very simple model of the ocean consisting of three points vortices. We develop an optimization scheme based on genetic algorithms, which is capable of exploring the high dimensional search space of initial drifter locations. We made use of the highly parallelizable character of the genetic algorithm to implement our numerical simulations on the local cluster.

**POSTER # 18**

**Efficacy of Curcumin in Eliminating Cancer Cells**

Alexandra Berliner, Buddima Ranasinghe, Sudarshana Purkaystha, and Suraj Shawn Fernando

Faculty Mentor: Dr. Probal Banerjee  
Department of Chemistry, Neuroscience Program, and The MMA Institute

The various types of cancer that invade human tissue have diverse etiologies of formation, but the common factor among all of them is the state of uncontrolled cell division that yields the tumors. Traditional medicines have been used with some success for some forms of cancer. Yet for many other types of cancers, such as brain tumors, very little success has been obtained using such therapies. The most common therapeutic strategy uses antimetabolites, which target and block uncontrolled division of cancer cells. However, such antimetabolites also have pronounced, detrimental side effects on normal cells. The other strategies, such as the use of agents that block angiogenesis (blood vessel formation) in tumors have not yet come to the therapeutic level. This emphasizes the need for investigations on the application of natural agents that have been used earlier to treat tumors for many years with little or no side effects. Our preliminary data have shown that the spice component, curcumin, results in caspase-3 induction in oligodendroglioma (HOG), neuroblastoma (N18), mixed glioma (GL261), and melanoma (B16F10) cells. This is also concomitant with decreased MTT activity, which demonstrates increased cell death. Furthermore, we have observed that curcumin crosses the blood-brain-barrier in mice and prevents tumor formation in mice injected with the potent tumor cells B16F10 but does not affect the normal brain cells. Further studies focus on analyzing the mechanism by which curcumin causes selective elimination of cancer cells from the brain. To this end, cultured brain slices will be obtained from mice injected in the front brain with B16F10 and GL261 cells. Curcumin treatment of such cultured slices under carefully designed conditions will elucidate the mechanistic details of its anti-tumor activity and lay the foundation for its efficacious use as a potent anti-tumor agent in *in vivo* studies.

**POSTER # 19**

**Effect of Nucleotides on Tau Self-Assembly**

Anum Humayun

Faculty Mentor: Dr. Alejandra Alonso  
Department of Biology and Center for Developmental Neuroscience

One hallmark lesion of neurodegenerative disease in Alzheimer disease (AD) is the initial appearance of neurofibrillary tangles inside neurons. These tangles are composed mainly of hyperphosphorylated tau, a microtubule-associated protein (MAP), polymerized into filaments. Impaired cognitive function and pathology of AD is correlated with this lesion. We have previously shown that the cytosolic Alzheimer hyperphosphorylated tau (AD P-tau) sequesters normal tau, MAP1A, MAP1B and MAP2, which results in the inhibition of microtubule assembly and disruption of microtubules and self assemble into filaments. Tau promotes the assembly and stabilizes microtubules. Tau is a phospho-protein, and its phosphorylation is developmentally regulated. Unraveling the mechanism of self-assembly of tau has generated considerable interest. *In vitro* assembly of tau has been achieved under different conditions, such as urea treatment for 60 hour or incubations with unsaturated free fatty acids, tRNA, heparin, polyglutamic acid or quinones; with a tau fragment; or with high protein concentration (12 mg/ml) and long incubation period (several days). We have shown that tau self assemble upon phosphorylation. We have found that tau posses a consensus sequence for binding ATP. We studied the influence of ATP and GTP on tau self assembly. Using photolabelling we found that tau binds ATP and there is no auto-phosphorylation. The implications of tau binding to the nucleotides, its self-assembly and neurodegeneration are discussed.

**POSTER # 20****The Electromagnetic Elevator**

Arnel Pasag and Vin Kavaja

Faculty Mentor: Dr. Alfred Levine

Department of Engineering Science and Physics

Currently the most used types of elevators are the traction system. This type of elevator consists of cables pulled by a motor which can go to a maximum speed of 5 meters per second. For our project we hope to improve the elevator greatly by applying to it the concepts of Magnetic Levitation Technology (Maglev). This technology is seen today in high speed (bullet) trains, which are the fastest trains in the world. This complex technology utilizes the powerful forces of attraction and repulsion in magnets to both propel and levitate a train. It is a fact that the forces applied by magnets are very powerful and instantaneous. By alternating strong forces of attraction and repulsion, we can propel our elevator car up or down. Also, we are able to control its speed by controlling the frequency of alternating forces. In using electromagnetism we hope to increase the elevator's speed, make the ride smoother, and eliminate the need of cables. By eliminating the cables and allowing for faster transportation, we are also removing the height restriction which current elevators have.

**POSTER # 21****Experiments on the First Two Transmembrane Domains of a G Protein-Coupled Receptor**

Katrina Carocchia

Faculty Mentor: Dr. Fred Naider

Department of Chemistry

G protein-coupled receptors (GPCR) are extremely important in eukaryotes. They are one of the largest groups of proteins found in eukaryotic organisms, and are involved in signal transduction. These proteins are characterized by seven transmembrane domains connected by loops located in both the cytoplasm and extracellular space. Characterization of these proteins is extremely difficult because of their physical properties. To date, there are only two detailed structural descriptions of GPCRs. The

structures of the GPCRs rhodopsin and the human  $\beta_2$ -Adrenergic Receptor were determined by X-ray crystallography. These structures are often used as a model for the structure of G protein-coupled receptors. Currently, attempts are being made to determine the detailed structure of GPCRs using X-Ray Crystallography and NMR Spectroscopy. Detailed structural information on these proteins is essential to understanding their function and designing therapeutic agents to target their activity.

The yeast GPCR, Ste2p is found in the yeast *Saccharomyces cerevisiae* and is involved in sexual conjugation. The structure of Ste2p is being studied by investigating small segments of the receptor using NMR Spectroscopy. In order to study the structure of these segments in the context of an active receptor we will employ Intein-Mediated Protein Ligation to produce a construct of Ste2p in which only the first two transmembrane domains will be NMR visible. This process utilizes intein chemistry to generate a protein with a C-Terminal thiol ester. This derivative can then be ligated to a second protein with a C-Terminal Cys residue.

In this presentation I will describe the design of plasmids that will drive expression of the fragments necessary for the Intein Mediated Protein Ligation of Ste2p, the cloning of these fragments in *Escherichia coli* and initial attempts to express the TM1-TM2 thiol ester required for ligation. Three constructs were designed to generate a C-Terminal thiol ester using the IMPACT Kit. All three constructs contained a portion of Ste2p followed by an intein and a chitin-binding domain. The first construct was designed to express the first transmembrane domain of Ste2p. The second was designed to express the first two transmembrane domains of Ste2p from G31 to N105, and the final construct was designed to express the first two transmembrane domains of Ste2p from G31 to F119. All of these constructs were subcloned into the GST, Trp $\Delta$ LE, and MXB10 vectors, and initial attempts were made to optimize their expression in *E.coli*.

**POSTER # 22**

**Simulation of Postsynaptic Inhibition Caused by GABA Neurotransmitter**

Devorah Walker

Faculty Mentor: Dr. Natacha Gueorguieva  
Department of Computer Science

The neuron is an elementary processing unit in the nervous system. There are many highly specialized types of neurons that differ in appearance.

Generally, a neuron consists of three distinct parts:

1. The dendrite, a short, branching arbor of cellular extensions.
2. The soma, or cell body is a large central part of the cell between the dendrites and the axon.
3. The axon, a projection, which may extend tens, hundreds, or, the diameter of the soma in length. Neurons have only one axon, but this axon may undergo extensive branching, enabling communication with many target cells.

Dendrites bring information to the cell body and axons take information away from it. Neurons communicate with each other through an electrochemical process. Neurons contain some specialized structures (synapses) and chemicals (neurotransmitters). Synapses provide a communication mechanism between neurons.

The most common transmitters in the brain are gamma-aminobutyric acid (GABA), Nmethyl- D-aspartate (NMDA) and alpha-amino-3-hydroxi-5-methylisoxazole-propionionate (AMPA). The neurotransmitters not only allow neurons to communicate accurately and quickly, but also to control the proper level of arousal of the nervous system for efficient and correct processing of the information. Many mental disorders are due to disturbances in postsynaptic inhibition.

The goal of this research is to understand how inhibitory postsynaptic potentials (IPSP) “clams” the membrane voltage and to examine how membrane excitability following an IPSP is affected. In order to achieve this goal we perform a wide range of experiments on NEURON simulator with different sets of parameters close to those found by medical researchers.

**POSTER # 23**

**The Role of Expertise and Gender in Mental Rotation**

Annemarie Donachie

Faculty Mentor: Dr. Irina Sekerina  
Department of Psychology

The proposed experiment will investigate the effects of gender difference in a mental rotation task (MRT) and how it interacts with different levels of expertise. The MRT is an experimental task in Cognitive Psychology based on abstract figures and used to assess spatial abilities. Shepard & Metzler (1971) found that when participants mentally rotated objects, their reaction time increased as the degree of rotation increased.

Subsequent research demonstrated that men and women differ in the MRT: Men are faster and more accurate than women. (Maccoby & Jacklin, 1974; Masters, 1998). This study will test the hypothesis that gender is not the only factor that affects performance on the MRT. We suggest that expertise, in particular, expertise in psychology can reduce gender difference in the MRT. We will compare a group of CSI male students with two groups of CSI female students, all Psychology majors but at different points of their psychology training, beginning and advanced. Participants will perform the MRT on the computer to determine which three-dimensional block shape is the same as the target item. We predict that freshman men will outperform freshman women, replicating the well-established gender difference in mental rotation. However, this gender difference is predicted to disappear when we compare freshman men to senior women because of their advanced level of expertise in cognitive psychology and knowledge of spatial cognition.

**POSTER # 24****Pattern Classifiers Based on Support Vector Machines**

Vyacheslav Glukh

Faculty Mentor: Dr. Natacha Gueorguieva  
Department of Computer Science

Support Vector Machines (SVMs) are a set of related supervised and unsupervised learning methods, applicable to both classification and regression. SVMs may be defined as a classification method that determines the maximum-margin hyperplane which divides the classes. In the case of basic linear classification, a SVM creates a maximum margin hyperplane that lies in a transformed input space. Given binary choice training examples (labeled either 'yes' or 'no'), a maximum-margin hyperplane divides the 'yes' and 'no' examples, such that the distance from the closest examples, i.e. the margin, to the hyperplane is maximized. In non-linear case we have non-separable data and the SVM is therefore a combination of a maximum margin and a penalty for misclassification.

The essence of SVM is that the input data is mapped to a higher-dimensional feature space, by the use of the kernel trick, where the data can be separated, or "shattered", by a hyperplane. Finding such an optimal separating hyperplane requires solving a quadratic programming problem.

The goal of this research is to use some of the existing software implementations for conducting experiments by using SVMs technique and to extend the functionality of these existing packages by including additional kernels beyond the traditional one. Our experiments demonstrated that the fitting ability of the kernel depends greatly on the characteristics of the input. This means that choosing one kernel and expecting it to be the best for all applications is rather naïve. Parameter selection is also an issue solving of which determines the classifier performance.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 25****Activation of Yeast *INO1* Results in a SWI/SNF-Dependent, INO80-Dependent Local Nucleosome Movement**

Jason Ford

Faculty Mentor: Dr. Chang Hui Shen  
Department of Biology

Transcriptional activation in yeast *INO1* chromatin was studied using the indirect end-labeling technique. *INO1* chromatin is organized into an ordered, overlapping nucleosomal array under repressing conditions. The nucleosome positions were disrupted only at the promoter region under inducing conditions and this disruption requires both SWI/SNF and INO80. This indicates that these two remodelers play an essential role in local nucleosomal mobilization at the *INO1* promoter. Consistent with these findings, chromatin immunoprecipitation analysis revealed that both remodelers are restricted to the promoter region and are not found over the entire gene. This reinforces the notion of a local remodeling activity for nucleosomes positioned at the regulatory region. Furthermore, both the SWI/SNF and INO80 complexes are constitutively present at the *INO1* promoter during repressing and inducing conditions, suggesting that the remodeling activity depends on a functional activator. We have also demonstrated that the presence of SWI/SNF is the prerequisite for INO80 recruitment. In light of these findings, we suggest that the localized distribution of chromatin remodeling complexes at the *INO1* promoter region determine and result in a local nucleosome mobilization. These remodeling activities are stimulated by the functional transcriptional activator, the Ino2p/Ino4p heterodimer in the absence of the Opi1p repressor under inducing conditions. Thus, we have proposed a model to describe the order of events in *INO1* activation.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 26**

**Learning in Neural Networks of Excitatory and Inhibitory Neurons**

Matthew Luberto

Faculty Mentor: Dr. Natacha Gueorguieva  
Department of Computer Science

Neural networks of spiking neurons (SNs) are used for computer modeling and simulations of biological neural systems as they allow observation of interactions between neurons. There are two major types of biologically inspired artificial neuron models: conductance based models (Hodgkin-Huxley) and the integrate-and-fire models, such as the MacGregor model.

Conductance based models allow for detailed dynamics of a neuron's membrane potential and spike generation. They imitate the biological neurons' response by modeling several ion channels, like sodium, potassium, calcium, etc. Advantages of conductance models are the possibility of modeling post-inhibitory rebounds, bursting, and the multiple-compartmental structure of a single neuron. In many applications, such as modeling of learning processes, modeling of spike generation can be simplified but this simplification decreases degree of biological similarity.

The family of integrate-and-fire neuron models has a simplified spike generation mechanism while providing an accurate approximation of the membrane potential and other neuron properties like refractory properties and adaptation to stimuli. Simplification of spike generation allows for improved computation speed as compared with conductance based models.

In this research we investigate the importance of inhibition and inhibitory learning in the network. Our experiments showed that the lack of inhibition almost completely eliminates the ability of the network to learn. For our simulations we use the integrate-and-fire neuron model, which is based on the MacGregor model. It models the biological neuron behavior closely in terms of sub-threshold membrane potential, potassium channel response, refractory properties, the neuron's excitation and inhibition, and adaptation to stimuli.

**POSTER # 27**

**Analyzing Attitudes toward Public Mobile Phone Use and Factors Related to an Increased Sense of Public Safety**

Alokika Fernandes and Laura Nicolassy

Faculty Mentor: Dr. Kathleen M. Cumiskey  
Department of Psychology

The necessity of having a mobile phone often relates to the sense of personal safety it affords users by allowing them to contact important others in an instant (Rosen, 2004). There is no denying that as the saturation of mobile phone use increases throughout the world, that people often cite the necessity of having a phone for use in case of emergencies as one of the main reasons for mobile phone ownership (Cumiskey, 2004). This study utilizes specific items from 91-item survey that was developed by Cumiskey (2006). This survey was designed to measure people's attitudes toward public mobile phone use and to capture the differences in responses about other people's public mobile phone use as compared to their own mobile phone use. The survey was administered to close to 400 participants. The analyses for this study were focused on items from that survey that relate to whether or not individuals use their cell phones as a tool to increase their sense of public safety. It was hypothesized that women may rely on their mobile phones to increase their sense of public safety more than men do. By performing a one-way ANOVA, it was discovered that women in fact do believe, more than men, that cell phones make them feel safer in public. Whether or not this increased sense of safety leads to women's increased sense of freedom and independence or does this sense of safety lead to an over-reliance on cell phones which can lead women into taking unnecessary risks, will be discussed.



**POSTER # 28****Generating Synthetic Electrocardiogram Signals with Prescribed Characteristics**

Chin Ming Hui

Faculty Mentor: Dr. Natacha Gueorguieva  
Department of Computer Science

The primary function of the heart is to supply blood and nutrients to the body. The regular beating of the heart moves the blood throughout the body. Each heartbeat is controlled by electrical impulses traveling through the heart. In the normal heart these electrical impulses occur in regular intervals. When something goes wrong with the heart's electrical system, the heart does not beat regularly. The irregular beating results in a rhythm disorder, or arrhythmia. ECG is a record of electrical impulses which precede the heart contractions. A single sinus (normal) cycle of the ECG, corresponding to one heart beat, is traditionally labeled with the letters P, Q, R, S and T which correspond to P-wave, PQ interval, QRS complex, QT interval, ST interval and T-wave.

Heart arrhythmias result from any disturbance in the rate, regularity, and site of origin or conduction of the cardiac electric impulse. Premature ventricular contraction (PVC), left bundle branch block (LBBB), and right bundle branch block (RBBB) are the three cardiac arrhythmias which can lead to or indicate the risk of heart failure.

Our research is focused on constructing model parameters in order to generate different morphologies for the PQRST-complex. By prescribing specific characteristics of the heart rate dynamics such as the mean and standard deviation of the heart rate, spectral properties etc, we built a database which will be used for calculating the effectiveness of different techniques for noise and artifacts removal as well as for designing a pattern classifier able to recognize the above cardiac arrhythmias.

**POSTER # 29****The Development of a 3-Dimensional Breast Epithelial Culture Assay that Tests the Effects of Exposure to Specific Environmental Factors**

Goldie Lazarus and Sarah Tirro

Faculty Mentor: Dr. Jimmie E. Fata  
Department of Biology

The research project is concentrated on determining the effects that specific environmental factors have on normal breast epithelial cells. The project aims to discover how specific environmental factors that are widespread in our everyday lives affect cell polarity, cell proliferation, and cell death which are cell characteristics often deregulated during cancer initiation and progression. In order to test these effects the project will transiently expose human and mouse breast epithelial cells cultured in a 3-dimensional assay to trace amounts of known carcinogenic chemicals that are found in our environment. The initial efforts will focus on eight chemicals that are found on the list of rodent mammary gland carcinogenic chemicals recently compiled by the Environment and Breast Cancer Science Review Project. These eight chemicals include 1,2-propylene oxide, benzene, carbon tetrachloride, nitromethane, o-toluidine, styrene, 1,2-dichloroethane and methylene chloride. We have chosen these chemicals because they all fall into at least four out of the following five categories: existence as an air pollutant, existence within consumer products, existence as food additives, existence in common occupations, and a high rate of production. An analysis of environmental factors and how they affect normal breast cells may provide a framework for future precautionary measures and may direct new preventative approaches and life style interventions geared toward decreasing breast cancer rates.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 30**

**Synthesis and Characterization of Ordered Silicas with Open and Closed Spherical Nanopores**

Chin Ming Hui

Faculty Mentor: Dr. Michal Kruk  
Department of Chemistry

Mesoporous materials, that is materials with pores of diameter between 2 and 50 nm, are important in heterogeneous catalysis, and separation of mixtures, for instance by chromatography. The usefulness of these materials stems from their very high specific surface areas (up to about 1200 m<sup>2</sup> g<sup>-1</sup>) and high adsorption capacity. Recently, mesoporous materials, especially those with closed pores, also became attractive as low dielectric constant insulation materials in electronics. Currently, mesoporous materials with well-defined pore shape and narrow pore size distribution can be synthesized using surfactant micelles as templates.

In our study, silicas with spherical mesopores arranged in face-centered cubic structure (pore diameter 15-26 nm) and body-centered cubic structure were synthesized using Pluronic F127 poly(ethylene oxide)-poly(propylene oxide)-poly(ethylene oxide) triblock copolymer as micellar template. These materials were then characterized by Small-Angle X-ray Scattering and nitrogen adsorption porosimetry. The pore diameter in the face-centered cubic structure was tailored by modifying the synthesis temperature and time. We also found that the spherical pores in both of these structures can be closed by increasing the temperature of a treatment used to burn out the block polymer template.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 31**

**Hormonal Influences on Behavior in a Population with Developmental Disabilities**

Padmi Ranasinghe

Faculty Mentors: Dr. Dan McCloskey  
Department of Psychology and Program in Developmental Neuroscience

Dr. Robert L. Freedland  
Director, Center for Developmental Neuroscience and Developmental Disabilities (CDNDD)

In this study we will be comparing the behavioral differences of people who are suffering from developmental disabilities with or without thyroid diseases. The thyroid is an endocrine gland in the neck, partially surrounding the trachea immediately lower to the larynx. It secretes hormones that help regulate the body's metabolism, oxygen consumption, heat production and promote nervous system and skeletal system function. The abnormalities of the thyroid gland may result in hypothyroidism. Changes in thyroid function have previously been associated with behavioral changes such as depression, sleep disorders and sensory skills. The present study will look at differences between people with developmental disabilities who are taking drugs for thyroid diseases (Synthroid, Levothyroxine) and people with developmental disabilities who are not being treated for thyroid diseases. Data were drawn from more than 5000 anonymous research surveys available through the NYS Institute for Basic Research in Developmental Disabilities. Of those, 482 participants (269 females and 215 males) who are suffering from hypothyroidism were compared to 482 same age individuals who are not taking drugs for hypothyroidism (269 females and 213 males). It is hypothesized that thyroid dysregulation, even if it is treated, may be a factor that produces a change in the behavioral outcome of individuals with developmental disabilities.

**POSTER # 32**

**An Affirmative Interpretation of Case Studies on Gender Variant Youth**

Jeannemarie Leone

Faculty Mentor: Dr. Darryl Hill  
Department of Psychology

This study takes an affirmative phenomenological approach to study of the lives of children and adolescents diagnosed with gender identity disorder. The primary goal was to understand the psychological experience of a child who has unconventional gender beliefs. To do this, I analyzed the entire published case literature on gender variant youth (60 studies) in academic psychology and psychiatry from December, 1963 to May, 2003. While my analysis of case literature discourse found uncovered many themes relevant to the subjectivity of gender variant youth, I found the following observations most compelling. First, these youth lived in highly heterosexist, genderist, and transphobic family, society, or peer group contexts. The gender variant youth's families dichotomized gender and pathologized anything except stereotypical, traditional expressions of gender and sexuality, and the youth often internalized these views. They often described their gender as "being born in the wrong body" and locate the origin of these desires in either their cross-gender interests or their sexual desires. While the case literature constructs these youth as extremely pathological, an affirmative interpretation of the youth's experiences shows that they may be using gender variances as a strategy to empower them against psychological threats like fear of abandonment, loss of love, and lack of power.

**POSTER # 33**

**Computation of Lagrangian Coherent Structures in Loop Current Pinch-Off**

Jonathan Maltz

Faculty Mentor: Dr. Andrew Poje  
Department of Mathematics

We utilize a high resolution ocean model of the Gulf of Mexico (HYCOM) to observe Lagrangian Coherent Structures (LCS) associated with the pinch-off of Loop Current Rings. We identify LCS and advection pathways according to dynamical systems theory by studying synthetic drifter trajectories. Many drifter trajectories are computed using a numerical integration application (GENCURVE). In order to maximize the quality of the results, GENCURVE was modified to run large numbers of trajectories in parallel on CUNY's supercomputer in two ways. It was first adapted to separate trajectory calculations across the processors. A second alteration enabled GENCURVE to run the same initial drifter conditions across varying start days. To assess the accuracy of these calculations we look at the convergence of the computations based on both integration and interpolation parameters. Running GENCURVE's results through a Finite Scale Lyapunov Exponent (FSLE) analysis provides an estimate of hyperbolic trajectories in this region. These estimates offer initial trajectory locations to calculate approximate stable and unstable manifolds. We then study the mixing of water parcels between the structures formed by the manifolds.

**POSTER # 34**

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**Synthesis and Characterization of Copolymer-Templated Periodic Mesoporous Organosilicas with Very Large Pores using Hydrocarbons as Micelle Expanders**

Kristina Foulias

Faculty Mentor: Dr. Michal Kruk  
Department of Chemistry

Surfactant-templated periodic mesoporous organosilicas (PMOs) have received much attention as well-defined periodic inorganic-organic hybrids, catalyst supports, hosts for nano-objects and media for immobilization of biomolecules. In some applications of PMOs, it would be beneficial to enlarge the pore diameter beyond 10 nm, which is a typical limiting pore size value. Recently, it was demonstrated that this goal can be achieved by performing the block-copolymer-templated synthesis of PMO at low temperature (5-15 °C) in the presence of aromatic hydrocarbon (trimethylbenzene) as a micelle expander, following the method reported earlier for large-pore ordered mesoporous silicas. The current project is intended to further explore the opportunities in the synthesis of large-pore PMOs using a procedure similar to those previously reported, as well as modifications of synthesis procedures used for the synthesis of ordered mesoporous silicas with linear hydrocarbons as swelling agents. The work in progress includes:

- Synthesis and/or characterization of silicas with large spherical and cylindrical mesopores using procedures previously reported.
- Synthesis of large-pore PMOs in the presence of different hydrocarbons and under adjusted conditions, and characterization of the products.
- Optimization of block copolymer ratios, and temperature variations in order to further increase pore diameter to a maximum.

Pore size is markedly increased upon the increased ratio of two block copolymers in comparison to those previously presented in the literature, with pore sizes of up to ~16nm and larger. In addition, pore distribution has demonstrated a high degree of uniformity with specific surface areas of over 100 square yards.

**POSTER # 35**

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**Action Research Study of Cancer Preventive Behaviors in Chinese Americans**

Jacey Li, RN

Faculty Mentor: Dr. Margaret Lunney, RN  
Department of Nursing

Cancer is the leading cause of death among Asian Americans, while heart disease is the first cause of death among other groups such as African Americans and Hispanics (American Cancer Society, 2007). Additionally, Chinese Americans have higher risks to some cancers, particularly colorectal and lung, compared to other Asian groups. The purpose of this study is to discover the values, beliefs, and factors that influence Chinese American adults' cancer preventive behaviors. The study will be conducted using Community-Based Action Research Design (Stringer, 2007). Action research is a methodology in which the researcher actively interacts and collaborates with the participants to explore solutions to problems that the participants may experience. Five to eight Chinese American adults between the ages of 30 to 50 years old who were born in the U.S. will be asked to participate in this study. The study will last three to four weeks depending on the satisfactory level of the participants after the third week and if they feel confident in the summary of findings. As for the procedures, each week the group will discuss a particular topic provided by the researcher. Participants will discuss their views on how values, beliefs and other factors influence Chinese American adults and their cancer preventive behaviors. However, there is a possibility that the study may still be in progress at the time of the undergraduate research program. If that is the case, the methodology of the research study will be presented at that time.

**POSTER # 36****Synthesis of Copolymer-Templated 2-D Hexagonal Silicas with Very Large Mesopores using Cyclohexane as Micelle Expander**

Benedette Adewale

Faculty Mentor: Dr. Michal Kruk  
Department of Chemistry

The project is about using Copolymer-templated ordered silicas with large cylindrical pores (diameter ~ 10nm) arranged in two-dimensional (2-D) hexagonal (honeycomb) arrays (referred to as SBA-15 silicas) which have received much attention as catalyst supports, hosts for nano-objects and media for immobilization of biomolecules. In some applications of these materials, it would be beneficial to enlarge the pore diameter beyond 12nm, which is a typical limiting pore size value for SBA-15. Recently, we demonstrated that this goal can be achieved by adding triisopropylbenzene to the synthesis mixture, which results in the pore diameter from 12 to 19nm (or more), depending on the synthesis conditions. We also found that a more readily available compound, cyclohexane, exhibits a promising performance as a micelle swelling agent. The current project is intended to further explore the applicability of cyclohexane in the synthesis of large-pore SBA-15 silica. The project involves:

- Synthesis of block-copolymer-templated samples in the presence of cyclohexane under different conditions, and characterization of the products.
- Literature readings
- Preparation of the results of the project

**POSTER # 37****Strain-Specific Differential Morphogenetic Response**

James Steinberg

Mentor: Dr. Jimmie E. Fata  
Department of Biology

A fundamental question in developmental biology is how a single signaling cascade can produce multiple morphological outcomes. We have shown previously that transforming growth factor- $\alpha$  (TGF $\alpha$ ) and fibroblast growth factor-7 (FGF7) can stimulate unique morphogenetic changes in mammary tissue by eliciting different activation kinetics of the mitogen-activated protein kinase (MAPK) pathway. This analysis was performed using 3-dimensional cultures of mammary ducts isolated from the mouse fat pad. Surprisingly, we recently found that TGF $\alpha$  is necessary and sufficient to induce branching morphogenesis in the Balb/c strain of mice, but in amorphogenetic response that involves "cyst" formation. The question remains as to whether the kinetics of MAPK activation downstream of TGF $\alpha$  stimulation is dependent on mouse strain, and if so by what mechanism does strain regulate this signaling cascade. To date, strain dependent morphogenesis has not been explored as a model to investigate how a single signaling cascade induces different patterned outcomes. I propose to further investigate the differences in morphogenetic response to TGF $\alpha$  in these mouse strains, and to positively identify which variable in their respective physiologies is responsible for the difference morphological outcome.

**POSTER # 38**

**Sex and the Serious: Scandalous and Liberating**

Kristie Falco

Faculty Mentor: Dr. Matthew Solomon  
Department of Media Culture

Throughout the 1950s, three infamous sex symbols, Marilyn Monroe, Jayne Mansfield and Kim Novak were known more for their body measurements than for their acting aptitude and accomplishments. As a result of their curvaceous figures, these actresses were cast continuously as the object of a male's desire. All three women were given the opportunity to unbutton their blouses one more button, to hike up their skirt a little shorter, but they were not given the chance to be taken seriously. Although they used their bodies to further their career in show business, once there, they combined sexuality and intelligence to create the iconic status that still exists today. When Kim Novak exploded into Hollywood she was constantly criticized about her acting ability. She was known for her beautiful porcelain face and comforting sex appeal. Novak's roles consisted of the exploitation and objectification of her body. Jayne Mansfield reached Hollywood status through her scandalous sexual magnetism. The media attacked Mansfield for being unwomanly and sinful. However, she openly explored her sexuality and tried to prove that women can be as sexual as men. These same pressures were placed upon Monroe and, after several successful films, Monroe's career was in jeopardy because of a nude picture that surfaced. Her fan base consisted mostly of men and because of the picture; women began to reject her erratic lifestyle. Monroe took control over the controversy and embraced her body and sexuality. All three women fought for more challenging and serious roles, but they were denied because serious actresses were not considered sexy. They were forever portrayed in the media as the stereotypical blonde sex symbols, but they resisted these restrictions and proved that they could be serious and sexy at the same time. Monroe, Mansfield and Novak have helped pave the way into a women's world where sex and the serious can coexist.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 39**

**Dynamic Studies of Alzheimer Disease-Like Pseudophosphorylated Tau**

Sherry Browne

Faculty Mentor: Dr. Alejandra Alonso  
Department of Biology

Understanding mechanistically the foundation of synaptic withering and loss that precedes cell death in Alzheimer's disease (AD) and other neurodegenerative diseases is pivotal. Accumulation of hyperphosphorylated tau and the disruption of microtubules are correlated with synaptic loss and pathology of AD. One hallmark lesion of neurodegenerative disease in AD is the initial appearance of neurofibrillary tangles inside neurons. These tangles are composed mainly of hyperphosphorylated tau, a microtubule-associated protein (MAP), polymerized into filaments. Impaired cognitive function and pathology of AD is correlated with this lesion. We have previously shown that the cytosolic Alzheimer hyperphosphorylated tau (AD P-tau) sequesters normal tau, MAP1A, MAP1B and MAP2, which results in the inhibition of microtubule assembly and disruption of microtubules.

We will study the effect of pseudophosphorylated tau (Ps-tau) at Thr 212, Thr 231, and Ser 262, on the cells by live cell time-lapse fluorescent microscopy using fluorescent tagged tau. Ps-tau was generated by site directed mutagenesis. We will be able to record the movement of the mitochondria and the stability of the microtubules in the transfected cells versus the untransfected ones. The expression of tau pseudophosphorylated at Thr212, Thr231, and Ser262 triggers caspase 3 activation in as much as 85% of the transfected cells and apoptosis to a lesser degree. These findings suggest that the combination of phosphorylation at Thr212, 231 and Ser262 in the same tau molecule can trigger toxic reaction.

**POSTER # 4 0**

**Willowbrook State School Staff:  
“Resident Sex Uncontrollable”**

Helen Starogiannis

Faculty Mentor: Dr. Darryl Hill

Department of Psychology

Historians tell us that, in the past, mental health institutions tried to control and prohibit any sexual relations among their residents, mostly by sex-segregated housing. This was the case at the Willowbrook State School, housed on the grounds of the College of Staten Island, open during the early 1950s to the 1970s. This poster reports on interviews with Willowbrook State School staff on the sexual behavior of residents. Despite sex-segregation, the institution’s regulations did little to control residents’ sexuality.

Using word of mouth, the Internet, public phone directories, and published documents, we identified former staff members of the Willowbrook State School. Eight staff members (nurses, teachers, administrators, occupational therapists, and doctors) volunteered to reflect on their memories of working at the school. Participants were interviewed on the telephone for about an hour on their memories of the romantic and sexual lives of the residents.

Institutions like Willowbrook State School segregated the sexes to control the sexual behavior of the residents. Yet, sexuality, with its comfort and pleasure, is so basic to human life, segregating where residents lived and slept did little to stop sex. Even though staff would try to prohibit sexual activity when they felt it was inappropriate, sexual relations continued—whether it was in the form of same-sex relations, masturbation, and in some cases, with staff members.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 4 1**

**Climate Sensitivity of Different  
Tree Species in Palisades Park**

David Di Lillo, Jennifer Blake, Victoria Porcell, Briana Vega Giordano, Matthew Signorile, and Jolanta Smulski

Faculty Mentor: Dr. Athanasios Koutavas  
Department of Engineering Science and Physics

Climate change can be revealed through the study of tree rings. Our study involves sampling and examining tree ring data from an Eastern White Pine, Sweet Birch, Shortleaf Pine, White Oak, and Norway Spruce in order to determine how different tree species in Palisades Park are sensitive to various climate changes. We standardized and compared tree ring data to historical climate records. It was discovered that diverse species reflect distinct climate factors based on their biological sensitivity.

**POSTER # 4 2**

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**The Perception of Affective Speech Prosody in Typically Developing Children**

Jessica Winder, Snigdha Banerjee, and Dan Gelardi

Faculty Mentors: Dr. Patricia Brooks and Dr. Bertram Ploog  
Department of Psychology

Prosody comprises components such as pitch variation and stress variation, which allow for effective communication of affect, focus of attention, and communicative intention. Typically developing children develop sensitivity towards speech prosody during infancy and production of appropriate speech prosody is mastered by preschool years. Children with developmental disabilities, including autism, showed atypical speech prosody. This study will use a computer game to test the preference of affective prosody in typically-developing children. The results of our previous study have shown that children with autism do not show preference for intonation over lexical content of speech, whereas typically-developing children show a bias towards to lexical content. With future study, we will be able to determine the differences in perception of affective prosody between autistic and typically-developing children.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 4 3**

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**Accommodative Esotropia: Diagnosis Through Decision Tree Analysis**

Stanislav Kirov

Faculty Mentor: Dr. Susan Imberman  
Department of Computer Science

In this study we analyzed data from a large sampling of eye patients. These patients had accommodative esotropia, or crossed eyes. We applied decision trees with the goal of discovering what factors lead to someone's condition deteriorating, hence needing surgery. The data consisted of numerous fields of measurements. Our results indicated which of these fields contribute to deterioration and at what thresholds this occurs. The tree created from the analyses can be used as a tool to help diagnose these patients and to recognize precursors for deterioration.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*



**POSTER # 4 4****The Effect of Alcohol Consumption and Student Living Arrangements on Collegiate GPA**

Francesca DiMarco, Jenna Emilio,  
Nicole Lukovsky, and Jeremy Minore

Faculty Mentor: Dr. Irina Sekerina  
Department of Psychology

Past research has shown that alcohol consumption has a negative effect on academic success in college as reflected in lowered GPA. But it is not clear whether this effect can be mediated by the type of students' living arrangements. Our research project will investigate joint effects of alcohol consumption and living arrangements on the collegiate GPA of students on Staten Island. We will obtain the self-reported measure of alcohol consumption of two groups of students: one group will be CSI students who live off campus and commute to school, and the other will be students from Wagner College who live in dorms on campus. We will adapt one of the existing surveys of alcohol consumption and augment with additional questions that collect information on respondents' living arrangements and their collegiate GPA. Self-reported alcohol consumption will be measured as a reported number and type of alcohol drinks consumed weekly. We predict that we will replicate the finding reported in the literature that alcohol consumption is in a negative linear relationship to the GPA. However, we also expect to find that alcohol consumption will affect the GPA differently depending on the type of their living arrangements: For students who live in the dorms, this effect is expected to be much stronger due to the notorious "drinking" campus culture. Its effect should be weaker on students who live off-campus. These data should serve as a strong message to control drinking on college campuses.

**POSTER # 4 5****Synthesis of Novel ATRP Initiators and Polymers**

Saadyah Averick, Sukanta Dolai, and  
Wei Shi

Dr. Krishnaswami Raja  
Department of Chemistry

The focus of the research was based upon the synthesis of atom transfer radical polymerization (ATRP) polymers and suitable ATRP initiators with novel functional groups. The initiators synthesized were either azide terminated (1-(2-(2-(2-azidoethoxy) ethoxy)-3-bromo-3-methylbutan-2-one) or aldehyde terminated (4-formylphenyl 2-bromo-2-methylpropanoate). The purpose of the azide chain end is to allow for the polymer to be attached to other molecules via a highly selective "Click" reaction. The aldehyde chain end allows for mimicry of biological condensation reaction-peptide synthesis. The polymers synthesized were derivatives of poly(tert-butyl acrylate). These derivatives included copolymers of glucose amine with NIRF-dyes or fluorescence amine, to allow for water-soluble highly fluorescing dyes.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 4 6**

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**Supersolidity of Topological Defects in Quantum Solid He4**

Karamatou Yacoubou Djima

Faculty Mentor: Dr. Anatoly Kuklov  
Department of Engineering Science and Physics  
Department of Mathematics

We analyze the properties of supersolidity, a new state of matter, in He4 crystals using Monte Carlo simulations. Recent studies have shown that screw dislocation, a type of structural defect found in many crystals, induced the presence of superfluid along the core of the defect in solid He4 at absolute zero temperature. This was a non-preceded example of supersolidity, the cohabitation of both solid and superfluid properties in an ideal He4 structure. Although some simulations have revealed the essential role of the defects which, on one hand, distort ideal symmetry (hexagonal close packing) and, on the other, create supersolidity, the nature of the observation remains puzzling and requires further study. Our approach is to determine if there is classical analogy of the effect in classical solids with dislocations. In particular, we study how inter-particles' potential affects the particles' ability to flow along the core. To do so, we first create screw dislocation in the solid of classical particles repelling each other with the potential  $\propto 1/r^n$ , where  $n$  is some high power (say,  $n = 6$ ). Then, we use classical Monte Carlo simulations to show that perfect structure close to the core becomes unstable and forms liquid at temperatures much less than typical energy per particles. We then focus on the energy configuration of the supersolid crystal as a function of the location of a vacancy-interstitial particles pair. Then we present the results of another method that uses Metropolis algorithm to show how the mobility of a single vacancy affects the behavior of particles around the core. We present the results of our simulations using Matlab and PV-wave imaging tools.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 4 7**

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**Dynamic Schema Updates for a Root Cause Analysis Reporting System**

Xia Ye

Faculty Mentor: Dr. Deborah Sturm  
Department of Computer Science

Root Cause Analysis is a technique used in many fields to identify the underlying cause for an adverse event. Among others, this method has been applied to analyzing accidents in space travel, industry and hospitals. According to the National Academy of Sciences' Institute of Medicine, there are approximately 44,000 to 98,000 deaths each year in the United States from preventable medical errors. Root Cause Analysis employs a hierarchical tree whose top level is the sentinel event. Subsequent branches define antecedent events that led to the prior occurrence. This process continues until the root causes are defined. In this study we are extending work on an interactive causal tree builder that allows users to define a variable number of antecedent events and root causes. A number of medical error taxonomies are available for medical error reporting. This project will develop an event taxonomy management framework to enable authorized end users to select and modify a taxonomy for a web-based RCA editor. The event code definitions will be stored in the database along with the report data. A code editor and menu generator will be developed to enable a user to modify the code definitions and update the report form interface.

**POSTER # 48**

**Serotonin 1A Receptor Mediated Signaling Through Two Major Biochemical Cascades in Brain Derived Cells**

Souleymane Diallo

Faculty Mentor: Dr. Probal Banerjee  
Department of Chemistry

The serotonin 1A receptor (5-HT<sub>1A</sub>-R) plays an important role in early post-natal brain development. This project studies the link between the 5-HT<sub>1A</sub>-R and two major biochemical cascades that regulate both neurogenesis as well as neuronal survival. In the first cascade, NF-kappaB is a transcription factor that plays an important role in the regulation of cell lineage development and cellular apoptosis. We investigated the two biochemical pathways using a hippocampal neuron derived cell line and also organotypic cultures of hippocampi from neonatal mice. First we attempted to study the expression of 5-HT<sub>1A</sub>-R by submitting different clones in the presence and absence of doxycyclin to binding assay. The results indicate that in the presence of doxycyclin the expression of 5-HT<sub>1A</sub>-R is turned off. The luciferase activity data shows that stimulation of 5-HT<sub>1A</sub>-R results in the activation of NF-kappaB.

A second biochemical pathway has been studied in mouse hippocampi organotypic from neonatal mice. A binding assay has been done on acutely isolated hippocampi from P6 and P15 and the results indicate that at P6, 5-HT<sub>1A</sub>-R expression is 2 fold less than that at P15; however, the 5-HT<sub>1A</sub>-R expression at P6 is low, but that is not enough to block the signaling pathway. At P6, The PKC isozyme (a probably, PKC  $\delta$ ) is located upstream of Erk1/2, in contrast at P15 where PKC isozyme is involved downstream.

The switch in positioning of PKC in 5-HT<sub>1A</sub>-R erk1/2 pathway might be due to the differential involvement of The PKC isozyme.

The long-term goal of this project is to correlate these two pathways to construct a better understanding of the mechanism of 5-HT<sub>1A</sub>-R mediated regulation of brain development.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 49**

**The Effects of Walking on Cognitive Resources**

Lauren Orleman and Paula Bertelli

Faculty Mentor: Dr. Sarah Berger  
Department of Psychology

One way to test infants' ability to inhibit is a locomotor A-not-B task. Infants are placed in front of two paths with their goal at the end of one of the paths. After going down one path (A) for a number of times in a row, the goal is switched to the other path (B). In this study, 6 infants were tested from their first week of independent crawling until their 6th-8th week of independent walking. Infants were given two conditions; the easy condition required infants to go straight down the path to their goal, the difficult condition required infants to crawl through a tunnel to get to their goal. Infants who had less than 2 weeks of walking experience failed to make the switch and went down A when their goal was at B, while infants with 6-8 weeks of experience were capable of changing their behavior and went down B. Newly walking infants have difficulty performing a cognitive (inhibition) and motor (walking) task simultaneously because maintaining balance and walking requires all of their effort. The tunnel condition offered an additional challenge to new walkers; they had to switch from a walking position to a crawling position to get through the tunnel. One hypothesis for the higher rate of errors in the tunnel condition is that they do not see the tunnel as supportive of locomotion, but instead as an obstacle in their path.

**POSTER # 50**

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**Real Costs**

Michele Rose

Faculty Mentor: Dr. Michael Mandiberg  
Department of Media Culture

*Real Costs* is a Firefox plug-in that inserts the CO<sub>2</sub> emissions for mapping, e-commerce, and shipping websites. These interventions visualize the costs of automobile trips, present the different environmental costs of shipping, and map out the global-migration of products in the first-world import economy.

The part of the plug-in that I have worked on is the mapping sites. When a user gets directions on Google Maps, for instance, the plug-in calculates the mileage and duration of the trip. Based on the miles-per-gallon and emissions of the user's car, and the cost of gas in the state of travel, the *Real Costs* script will add the ability to calculate the gas used, the cost of that gas, and CO<sub>2</sub> emissions produced by the trip. Along side of this data, the script also includes the equivalent values of other transportation modes: bus, airplane, bicycle, foot. I have done this for the major mapping websites.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 51**

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**Utilizing Advanced Mapping Techniques to Understand Spatial Distortion in Transportation Maps**

Jonathan Torres

Faculty Mentor: Dr. Jonathan R. Peters  
Department of Business

The transportation infrastructure of the New York City area exists as a vital component in determining congestion and commuting times. The regional transportation maps are useful tools that riders use to determine the length of a particular journey or the actual distance to a given destination. In addition, people develop mental pictures of a given area based on the spatial information received from maps, aerial photos and electronic devices such as GPS units. This study will explore the level of spatial distortion contained by a range of transit and community maps and develop metrics of the overall level of distortion. In addition, the authors plan to conduct a survey of individuals to see how regional transportation maps affect their spatial perceptions of the community. The project will help public policy makers understand how the information that is provided by the public sector impacts the understanding and perceptions of their community with regard to the spatial environment.

**POSTER # 52****Synthesis of Well-Defined Water-Soluble Fluorescent Polymer for *In Vivo* Imaging**

Jose Saltos

Faculty Mentor: Dr. Abdeslem El Idrissi  
Department of Biology

NIRF-dye polymers will be synthesized for applications in imaging. The polymers have a glucose side chain to improve water solubility; a pendant NIR dye side chain acting as an imaging agent. The polymers will be conjugated to targeting antibody-binding proteins to produce improved detection reagents. Our approach would allow attaching several copies of imaging agents per antibody molecule without compromising the binding specificity and affinity of the antibody and to reduce the amount of antibody per dose required for targeting, thereby reducing both the price and possibly the toxicity of imaging agents. Syntheses involved various steps such as the synthesis of poly(tert-butyl acrylate) via Atom Transfer Radical Polymerization (ATRP), deprotection of tert-butyl group by trifluoroacetic acid (TFA), side-chain functionalization of poly(acrylic acid) with Glucosamine and NIRF dye-amine. Polymer optimization is currently being performed and its characterization being done using NMR spectroscopy and GPC. The polymers were used for non-invasive *in vivo* imaging in mice.

**POSTER # 53****Effects of Taurine on Anxiety-Like and Locomotor Behavior of Mice**Ekaterina Zavyalova, Lorenz Neuwirth,  
and Latifa BoukarrouFaculty Mentor: Dr. Abdeslem El Idrissi  
Department of Biology

Taurine is one of the most abundant free amino acids, especially in excitable tissues, with wide physiological actions. We have previously reported that chronic supplementation of taurine in drinking water to mice increases brain excitability, mainly through alterations in the inhibitory GABAergic system. In this study we investigated the effects of chronic versus acute taurine treatment on anxiety-like and locomotor behaviors using two behavioral tests: elevated plus-maze and open-field. These two test conditions generated different levels of anxiety, and both anxiolytic and anxiogenic effects of taurine could be assessed. We used two paradigms for taurine treatment: acute injection versus chronic supplementation. In the open field test, taurine supplementation increased whereas taurine injection suppressed locomotor activity. We found that taurine supplementation induced an increase in the total distance traveled, the overall movement speed, the time the animals spent mobile, the number of line crossings, and the time the animals entered the center zone. In the elevated arm maze, taurine injection suppressed anxiety whereas taurine supplementation was anxiogenic. The major findings of this are two fold: First these results suggest that taurine might play a role in the modulation of anxiety and locomotor activity. Second, taurine when injected acutely had opposite effects than when administered chronically.

**POSTER # 54**

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**Microcontroller-Based ATM/Credit Card Reader**

Xhevair Maskuli and Yevgeniy Trofimchuk

Faculty Mentors: Dr. Neo Antoniadis and Dr. Alfred Levine

Department of Engineering Science and Physics

Security in industries today utilizes many new innovations, one of which is biometric information (e.g., fingerprints, palm prints, and iris scans). Our intent is to understand the common credit card and eventually enhance it by including added security, your fingerprint. Our first stage of the research tests the ability of the 8-bit Microcontroller to handle and display information taken from the common credit card. After this stage in the research we will work towards the eventual implementation of the added security that all credit cards are capable of.

We are using an 8-bit PIC18F452 Microcontroller connected with a card reader to mimic operations associated with an Automated Teller Machine (ATM) as well as a credit card reader. Verifications are performed and information is displayed on the controller's LCD display. This beginning stage is meant to show the possibilities of its use.

**POSTER # 55**

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**Noise Reduction of MR Brain Images via the Use of Spatial and Frequency Filters**

Troy Johnson and Nandhini Sudarsanan

Faculty Mentor: Dr. Lihong Li

Department of Engineering Science and Physics

The subject of image noise is quite a proverbial issue in the field of medical imaging. It is the result of pixel fluctuation in an image and usually occurs when light exposure on the subject being examined is at a minimum. This unwanted behavior appears as random speckles on a normally smooth image and gives it a grainy appearance.

Image noise isn't exclusive to medical imaging but also affects digital cameras and is a grave concern to camera manufacturers. In photographs, noise appears as specks, pale areas of white or blotchy patches where there is normally a uniform graduation of shade. This outcome is usually created by electronic noise and low light conditions. Electronic noise in digital photography occurs during the process of converting light into digital numbers.

This project studies the effectiveness of spatial and frequency filtering in reducing noise in five brain images at various noise intensities. The usefulness of both filters is tested and analysed on the images via the use of algorithms. From the procedures it will be shown that the pixels which constitute images can be mathematically manipulated to reduce noise thereby refining an image's appearance.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 56****Type I Palladacycle-Catalyzed Addition Reactions of Arylboronic Acids with Aromatic Aldehydes**

Mathew Israel and Yuan-Xi Liao

Faculty Mentor: Dr. Qiao-Sheng Hu  
Department of Chemistry

The addition reactions of arylboronic acids with carbonyl-containing compounds constitute some of the most attractive methods to access arylmethyl alcohols, imines and ketones because arylboronic acids are readily available, air/moisture-stable. Rh(I), Ni and Pd(II)-catalyzed such addition reactions have been previously reported. However, reported catalyst systems suffer from low catalyst activity and/or selectivity. It is significant to develop more efficient catalyst systems for such addition reactions, especially under mild conditions.

Type I palladacycles have been previously found to be effective catalysts for the addition reaction of arylboronic acids with aldehydes.<sup>1,2</sup> To gain more insight information, we undertook the study of the influence of bases for this catalyst system. We found that the use of different amounts of base has great impact on the reaction rate. This finding could be very useful for the development of more efficient catalysts for the addition of arylboronic acids with aldehydes.

**Acknowledgments**

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**References:**

1. He, P.; Lu, Y.; Dong, C. G.; Hu, Q.-S. *Org. Lett.* 2007, 9, 343-346.
2. He, P.; Lu, Y.; Hu, Q.-S. *Tetrahedron Lett.* 2007, 48, 5283-5288.

**POSTER # 57****Transition Metal-Catalyzed Addition Reactions of Arylboronic Acids with Aromatic Aldehydes**

Jin-Rong Zheng

Faculty Mentor: Dr. Qiao-Sheng Hu  
Department of Chemistry

The addition reactions of arylboronic acids with carbonyl-containing compounds constitute some of the most attractive methods to access arylmethyl alcohols, imines and ketones because arylboronic acids are readily available, air/moisture-stable. Rh(I), Ni and Pd(II)-catalyzed such addition reactions have been previously reported. However, reported catalyst systems suffer from low catalyst activity and/or selectivity. It is significant to develop more efficient catalyst systems for such addition reactions, especially under mild conditions.

My summer research focused on the use of several readily available transition metal complexes including Ni(0) and Rh(I) complexes as catalysts for the addition reactions of arylboronic acids with arylboronic acids. With Rh(I) complexes as catalysts, excellent results were obtained.

**Acknowledgments**

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*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 58**

**A Musical Interpretation of Caryl Churchill's *Vinegar Tom***

Gerrianna Cardito, Composer/Music Director

Faculty Mentor: Professor William R. Bauer  
Department of Performing and Creative Arts

During the spring term of 2007, Professor Lee Papa selected me to compose, produce, and direct the music for CSI's Fall 2007 production of Caryl Churchill's *Vinegar Tom*. A comedy that uses sexual connotation and mischievous characters to make serious points, the play takes place in England's Middle Ages during a time when women faced the threat of witch-hunts. The message of the play addresses such important topics as women's rights, abortion, religion, molestation, and politics. Written over thirty years ago, the dramatic piece has continued relevance to this day: even now, there are places in the world where witch hunts still threaten women's lives and safety.

The creative challenge I faced was this: How do I keep Caryl Churchill's lyrics, negotiate the play's delicate balance between humor and grimness, and get her political message across with up-to-date music that would appeal to listeners in 2007? In order to meet this challenge, I had to apply all of the skills that I learned in my studies at CSI.

While reading the script, I put myself in each character's shoes. I imagined each character's situation until I felt I had lived in his or her world and understood his or her full purpose/role in the play. From that preparation, I quickly sketched out the vocal line to the eight songs for which Churchill wrote the lyrics. I then shared my musical ideas with the director, Lee Papa, to ensure that my approach would be consistent with his vision of the production as a whole.

In order to get each song to make sense, I had to fit the lyrics into a musical meter (written as the time signature). For each song, I also had to rearrange the lyrics to create a musical form/roadmap (for example, the organization of music into verses and refrains). Singing the lyrics out-loud enabled me to create convincing melodies to fit the words. The words' emotional content affected my choice of tempo and rhythm. I cut some words from the original lyrics in order to fit the phrases into the time signature, often creating a new rhyme scheme

in the process. This approach helped me to make the words of the songs understandable to listeners, even though Churchill's lyrics often involved complex imagery and many words per line. In collaboration with members of the play's pit ensemble, I created arrangements for two guitars, bass, and drums. I also arranged the vocal line so that I could sing back-up vocals to one of the production's cast members. During rehearsals for the play, I also worked with the instrumentalists to create other musical cues to smooth transitions between scene changes.

The music I created for *Vinegar Tom* brought this feminist drama into the 21<sup>st</sup> century and gave its still-relevant message an immediacy that it would have lacked had Professor Papa used the play's original score. I am able to gauge the effectiveness of my creative process in part from the audience's positive response to the play as a whole and to the songs in particular. But I also fulfilled my own creative vision of the project by realizing the possibilities that lay waiting to surface in the raw materials I chose to work with.



**POSTER # 59**

**Motor Development of *Pan troglodyte*, Natsuki**

Virginia Dawkins

Faculty Mentor: Dr. Sonia Ragir  
Department of Sociology, Anthropology and Social Work

I observed and coded the emerging coordinated movements of a newborn chimpanzee (*Pan troglodytes*) prior to the achievement of major milestones in the motor development. This research complemented and extended a previous study (2006) based on observations from the same video records covering 0-17 weeks of development and focused on the increasing integration of head, limb, and trunk movements of an infant chimpanzee, Natsuki. The Great Ape Research Institute in Okayama, Japan, where Natsuki was born in 2005, provided video footage.

The 2006 study identified and correlated developmental milestones (sitting, standing, and walking) with time of maturation (weeks of age). In this follow-study, movements of head, limbs and trunk are being coded from the same video footage in greater detail in order to identify patterns of motor activity *preceding and following the emergence and stabilization of developmental milestones*. Changes in infant-mother dependency are noted as new behaviors emerge.

Patterns of movement include synchronous, non-synchronous and alternating movements of hind and rear limbs, as well as movements of the head and trunk. Identifying patterns of movement preceding milestones would provide a better understanding of the experiential foundation for the surprisingly rapid development of chimpanzee motor skills between seven and eleven weeks reported in the 2006 study.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 60**

**Aerodynamic Simulation to Reduce Drag and Increase Automotive Efficiency**

Michael Raghunath

Faculty Mentor: Professor James Hladek, P.E.  
Department of Engineering Science and Physics

In this day and age, the price of gas has been soaring higher and higher as time goes on. People cringe when they drive down the road to the neighborhood gas station and see the prices fluctuate within the range of \$3.30 to \$3.60 per gallon. Due to the war overseas and because of the limited means for acquiring oil, there doesn't seem to be a decline in oil prices in sight. In addition to economics, the direct relationship between gas consumption and automotive pollution is detrimental to the environment due to emissions of greenhouse gasses.

This information served as a great motivation towards researching a way to help alleviate the economic stresses due to gas prices by aerodynamically testing whether we can save money by altering the profile shapes of today's automobiles. This research involves theoretical analysis of oil consumption, consumer cost, global warming, and air pollution. I will explore the meaning of "drag", its relation to the Bernoulli Principle and stagnation pressure, and its effect on automobiles. Using advanced fluid dynamics theory with a concentration in stream flow, I will look into a way to minimize the drag on a car from a single perspective within specific boundary conditions. Using this information, perhaps there is a way to assuage the concerns of those who are commuters and depend on their cars to take them and their families from one place to another.

**POSTER # 6 1**

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**Productivity of Song Birds After Spraying for West Nile**

Allison Santora

Faculty Mentor: Dr. Richard Veit  
Department of Biology

Bird populations in urban environments overlap broadly with humans and are therefore susceptible to anthropogenic activities. For example, habitat degradation via forest fragmentation and the introduction of pollutants may detrimentally affect the breeding biology of native and migratory species of songbirds. One way to assess growth and health of bird populations is to measure reproductive success. This is calculated by measuring the proportion of juveniles relative to adults produced in a given breeding season. We used standardized mark-recapture techniques to track bird population dynamics over 10 years (1997-2007). Our objective is to measure reproductive success of songbirds in the NYC area to examine inter-annual variability of reproductive success for Gray Catbird, American Robin, Cardinal and Wood Thrush. We combine our index of reproductive success with physical indices such as mean precipitation, and air temperature to test whether bird reproduction varies with basic environmental parameters. During the 1999/2000 seasons an outbreak of West Nile Virus elicited a rigorous attempt to eradicate mosquitoes using insecticides. Since songbirds rely heavily on insects as a primary food resource it is probable that food shortages during this time negatively affected bird reproduction. We compare reproductive success of birds before and after insecticide spraying events to determine if spraying may be related to poor reproduction of birds.

*\*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*

**POSTER # 6 2**

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**Stimulation-Dependent Release of <sup>3</sup>H-D-Aspartate (a Glutamate Analog) from Electrically Stimulated Axons In Vitro.**

Anne Gomez

Faculty Mentor: Dr. Andrzej Wieraszko  
Department of Biology /Program in Neuroscience

It was once assumed that neurotransmitter release from one nerve cell to the next only occurred between the pre- and post-synaptic membranes. However, recent experimental evidence indicates that sites of synaptic vesicle exocytosis may not always occur between these membranes. For example, vesicular glutamate release at axonal membranes in the corpus callosum has been discovered. In this experiment, segments of mouse peripheral nerves of similar lengths were used. These segments were placed in three separate perfusion chambers filed with Ringer's containing 3H D-Aspartate. D-Aspartate is used because it is a nonhydrolyzable analog of glutamate. The chambers were then perfused with Ringer's and samples of the perfusate were collected every 3 min. accordingly. The nerves were electrically stimulated twice at the sample number 10. This stimulation mimics depolarization the depolarization of the nerves in vivo during propagation of an action potential. Once all the samples were collected, they were counted in the scintillation counter to determine the release of the <sup>3</sup>H-D Aspartate. To evaluate nonspecific release a <sup>14</sup>C-Proline was used instead of D-Aspartate. Some experiments were performed in Ca<sup>2+</sup>-free Ringer's to determine whether or not the neurotransmitter release is Ca<sup>2+</sup> dependent. It has been found that electrically stimulated axon releases neurotransmitter. This release was specific and was partially calcium-dependent.

**POSTER # 63**

**13-month-old Perseverative Behaviors**

Natasha Hernandez and Paula Bartelli  
 Faculty Mentor: Dr. Sarah Berger  
 Department of Psychology

Perseveration is defined as the inability to inhibit repeated behaviors. Much developmental research on perseveration is an attempt to figure out why perseveration is such a common error in infancy. Previous work has compared infants' ability to inhibit across different contexts. For example, current research shows the effect of locomotor expertise on perseverative behaviors for infants 12 months and younger. In contrast, my thesis investigated walking infants' ability to inhibit and whether new walkers or experienced walkers perseverated when given a difficult task. To test this theory, experienced walkers and new walkers were given an easy and difficult locomotor task requiring them to take a path to goal and then switch paths to find the goal at a new location. Perseveration was measured by the path infants chose, the number of times the infant changed direction, the locomotor method (crawl or walk) they started the task with and how many times they switched locomotor methods. In the difficult task, new walkers perseverated because they had yet to master the skills required for walking and balancing. Results supported the cognitive capacity theory. New walkers perseverated more than experienced walkers because new walkers were so focused on walking and keeping their balance that they were unable to direct their attention onto other available resources needed to complete the task.

**POSTER # 64**

**Does Store Atmosphere Affect Consumers' Behavior?**

Valentina Assenova, Julia Handel, and Sehrish Khan  
 Faculty Mentor: Dr. Irina Sekerina  
 Department of Psychology

How do different elements of a store layout, such as shelving layout, merchandise arrangement, cleanliness, lighting, spaciousness, and time to check out, influence how much money and time customers spend in the store? We will examine the effect of a number of such store layout elements using two research methods, an interview with the store manager and a survey of customers in the store. We will focus on one of the stores in the Pathmark chain, a large supermarket chain. In our interview with the store manager, we will identify strategies that the store uses to attract and retain customers. This will allow us to establish the four elements of the store layout that the manager perceives as the most important for customers' satisfaction. Using these four elements, we will create a 15-to-20 question survey. The first set of questions on the survey will ask customers to rate on a 10-point Likert scale (a) the elements of the store layout that they like, (b) the ease with which they find the items they are looking for, (c) employees' helpfulness and friendliness, and (d) the situation with check out. The second set of questions will ask customers to provide their estimates on how often they come to the store, and how much money and time they spend in it. Data from the survey will help the store management to identify the most effective elements of the store layout that lead to customers' satisfaction and better business informed by the psychological science.

**POSTER # 65**

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**The Effect of Gender on the Behavior of Drinking Games**

Jennifer Blake, Gabriella Gomez, Staphania Nicolas, and William Schoenhardt

Faculty Mentor: Dr. Irina Sekerina  
Department of Psychology

Drinking games have become a large part of the college social scene, especially among women. The goal of this study is to compare gender differences in behavior during drinking games with special attention on women's behavior, i.e., how much alcohol women consume in such games. We will recruit two groups of CSI students who will be asked to fill out an on-line survey on a weekly basis that tracks their behavior during drinking games. We will precede the administration of the survey by observing a number of college drinking parties that will allow us to create questions to be included into the survey. We predict that women will be less likely to participate in college drinking parties, but when they do participate, they will be consuming more alcohol than their male counterparts. The results of our study will help clarify the changing trends in college drinking games: from women not participating in drinking game activities in the past to active participation and equal or even heavier alcohol consumption today. They will also serve as an important warning of danger associated with increased binge drinking among female college students which is frequently overlooked.

**POSTER # 66**

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**The Effect of CSI Academic Learning Communities on Students' Coping Behavior**

Mayatu Cooper, Jiayi Liang, Sharmila Mohammed, and Margarita Ruiz

Faculty Mentor: Dr. Irina Sekerina  
Department of Psychology

Taking tests, writing papers, preparing and attending classes all constitute the core components of any student's academic life. They are also the main factors that cause the most stress, on a par with job- and family related stress. In the proposed study, we will study how CSI students cope with academic stresses and will attempt to evaluate whether academic support may alleviate them. We will compare three groups of beginning CSI students: those enrolled in the FIRST learning community, those in The Verrazano School community, and those from the general student population. Our goal is to see how students in the two types of learning communities (experimental groups) with special built-in academic support systems cope with stress in comparison to those in the general student population (control group) with no such support. We will recruit students from PSY 100 sections, 25 for each of the three groups of interest, and administer an existing scale that measures students' coping strategies in response to academic stressors. Our prediction is that the CSI students from the learning communities will report being able to cope with stress better than the general population students with no special built-in academic support system. We hope that our results may be useful to the CSI administration in demonstrating the effect academic support has on students' ability to cope with stress and encourage them to extend additional academic support to the general CSI student population.

**POSTER # 67**

**Infant Communication During a Problem Solving Task**

Tara La Perla

Faculty Mentor: Dr. Sarah Berger  
Department of Psychology

Communication begins as young as four months for the average person. Infants usually start this process of communicating with cooing, babbling, and giggling. Verbal and nonverbal abilities begin to develop as the infant grows. As the infant becomes more independent in their environment they are exposed to more cues of communication and eventually begin to use words or body gestures. Infants are notorious for using their bodies to communicate their desires. In this experiment, 16-month-old infants cross bridges of various widths. Sometimes a handrail is available, but on some trials there is no handrail. The aim of this study is to see if 16 month old infants can communicate differently using nonverbal and verbal behaviors depending on risky or safe situations. It is hypothesized that behaviors indicating a risky task of crossing the bridge may include the child avoiding to step onto the bridge, the infant using the handrail as a guide to get across, the infant turning to avoid the bridge, or the infant refusing to walk across to the other side of the bridge.

**POSTER # 68**

**Beginning at “I Can’t”: How Nina Can Learn to Soar**

Joan A. Seguin

Faculty Mentor: Dr. Charles Liu  
Engineering Science and Physics

HON 501 Interdisciplinary Seminar

The purpose of this project is to examine Anton Chekhov’s *The Seagull*, in particular the role and development of Nina in the play. Nina’s journey from a naïve adolescent with hopes and dreams to an adult who has been pecked at by the real world’s beak transforms her into an injured sea gull. However, in the end, Nina learns how to soar. In order to take flight once again, the character rights the wrongs that she has done and that have been done to her. The project examines the influence Nina’s parents had on her development, her desire to imitate the older actress Arkadina, and Nina’s complex love affairs. After experiencing leaving home, a tumultuous acting career, and motherhood, it is only when she revisits nature does she become an artist and a new self. This young female is able to withstand the rejection, fear, and severe loss, managing to find herself now both in the country and the city, in art and in love. What was once a carcass with no hope for revival has matured into a sea gull, one that is attracted to its country water roots, but also one who is not afraid to fly away and experience the ebbs and flows of life.

**POSTER # 69**

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**Spectroscopic Properties of Narrow Emission Line Galaxies in the COSMOS Field**

<sup>1</sup>Amy Colon, <sup>2</sup>Patti Carrol, <sup>1</sup>Nettie Wong, and <sup>3</sup>Robin Roberts

Faculty Mentor: Dr. Charles Liu  
Department of Engineering Science and Physics  
HON 501 Interdisciplinary Seminar

We present properties of seven narrow blue emission line galaxies (NELGs) in the redshift range  $0.25 \leq x \leq 0.73$ , initially selected as QSO candidates in the COSMOS 2-square degree survey field. These galaxies are selected for the high signal to noise ratio of their spectra, as indicated by the presence of the emission line [NeIII]  $\lambda 3869$ . Emission line diagnostics are used to measure metallicities, star formation rates and to test the presence of AGN. Hubble ACS images are used to measure their surface brightness distribution and quantitative morphologies. Preliminary results indicate that these objects are forming stars at a rate of 9 to 68 solar masses per year; have low metallicities ( $7.77 \delta$  x  $\delta$  8.76). Emission line diagnostics show that four of these seven galaxies may harbor AGN.

<sup>1</sup>Hunter College - CUNY

<sup>2</sup>Sienna College

<sup>3</sup>City College of New York - CUNY

**POSTER # 70**

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**Entropy in Postmodern Literature**

<sup>1</sup>Talal Choudhury

Faculty Mentor: Dr. Charles Liu  
Department of Engineering Science and Physics  
HON 501 Interdisciplinary Seminar

The concept of entropy has captured the minds of writers and artists across the globe. However, this transition was not immediate. Since entropy's inception, it has taken almost a century for contemporary writers to begin experimenting with entropy. While many authors merely included fancy thermodynamic terms, a few authors captured the concept dead-on. These authors include Thomas Pynchon and Isaac Asimov. Educated in the sciences, these authors employed their scientific knowledge of entropy into their novels and short stories. This paper surveys Thomas Pynchon's use of "entropy management" in his short story, "*Entropy*" and his novel, *The Crying of Lot 49*. Isaac Asimov's use of entropy is explored in his short story, "*The Last Question*." Both of these authors successfully utilize the concept of entropy and express their praise and understanding of the second law of thermodynamics.

<sup>1</sup>Brooklyn College - CUNY

**POSTER # 7 1****Women: Paving The Way to Better Democracy and Development**<sup>1</sup>Reshma Shah

Faculty Mentor: Dr. Charles Liu  
 Department of Engineering Science and Physics  
 HON 501 Interdisciplinary Seminar

The achievements of women tend to be recognized when women reach the highest levels of political life and become heads of state. Female leaders such as Benazir Bhutto and Tansu Ciller, in Pakistan and Turkey respectively, have been viewed as democratic leaders who have made efforts towards better development. These women at the top have not been successful in opening up spaces of opportunity for women. Bhutto and Ciller, among many other well renowned females that have held positions of high esteem, are merely tokens of women-power because they have provided nothing more than lip service to the women in their country. This paper focuses on the women at the local level in India who are laying stronger foundations for democracy and development. While analyzing the work that women in India are taking part in politically through the local Panchayat systems, I also look to India's colonial history, which helps to explain the status of the developing country and its people today. If women in the developing world are ever to take on leadership roles, access to education is one of the key requisites. Recognizing its importance, there is an in-depth discussion on women's education within the state of India. In addition, a comparison study is done between the states of Kerala and Rajasthan, which have stunningly divergent literacy statistics. With the help of education and micro credit programs that assist in pulling women at the grassroots level out of poverty, women are making great contributions to the social, political and economic capital of the country. This paper proves that for better democracy and development the focus should be on the women at the bottom and their practical gender interests, rather than idolizing the rare women at the top.

<sup>3</sup>City College of New York - CUNY**POSTER # 7 2****Becoming a Reflective Practitioner**

Susan Jaquish and Vjolca Mehmedovic

Faculty Mentor: Dr. Judit Kerekes  
 Department of Education

This analysis indicates our findings from a three week case study of a third grade class in which students explored the relationships between measurement and spatial relations. The goal of this study was to examine students' ability to correlate a concrete operation such as measurement to a more abstract concept such as spatial relations, as well as area. The culminating activity for this study included the designing of a bulletin board by the students. This exhibit would display the compilation of work they completed in order to develop the concepts necessary to successfully design the bulletin board. Working in small groups, we began by determining the level of prior knowledge the students held about spatial relations and the properties of shapes. We reflected upon the students' demonstration of knowledge and determined that they needed further instruction in more concrete concepts such as measurement in order to gain a deeper understanding of spatial relations. Through the use of measurement, we were able to further their understanding of the concrete relationships that exist between shapes. Using their newly developed skills, students were able to transfer that knowledge to a more abstract concept such as designing the bulletin board that would display the compilation of work they undertook throughout the three week process. We concluded that without a strong mathematical foundation in concrete concepts such as measurement, students are unable to visualize more abstract concepts such as spatial relations. Becoming a reflective practitioner is a necessary element in evaluating the pedagogical methods used in teaching abstract concepts such as spatial relations. Reflective practices allow educators to improve upon methods utilized in previous lessons to enhance students' comprehension of the concepts presented.

**POSTER # 73**

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**Integration of Multilayer Microchannels on VCSEL Arrays**

Dana Galla

Faculty Mentor: Professor John Hladek, P.E.  
Department of Engineering Science and Physics

Multilayer microchannels made from SU-8, a photosealable polymer, were generated on VCSEL (Vertical-Cavity Surface-Emitting Laser) arrays for optical cell sensing. The multilayer microchannels have advantages over single-layer microchannels because it creates complex systems. The channels were fabricated using lithography techniques on prepared VCSEL arrays on a three-inch GaAs wafer. The microchannels and wire bonding were successfully integrated on the VCSEL arrays.

**POSTER # 74**

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**Designing and Fabricating an Intelligent Robot**

Ben Tsui

Faculty Mentor: Professor James Hladek, PE  
Department of Engineering Science and Physics

The conceptual design, procurement of components, assembly and debugging of electronic circuits for testing and fabrication of the ROBOT itself, proved to be a more difficult and time consuming task than was expected. The project was undertaken to enter the 2008 IEEE Robot-Maze Competition and was accepted as the project for senior design. Treated as an actual engineering project in industry, the problem of building a working robot became secondary to the process used by engineers to design, develop and produce new products. The experience and knowledge gained from this project far outweighed what is secured in standard engineering courses. It might best be said that this "Intelligent Robot" taught me how little I actually knew about engineering.

**POSTER # 75**

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**Recognizing Sleep Apnea in Infants**

Mahdi Jawad

Faculty Mentor: Professor James Hladek, P.E.  
Department of Engineering Science and Physics

Sleep apnea is a common medical disorder that can be serious. In sleep apnea, your breathing stops or gets very shallow during the sleep period. Each pause in breathing typically lasts 10 to 20 seconds, sometimes more, while normal breathing occurs every 5 - 7 seconds. These pauses can occur 20 to 30 times an hour or more in some cases. Infants can experience this disorder, but since they can not describe the problem, their guardians must recognize the symptoms which are often vague and hard to pinpoint. For example, one symptom of Sleep apnea is increased fatigue and sleeping. How does one recognize this is a symptom when normal infants sleep 16 hours a day?

Sleep apnea has been shown to effect brain development in infants and has been linked to ADHD (Attention Deficit Hyperactive Disorder) and SIDS (Sudden Infant Death Syndrome).

I am researching the breathing habits of infants in sleep and will develop a convenient, effective, and reliable technique for recording any episodes of apnea that may occur throughout the infant's sleep period. The developed system will signal the guardians of all apnea episodes throughout the sleep, advise the guardians to see a physician immediately if a problem is perceived and produce a permanent record of the infant's breathing for proper medical diagnosis and treatment.



## Undergraduate Conference on Research Scholarship and Performance Faculty Mentors

<b>N A M E</b>	<b>D E P A R T M E N T</b>	<b>P O S T E R #</b>
Alejandra Alonso	Biology and Center for Developmental Neuroscience	19, 39
Neo Antoniades	Engineering Science	54
Probal Banerjee	Chemistry, Neuroscience And the MMA institute	18, 48
William R. Bauer	Performing and Creative Arts	58
Sarah Berger	Psychology	49, 63, 67
Patricia Brooks	Psychology	12, 42
Kathleen M. Cumiskey	Psychology	27
Abdeslem El Idrissi	Biology	5, 14, 52, 53
Jimmie E. Fata	Biology	4, 29, 37
Robert L. Freedland	Director, Center for Developmental Neuroscience and Developmental Disabilities	31
Natacha Gueorguieva	Computer Science	22, 24, 26, 28
Darryl Hill	Psychology	11, 32, 40
James Hladek	Engineering Science	60, 74, 75
Qiao-Sheng Hu	Chemistry	2, 16, 56, 57
Susan Imberman	Computer Science	43
Judit Kerekes	Education	72
Athanasios Koutavas	Engineering Science and Physics	3, 41
Michal Kruk	Chemistry	15, 30, 34, 36
Anatoly Kuklov	Engineering Sciences/Mathematics	46
Carlo Lancellotti	Mathematics	7
Alfred Levine	Engineering Science	20, 54
Lihong Li	Engineering Science & Physics	55
Charles Liu	Engineering Science & Pysics	68, 69, 70, 71
Margaret Lunney	Nursing	35
Michael Mandiberg	Communications	50
Dan McCloskey	Psychology and Program in Developmental Neuroscience	31
Edward F. Meehan	Psychology	8
Fred Naider	Chemistry	21
Jonathan R. Peters	Business	51

## Faculty Mentors

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Bertram Ploog	Psychology	42
Andrew Poje	Mathematics	17, 33
Sonia Ragir	Sociology/Anthropology	59
Krishnaswami Raja	Chemistry	45
Irina Sekerina	Psychology	10, 23, 44, 64, 65, 66
Chang-Hui Shen	Biology	25
Chwen-Yan Shew	Chemistry	9, 13
Mathew Solomon	Media Culture	38
Deborah Sturm	Computer Science	47
Richard Veit	Biology	61
Andrzej Wieraszko	Biology/Program in Neuroscience	62
Siona Wilson	Performing and Creative Arts	6
Zhanyang Zhang	Computer Science and Biology	1

## **Undergraduate Research Conference Committee**

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