CSI UNDERGRADUATE RESEARCH CONFERENCE*

April 26, 2007
Center for the Arts, 1P-Atrium
1:00pm - 4:00pm

Conference Schedule
12:15pm - 1:15pm  Authors and Mentors Lunch
1:00pm  Opening Remarks by President Springer
         1P Second-Floor Lounge
1:30pm - 4:00pm  Poster Presentations
         1P Atrium

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

It is indeed a pleasure that the College of Staten Island is hosting its sixth annual Undergraduate Research Conference. Its continuing theme “Your Passport to Knowledge,” underscores the importance of the pursuit of knowledge, academic excellence, and scholarly research. I strongly believe that learning takes place both inside and outside of the classroom. The projects undertaken by our student scholars with the guidance of their faculty mentors and presented at this conference are testimony to in-depth learning and shared accomplishments starting in the classroom and continuing outside. As always, I take great pride in these accomplishments and congratulate all of the student scholars and their faculty mentors. I commend them for their hard work, dedication, and collaboration in designing, undertaking, and completing these projects.

Conducting research, in my view, is an enterprise with no disciplinary boundaries, although unique approaches and methods best serve each of the disciplines. Scientists, for example, conceive and conduct experiments in their laboratories; social scientists engage in fieldwork and analyses of problems; artists, through years of rigorous preparation, perform, compose, and expand the creative possibilities of human expression. I am always fascinated, encouraged, and inspired by the engagement of our students with their faculty mentors in the collaborative pursuit of knowledge, particularly as I know it will serve to strengthen their critical thinking skills, increase the understanding of their disciplines, and provide greater appreciation for inquiry.

I am very proud of the diversity of the academic disciplines represented at the Conference and the number of undergraduate students mentored by faculty members. This year the presentations include research in the natural sciences, mathematics, social sciences, and the humanities. It is also important to note that the College supported 15 of our students’ research projects through CSI Undergraduate Research Awards sponsored by the CSI Foundation, Northfield Bank, my office, and faculty grants. I am pleased that our students and faculty made excellent use of the Undergraduate Research Awards to further their intellectual pursuits in the disciplines of their choice.

We all know that a College-wide conference of this magnitude requires a great deal of planning and many organizational hands. I want to express my sincere appreciation to the faculty, students, and staff on the conference committee who invited conference abstracts and organized the event. Equally deserving are our student-faculty research teams that contributed to making this sixth annual conference a success. I would be remiss in not gratefully acknowledging the continued financial support for the conference provided by the CSI Student Government Academic and Curricular Affairs Commission, and the CSI Foundation.

I encourage more students to participate in the 2008 “Passport to Knowledge” as we continue on our lifelong journey dedicated to learning. Let me once again congratulate and thank all of the presenters and their faculty mentors and wish them success in future projects.
Research Poster Presentations
Research Poster Presentations
April 26, 2007
Center for the Arts, 1P-Atrium
1:30 p.m. – 4:00 p.m.

1. Sonya Larsen and Cristina Parasole
   Mentor: Eileen Gigliotti
   Department of Nursing
   Finding the Evidence for Evidence-Based Practice: Caregiver Support

2. Sandrine Tchatie
   Mentor: Tobias Schaefer
   Department of Mathematics
   European All Option: Binominal Tree Vs Black-Scholes Model

3. Thomas Jose and Mohammad Durrani*
   Mentor: Lihong (Connie) Li
   Department of Engineering Science and Physics
   Noise Reduction and Brain Tissue Classification in MR Images

4. Thomas Jose and Mohammad Durrani*
   Mentor: Alexander Zaitsev
   Department of Engineering Science and Physics
   Temperature Micro Sensor Based on Carbon Nanowires

5. Eric Lehrer
   Mentor: Tobias Schaefer
   Department of Mathematics
   Protein Folding as a Random Walk in a Rough Potential

   Mentor: Abdeslem El Idrissi
   Department of Biology and Center for Developmental Neuroscience and Developmental Disabilities
   Taurine Improves Learning and Retention in Aged Mice

7. Ismael Yacoubou Djima
   Mentor: Yitzhak Shnidman
   Department of Engineering Science and Physics
   Flow-Deformed Conformations of Entangled Polymers as Persistent Random Walks

8. Karen Pastore*
   Mentor: Darryl Hill
   Department of Psychology
   Love Will Tear Us Apart: Identity and Intimacy in Breakups

9. Afshan Hussain*, Solomon Gulyamov
   Mentors: Krishnaswami Raja and William L’Amoreaux
   Department of Chemistry, Institute for Macromolecular Assemblies, Center for Engineered Polymeric Materials (CePM); Department of Biology
   Protein Polymer Hybrids for Enhanced Antibody Based Targeted Imaging and Therapy

10. Solomon Gulyamov, Wei Shi, Afshan Hussain*, Krishnaswami Raja
    Mentor: Krishnaswami Raja
    Department of Chemistry, Institute for Macromolecular Assemblies, Center for Engineered Polymeric Materials (CePM);
    Novel Curcumin Avidin Conjugates Using “Click Chemistry”

11. Snigdha Banerjee*
    Mentors: Patricia Brooks and Bertram Ploog
    Department of Psychology
    The Perception of Speech Prosody in Autism

12. Karamatou Yacoubou Djima
    Mentor: Andrew Poje
    Department of Mathematics
    Limitations of Melnikov Analysis in an Example of Fluid Mixing

13. Carlo Montagnino*
    Mentor: Michael Mandiberg
    Department of Media Culture
    Real Costs

14. Daniel Agman*
    Mentor: Susan Imberman
    Department of Computer Science
    Accommodative Esotropia: Diagnosis Through Decision Tree Analysis

15. Nicole Greener
    Mentor: Grace Mitchell
    Department of Sociology, Anthropology, and Social Work
    The Sub-Minimum Wage: A.K.A. A Slow Death Sentence in Disguise
16. Katie Nuzzo*  
Mentor: Sarah Berger  
Department of Psychology  
*Do Older Siblings Influence Younger Siblings’ Motor Milestone Achievement?

17. Kevin Peters* and Katherine Clarke  
Mentors: Edward F. Meehan and Anita Conte  
Department of Psychology  
The Effects of Flight Case Social Experience and Experimental Procedures on Stress & Well-Being in Individually Housed Laboratory

18. Eric C. Jackson*  
Mentor: Matthew Solomon  
Department of Media Culture  
A Survey of African American Magic: Nineteenth Century to Present

19. Nathalia Nunez and Sonia Ninan  
Mentor: Sarah Berger  
Department of Psychology  
It’s on B, Not A!

20. Wanda Calamia° and Marc Hansen°  
Mentors: Sandra Gambetti and Craig Manister  
Department of History  
Department of Performing and Creative Arts  
Restoring the Parthenon Casts

21. Frances Schultz*  
Mentor: Irina Sekerina  
Department of Psychology  
Language Processing in Monolingual and Bilingual Speakers of English

22. Richard Pascale  
Mentor: Patricia Brooks  
Department of Psychology  
Exploring Word Retrieval in Elderly Adults

23. Melissa Ciccarelli  
Mentor: Arlene T. Farren  
Department of Nursing  
Magnet Status of Hospitals and Nurse Satisfaction: What is the Evidence?

24. Dina Elsibay*  
Mentor: Kathleen M. Cumiskey  
Department of Psychology  
Measuring People’s Attitudes toward Public Mobile Phone Use: Paradoxes, Preferences, and Perceptions of Public Safety

25. Matthew Luberto*  
Mentor: Natacha Gueorguieva  
Department of Computer Science  
Olfactory Bulb: Modeling of Inhibition/Excitation Firing Through Spiking Neurons

26. Ohnmar Myint  
Mentor: Natacha Gueorguieva  
Department of Computer Science  
Feed-Forward Neural Network with Backpropagation: Learning and Classification

27. Jahanzeb Syed Ahmed  
Mentor: Natacha Gueorguieva  
Department of Computer Science  
Management Information Systems Solutions in Today’s Organization

28. Johnna Sanzari  
Mentor: Nan Sussman  
Department of Psychology  
The Effects of Self-Construal on Reentry Adjustment

29. Soumitri Seshadri  
Mentor: James Hladek  
Department of Engineering Science and Physics  
Combustion of off-stoichiometric Al-MoO3 Nano-Composite Powders in Dry Air

30. Francoise Sidime  
Mentors: Krishnaswami Raja, Ralf Peetz, and William L’Amoreaux  
Department of Chemistry, Department of Biology  
Click Chemistry Route to Conducting Polymer Biochips

* 2006 Summer Undergraduate Research Fellowship recipient sponsored by Northfield Bank  
* 2006 Summer Undergraduate Research Fellowship recipient sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants  
° 2006 Summer Undergraduate Research Fellowship recipient sponsored Matthew Mirones, Mary Chrampanis, Stamos Zades, AHEPA Staten Island Chapter, and AHEPA Education Foundation
The Nursing Interventions Classification System (NIC) is an organized listing of nursing interventions that are proposed to enhance patient health. However, conclusive research supporting these interventions is scarce. This demonstrates the need to provide research support for the NIC interventions. The foundation of this study is based on the work of Skalski, DiGerolamo, and Gigliotti, published in the October 2006 edition of the Journal of Advanced Nursing. They found that caregivers experience the most stress due to the overwhelming burden they feel while caring for their loved ones. They proposed that further research be done to support the NIC intervention Caregiver Support (7040).

The purpose of this study is to find research to support the use of Caregiver Support activities as defined by the NIC. Melnyk and Fineout-Overholt’s (2005) evidence-based practice PICO model was used as a guide to formulate the research question: Does education and support influence caregiver wellbeing in family members who are caring for elderly dementia patients? A literature review was conducted using CINAHL, MEDLINE, PsycINFO, HealthSource, Nursing Sage Collection, and the Cochrane Database of Systematic Reviews. Relevant articles were critically analyzed for the best evidence related to the effectiveness of caregiver support activities.

Multi-component interventions including education and support are most effective to increase caregiver wellbeing in caregivers of elderly dementia patients. Recommendations for clinical practice include using multi-component interventions individually, tailoring interventions to the caregivers’ characteristics and preferences, and offering long term sessions. These recommendations will produce profound and favorable outcomes for the caregiver.

Poster #1

Finding the Evidence for Evidence-Based Practice: Caregiver Support

Sonya Larsen and Cristina Parasole

Mentor:
Eileen Gigliotti

Department of Nursing
We present two methods of pricing European call options. The first method follows the Black-Scholes model, leading to an analytical formula for the option value. The second method is based on Binomial Trees using a discrete step in time. By choosing the parameters appropriately, the continuum limit of the Binomial Tree model coincides with the Black-Scholes model. For a finite step-size, however, the models yield different option prices. We compare numerically the results of both pricing models and quantify their difference.
Our research addressed the filtering of noise during data acquisition in medical imaging. Scanned images of the brain encounter poor signal-noise ratio and electrical interference within the system, which results in the image losing its quality. To resolve this problem we came up with two possible filtering solutions: either applying the mean or median filter. After investigating both filters we found the median filter was more efficient than the mean. We chose to design a 3x3 median filter which would reduce the effect of noise thus allowing the image to retain more of its initial quality. After filtering the images of noise we wanted to make an “atlas” of the brain images. To do so we applied a method known as region growing to the filtered images. The three regions of our focus were grey matter, white matter and Cerebro-Spinal Fluid (CSF). To form a brain atlas of those images after filtering the noise, we also applied a region growing method on the filtered images. The three regions of my main focus were Gray matter, White matter and Cerebro-Spinal Fluid (CSF), thus forming an atlas of filtered brain images.

*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*
A temperature sensor based on an array of carbon nanowires written by 30keV Ga+ focused ion beam on diamond surface has been developed. We fabricated three structures with two contact pads each, along with a comb structure that has nanowires with gaps of 1000nm 500nm and 700nm. These structures were made chemical vapor deposited diamond film. The optimal design achieved for the temperature sensor is the structure with gaps of 500nm between nanowires. Temperature sensitivity of electrical conduction between the nanowires is explained by thermal activation of charge carriers in heterostructure graphite-diamond over an energy barrier of 0.24eV. The sensor shows an exponential increase of current with temperature at a rate of 0.15dB/C in the temperature range from 40 to 100 C. the advantages of the novel carbon nanowires sensor are its light blindness, compatibility with carbon nanotechnology and simplicity of fabrication. These sensors may have a wide variety of applications in medicine, aerospace industry and chemical industry.

*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*
Mathematically, protein folding can be described as a diffusion process along a rough potential. The first way this is analyzed is through Monte-Carlo simulations for the underlying Stochastic Differential equation which will enable us to evaluate the probability distribution of the position and orientation of the protein at varying times. Secondly, we analyze this further through studying the corresponding Fokker-Planck equation. This type of study is of great interest to mathematicians and biologists alike. The ability to understand and furthermore, manipulate the process of protein folding can lead to many medical innovations. One area where this would be incredibly beneficial is in studying treatment options for Parkinson’s disease patients.
Aging of the brain is characterized by several neurochemical modifications involving structural proteins, neurotransmitters, neuropeptides and related receptors. Alterations of neurochemical indices of synaptic function have been considered as indicators of age-related impairment of central functions, such as locomotion, memory and sensory performances. Several studies demonstrated that GABA receptors, glutamic acid decarboxylase (GAD65&67), and different subpopulations of GABAergic neurons are markedly decreased in experimental animal brains during aging. Thus, the age-related decline in cognitive functions could be attributable, at least in part, to decrements in GABA inhibitory neurotransmission. In this study we show that chronic supplementation of taurine to aged mice significantly ameliorated the age-dependent decline in memory acquisition and retention, and caused alterations in the GABAergic system. These changes include increased levels of the neurotransmitters GABA and glutamate, increased expression of glutamic acid decarboxylase and the neuropeptide somatostatin, decreased hippocampal expression of the beta 2/3 subunits of the GABAA receptor, increased in the number of somatostatin-positive neurons, and an increased in the amplitude and duration of population spikes recorded from CA1 in response to Schaefer collaterals stimulation. Such increased excitability of hippocampal slices of taurine-fed mice is consistent with lower threshold for induction of long term potentiation, which would explain the increased learning in these mice. These specific alterations of the inhibitory system caused by taurine treatment oppose those naturally-induced by aging, suggesting a protective role of taurine in this process.

Increased understanding of age-related neurochemical changes in the GABAergic system will be important in elucidating the underpinnings of the functional changes of aging. Taurine might help forestall the age-related decline in cognitive functions through interaction with the GABAergic system.

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

1 Department of Biology

2 Center for Developmental Neuroscience
The modeling of interfacial phenomena in polymer fluids requires the resolution of chain conformations at the Kuhn segment scale. For unentangled chains at thermodynamic equilibrium or under flow deformation, this is accomplished by representing the chains conformations as Wiener (uncorrelated) random walks. But in the case of entangled chains undergoing flow deformation, the stretching and orientation of chain strands between successive entanglements points must embody inertial and diffusive aspects in the random walk model for Kuhn segments. A model with such characteristics is the persistent (correlated) random walk at constant speed on an fcc lattice. It is a second-order Markov process governed by the probabilities for orientations of the initial Kuhn segment in a strand, and by the scattering probabilities for the orientation of successive Kuhn segments relative to the orientation of the preceding one. Using a generalized Green-Kubo relation and the maximum entropy principle, we determine these probabilities from the second moment of the strand’s end-to-end distance. The latter evolves according to the approximate Marrucci-Ianniruberto differential equation that couples affine deformation by flow with strand stretching and orientation relaxing on distinct time scales. The model for strand conformations presented here provides a cornerstone for extending into the entangled regime the recently derived dynamic self-consistent field theory for inhomogeneous polymer fluid in the unentangled regime by Mihajlovic, Lo, and Shnidman.
In recent years, researchers have begun to focus on a topic crucial to the study of human sexuality: the psychological impact of the termination of passionate, intimate, and committed relationships. What does the end of an important relationship mean to one's sense of self? Does the self change after the loss of the other, and, if it changes, how? Sixty undergraduate students (30 men and 30 women) at a large English-speaking university in Montréal, who had experienced a break-up in the last year, participated in this study. Participants were invited to write out the story of their breakup using a computer-based questionnaire. Students' break-up stories were qualitatively analyzed using NVIVO software to identify common patterns and themes in what they said about their identity and their intimate relationship. Many partners felt a loss of identity after the termination of their intimate relationship. Some participants had become aware of their loss of independence and wanted to gain their sense of self back. Others found themselves to be stuck in that uncomfortable dependency, too afraid of being alone. Those participants would have been content repairing the relationship, no matter how futile their attempts. There was clearly a loss of ego common to all of these breakups, however the difference lay in the perspective of the participant and how they began to mend themselves or tear themselves apart thereafter.

*Sponsored by the Northfield Bank*
Humanized monoclonal antibodies (mAbs) have been developed for the treatment of several diseases and for preclinical imaging applications. The mounting success of the antibody molecule as a therapeutic agent is based on the facts that Fab moiety permits antigen binding with exquisite specificity and affinity and a molecular mass of at least 150 kDa permits a circulatory half-life of up to 21 days.

In my research lab, we are proposing to develop a general methodology for using antibodies to deliver cytotoxic drugs, dyes (which serve as drug models), and imaging agents at a high small molecules to antibody ratio without directly covalently modifying mAbs. To establish the chemical feasibility of this approach, antibody binding protein, in our case, recombinant Protein A was conjugated to flourescin PEG-NHS. Protein A molecules have four high-affinity ($K \sim 10^8$/mole) binding sites capable of interacting with the Fc region from IgG of several species; the Fab unit is not involved in the interaction and is free to bind to the corresponding antigens. An efficient anion exchange FPLC based purification method of the Protein A-PEG conjugate was developed. Also, FITC, a small molecule was also conjugated with protein A. The conjugate was characterized by FPLC and employed to target HEla cells. This was imaged using Confocal microscopy.

*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants
Avidin is a glycoprotein that is naturally present in egg white. This 67 kilodaltons molecular weight protein has a very strong affinity for biotin, one of the highest known between any ligand and a protein. Many scientists use this high affinity bond between avidin and biotin to attach a range of molecules like antibodies to quantum dots to make a molecular bridge. Avidin is a tetrameric protein attaching four molecules of biotin per tetramer. In this poster, I will present the exploitation for the biotin avidin interchange for bioconjugation applications. Particularly, using “Click Chemistry”, 3+2 azide-alkyne triazole forming a “click” reaction, I attached a conjugate of Avidin and biotin derivatives with an azide group to the derivative of curcumin with alkyn group on its surface. The azide reacts exclusively with alkynes regardless of any other functional groups in the mixture. This unique reaction takes places remarkably leaving other functional groups alone and untouched. The reaction is run in the presence of copper-(I) catalyst. The synthesis, purification and characterization of a novel curcumin avidin conjugate using FPLC, SDS page and UV Spectroscopy will be presented.

*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants
This study examined the perception of linguistic prosody in autistic individuals through the use of a computer game. Prosody comprises components such as pitch variation and stress variation, which allow for effective communication of affect, focus of attention, and communicative intention. The video game used employs a choice paradigm with training followed by test probes to determine abnormalities in the perception of prosody. Five children diagnosed with autism (7 males, 2 females) and fourteen typically developing (TD) children (10 males, 4 females) were followed for 4-10 sessions. During a training session, participants were presented with two stimuli varying in intonation (question vs. statement) and content. Participants were required to make a choice and select one of the stimuli. Participants’ generalization during the test session reflected which aspects of the stimuli they were attending to. Currently, very little is known about prosodic perception in autistic individuals. This study tested the hypothesis that abnormalities exist in the auditory perception of individuals with autism, resulting in communicative impairment. A major finding was that children with autism had more difficulty than TD children in differentiating the content of phrases versus their prosodic elements.

*Sponsored by Northfield Bank*
The Melnikov function is a measure of the distance between the stable and unstable manifolds of a hyperbolic fixed point of a vector field subjected to a, typically time-periodic, perturbation. The construction of this function relies on the knowledge of the orbit connecting the fixed points of the integrable part of the vector field (the unperturbed separatrix) and is strictly valid in the limit of vanishing perturbation amplitude $\hat{A}$. In fluid mixing problems where the phase space and the physical space coincide, integrals of the Melnikov function can be used to quantify the transport across the perturbed separatrix. The geometry of this advective transport is crucial in determining the mixing of scalar fields governed by the advection-diffusion equation. Here, we conduct a Melnikov analysis for two two-dimensional, time-periodic, Hamiltonian vector fields with a stirring frequency $\hat{\omega}$ as critical parameters. For the first model, a simple cellular flow that leads to transverse intersections of the manifolds, the Melnikov function is a very accurate measure of the transport for all values of $\hat{\omega}$, even for finite values of $\hat{A}$. In the second vector field, which describes the interaction of two Rossby waves, there exists values of $\hat{\omega}$ for which the manifolds intersect non-transversally. We prove that the first order Melnikov analysis is unable to describe this transport geometry. However, the Melnikov function still predicts the frequencies at which such non-transversal intersections occur. Finally, we compute solutions of the advection-diffusion equation and show the range of validity of the Melnikov analysis for determining equi-flux frequencies even in the presence of finite diffusion.
I worked with Assistant Professor Michael Mandiberg on the Real Costs project, which displays the ecological effects of travel and e-commerce. The importance of displaying these effects at the point of sale is to give the user insight as to what the environmental cost of their purchase is along side of the monetary cost. Real Costs is a Firefox plug-in that finds two geographic points, calculates the distance between them, then applies the carbon emissions formula that fits. The results are displayed in-line with the content of the site.

My role in this project was to research how much CO2 is emitted between two given points with various modes of transportation. Since the project is based within the internet, I found that many websites contained pieces of the information needed. Most frequently, I would find information buried deep within JavaScript code and database tables. Other times the information I was after was displayed plainly on a web page. What I found includes mathematical formulas to find carbon emissions for multiple modes of transportation, coordinates for every operating airport in the world, distances between major US cities and 10 years of records containing information about miles driven per city, divided by vehicle type and miles per gallon. All of this information, will be used to display the carbon being emitted for every airline ticket purchase, e-commerce purchase, and driving route given on the internet on a user level.

* Sponsored by Northfield Bank
In this study we analyzed data from a large sampling of eye patients. These patients had accommodative esotropia, or crossed eyes. We applied decision tree analysis with the goal of discovering what factors lead to someone deteriorating, hence needing surgery. The data consisted of numerous fields of measurements. Our 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 Northfield Bank
In an age when even the most qualified women are still making on average only 76 cents in wages for every dollar that men are paid, and as if that wasn’t enough punishment, there exists such a thing called the sub minimum wage. The sub minimum wage is authorized by the Fair Labor Standards Act (FLSA), and is basically just another legalized form of exploitation; those affected by these laws are young adults, immigrants, and women.

Employers can legally pay “tipped” employees, like a waitress or delivery person, as little as $2.13 an hour, with the understanding that the customer’s tip will make up the difference between the sub minimum wage and the minimum wage, a difference of $3.02. With the minimum wage already totaling less when compared to the living wage, I wonder why one would think lowering the min. wage for certain jobs and placing the responsibility on society to make up the difference would be a socially responsible idea.

I find it interesting that the sub-minimum wage issued by the FLSA applies to tipped workers; however this practice is only exercised in the female dominated arena of the tipped work force. It seems that those in authority and control have created a vicious little cycle and managed to fill it with women, doing whatever possible (creating a sub-minimum wage) to make sure they remain there, which aside from disturbing is discrimination.

I chose to take on this project to bring attention to my fellow students and professors how this particular arrangement is devastating women’s economic possibilities as well as their due right for equality, with the hopes that it gets enough attention to eventually stir up change.
Younger siblings use their older siblings as models. For example, younger siblings seek assistance and older siblings take on a teaching role (Abramovitch et al., 1993). Infants are capable of performing a task just by observing a sibling. For example, younger children learned to press a lever to move a train by watching their older siblings (Barr et al., 2001). Moreover, infants with older siblings imitated more behaviors without instruction than did children without siblings (Barr & Hayne, 2003). The motivation for the current study is to address whether older siblings influence the onset of younger siblings’ motor milestones, a domain that has not yet been studied.

Parents of 52 sibling dyads participated in a 10-15 minute telephone interview. Parents reported for each child when they reached the motor milestones of crawling, cruising and walking.

Paired samples t-tests comparing the age of onset for crawling, cruising and walking revealed no significant differences between younger and older siblings (see Table 1). Although previous literature states infants imitate their older siblings, it is not until their second year that infants are able to imitate complex behaviors (Barr & Hayne, 2003). Between 8 and 13 months, when infants acquire new motor skills, they only imitate simple tasks (Barr & Hayne, 2003). Thus, observation of older siblings does not facilitate younger siblings’ locomotor development.

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Younger Sibling</th>
<th>Older Sibling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crawling</td>
<td>8.27 months</td>
<td>7.73 months</td>
</tr>
<tr>
<td>Cruising</td>
<td>9.85 months</td>
<td>9.67 months</td>
</tr>
<tr>
<td>Walking</td>
<td>12.40 months</td>
<td>12.67 months</td>
</tr>
</tbody>
</table>

Table 1. Mean age of motor milestones onset for each sibling.
This research investigated the amelioration of conditions for chronically housed laboratory pigeons. Twenty four mixed breed, gender and age pigeons maintained at the College Neuroscience and Psychology Vivaria were studied. Stress and well-being can have behavioral measures, but these vary widely between species, circumstances, domestication, season, etc. The present study used glucocorticoid (adrenocortical stress hormone) secretion from fecal samples to assess a baseline (individually housed) and examine the results of: 1) prolonged exposure to a social flight cage; 2) performing in a typical (stressful) positive reinforcement operant experiment; and 3) being handled by undergraduates in a psychology laboratory course. Pigeons tended to show increased stress levels following the social flight cage experience as well as the other conditions; returning to or below baseline following exposure. The results were discussed in terms of behavior, age, gender and the meaning of stress for chronically housed animals.

All participants were treated in accordance with standard humane and ethical procedures.

*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants
The popularity of the magic profession was strongest in the days of Vaudeville in the early 1900s. During this time, there were overt and brutal outright forms of racism that was deemed socially acceptable. Due to this, Black magicians had a very hard time finding shows and work. Also, they had an extremely hard time marketing themselves because many publications refused to promote “negro performers”. Thusly, the publicity spotlight that has been shone on the magic profession has, historically, been given to white male performers ultimately accrediting the origins of the magic profession to white male performers. However, there has been a small faction of magicians of African descent that have attempted to dispel this myth showing how deep underneath the fabric of popular American culture, there were a whole other group of people who had chosen magic as careers just as longer, and maybe even longer than your typical white male performers.

The history of magicians of African descent has been largely undocumented for the aforementioned factor of racism within the performing arts professions and because Black culture, historically, uses an oral tradition of telling history as opposed to written one. The purpose of this presentation is to present a survey of African American magic from the nineteenth century to the present day. The presentation will also examine the relationship between Black and American religious history and to show how the participation of African Americans in magic with such acts (set aside from common and popular Magic acts amongst performers across all ethnic lines) as escape artistry, hypnotism, and spiritualism was a form of counterculture to popular American religious practices during popular religious movements such as the great awakening. Also how magic, particularly, escape artistry served as form of liberation. It provided a sense of optimism to the social, economic, and political oppression for many Blacks during the early 1900s; and even for those in the present day who watched and now continue to view the acts of Black magicians.

*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*
Perseveration is the inability to inhibit a repeated behavior. Infants younger than 12 months find it hard to inhibit. One theory explaining perseveration is that infants build a strong motor memory the more they perform a behavior (Thelen, Schoner, Scheier, & Smith, 2001). Based on her theory, Thelen would predict that crawlers build a stronger motor habit than walkers of the same age because motor experience allows crawlers to maneuver consistently. In contrast, a Cognitive Capacity Theory (Berger, 2004) predicts that walkers would perseverate more than crawlers because walking requires new skills such as keeping balance which infants have not mastered, increasing task difficulty.

To compare these theories, 12 crawling and 20 walking infants, all 13 months, navigated an easy path on flat ground or difficult path through tunnels to reach a goal. In both conditions, infants maneuvered down one path repeatedly to reach the goal. Then the goal location was switched. We tested which path infants took to reach the goal and how long it took to make their decision.

In the easy condition, no crawlers and 9.5% of walkers perseverated. In the difficult condition, 25% of crawlers and 45% of walkers perseverated. Walkers took longer to decide in the difficult condition (6.8secs) than in the easy condition (.93secs). There was no difference for crawlers in either condition (2.02secs; 2.4secs).

Results support the Cognitive Capacity Theory. Task difficulty included having to decide which path to take and, for walking infants, converting to crawling to fit through the tunnels. However, crawlers could maneuver through the tunnels their typical way.
The Parthenon Frieze Restoration Project at the College of Staten Island is focused on the restoration of several plaster casts of the Parthenon frieze. The casts were produced by the Caproni Factory in Boston, MA and are made from the original 19th century molds which were housed at the British Museum in London. The restored casts offer a visual history that can be shared throughout the college and the community. The project was conducted by Prof. Sandra Gambetti of the department of History, and coordinated in part by Prof. Craig Manister of the department of Creative and Performing Arts. Theresa Robb, a professional sculptor and restorer, was responsible for the restoration.

As interns within this project, we worked, under the supervision of Theresa Robb, on the cleaning of the casts, in order to restore them to their original white marble-like color. The West VIII cast was in fragmentary conditions, and needed to be completely reconstructed. We learned how to use chemical products and proper tools and techniques. In addition to the actual restoration, we were responsible for documenting in detail, through images and writing, the entire process of cleaning and restoration. This was particularly important, as such documentation would become patrimony of the College and be available for future restoration programs.

Our presentation at the Undergraduate Research Conference will be a PowerPoint presentation including over 20 photographs and containing information from the duration of the project (June-Sept). This presentation, organized chronically, will include 2006). A highlight of the presentation will include the reconstruction of the West VIII frieze. A poster board will detail historical context and information about the time period.

*Sponsored by Matthew Mirones, Mary Chrampanis, Stamos Zades, AHEPA Staten Island Chapter, and AHEPA Education Foundation*
Language processing is a very important function for survival. It allows for people to communicate effectively amongst their peers. However, language processing appears to be “shallow” and incomplete. We are interested in investigating what factors attribute to “shallow” language processing in real time, specifically focusing on differences between both monolingual speakers of English and bilingual English language learners. Participants will view a series of pictures and decide whether aurally-presented sentences match what they see. Reaction time and Accuracy will be evaluated with respect to two cognitive factors (nonverbal IQ and cognitive motivation).

*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants
The picture-word interference task is a widely used technique for exploring effects of semantic context on lexical access in speech production. In this task, participants attempted to name pictures on which printed distractor words were superimposed. We tested 24 young adults (17-30 years) and 17 older adults (over 60 years) in a study designed to determine how different types of distractors affect the time course of picture naming. The distractors were presented 450 ms before, 150 ms before, or 150 ms after the picture to be named (i.e., stimulus onset asynchronies of -450, -150, and +150). For both groups of participants, associates (e.g., CARROT superimposed on a picture of a rabbit) produced facilitation (faster RTs), whereas coordinates (e.g., CHIPMUNK superimposed on a picture of a rabbit) produced inhibition (slower RTs) relative to unrelated distractors (e.g., DIAMOND superimposed on a picture of a rabbit). These effects, however, tended to vary somewhat as a function of participant group, providing information about the effects of cognitive aging on word retrieval processes in speech production.
The American Nurses Credentialing Center’s Commission confers Magnet Status on healthcare organizations that demonstrate excellence in nursing service. There are approximately 200 healthcare organizations with Magnet Status. This in-progress project aims to review the evidence regarding nurse satisfaction, a measure of several magnet quality indicators, in Magnet and Non-Magnet Status healthcare organizations. The methodology is a systematic review of the literature from 2002 to 2007 in the databases of MEDLINE, CINHAL Plus, Academic Search Premier, and Health Source: Nursing/Academic Edition. Inclusion and Exclusion criteria and the resultant pool of evidence for review will be presented based on identified levels of evidence. Conclusions and implications for administration, practice, and research will be described.

Mentor:
Arlene T. Farren

Department of Nursing
The integration of mobile communication technology into everyday life impacts a user’s sense of identity and place in the social world. When observing the public mobile phone use of others, the traditional rules of social interaction are changed. We may respond negatively to seemingly irresponsible cell phone users, yet, as cell phone users ourselves, we may engage in behaviors that we would find undesirable in others. Having a mobile phone with us at all times may increase our feelings of public safety.

In her previous research, Cumiskey measured people’s attitudes toward their own mobile phone use and the mobile phone use of others separately, but she is now developing an instrument that captures both perspectives within one survey. This measure is the first of its kind and it will make a significant contribution to the new field of mobile communication. The results of this study were based on participants’ responses to this 42-item survey.

The focus of this study was on survey items that captured the differential responses between mobile phone users and observers. Particular items relating to perceptions of public safety were also analyzed. The results from the data analyses reveal that participants recognized that they use their phones in similar ways to other people, however differential evaluations were found with the most significant being how people evaluated talking on one’s mobile phone while driving. Participants believed that it was acceptable for them to talk on their phone while driving but not for other people. In addition, some gender differences were found in perceptions of public safety and public mobile phone use. How these results relate to risk-taking and the use of mobile phones will be discussed.

*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants*
Synaptic circuits present neuronal organization between neurons inside different regions of the brain. These circuits provide connections to each other for the process and transmission of neurological data, which allows the brain to carry out its specific functionalities. The organization of the synaptic circuits is a multidisciplinary type of study. It includes the fields of neurobiology, neurophysiology, neurochemistry, computer science and the behavioral sciences just to name a few.

With this research, we aimed at developing a model to simulate important dynamics of the olfactory bulb which includes the reciprocal and lateral inhibition and excitation of mitral and granule cells. The model is based on spiking neuron network, which on the one hand is very powerful and close to the biological world but on the other hand quite complex concerning the parameters for modeling the dynamics.

Here we propose a Spiking Neuron Simulator (SNS) simulator which models both the mitral and granule layers. The most important parameters which can be set by the user are number of mitral cells, number of granule cells, structure of the connections between the layers and cells, weights, delays, simulation time, thresholds etc. The simulations are designed to exemplify certain properties of the olfactory bulb dynamics and are based on an extension of the integrate-and-fire neuron, and the idea of locally coupled excitation and inhibition cells. The circular connection of mitral and granule cells in the model and weighting the synapses of the granule-mitral connection negative enable the simulation of reciprocal inhibitory effects in the olfactory bulb. By changing the weight one can impact the strength of this inhibitory effect. Lowering the weights of a mitral-granule and/or of a granule-mitral connection leads to a weaker inhibition, whereas raising the weights has a stronger inhibitory effect as a result. The change of the delay of the synapse results in an earlier or later inhibition of a mitral cell.

Our integrate-and-fire simulator proves to be a useful basis from which we can study more sophisticated features as complex pattern formation and global stability and chaos of OB dynamics.

*Sponsored by the CSI Foundation, the Office of Academic Deans, and/or faculty grants
Feed-Forward Neural Network (FFNN) consists of at least three layers of neurons: an input layer, at least one intermediate hidden layer, and an output layer. Typically, neurons are connected in a feed-forward fashion with input units fully connected to neurons in the hidden layer and hidden neurons fully connected to neurons in the output layer. Backpropagation is the traditional training method for FFNN during which the neurons adapt their weights to acquire new knowledge.

Learning in FFNN with backpropagation occurs during the training phase in which each input pattern from the training set is applied to the input layer and then propagates forward. The pattern of activation arriving at the output layer is then compared with the correct (associated) output pattern to calculate an error signal. The error signal for each such target output pattern is then backpropagated from the output layer to the input neurons in order to adjust the weights in each layer of the network. After the training phase during which the NN learns the correct classification for a set of inputs, it can be tested on a second (test) set of samples to see how well it classifies new patterns. Thus, an important consideration in applying backpropagation learning is how well the network makes the generalization.

The purpose of this research is to modify the topology of FFNN, set the learning process and use the NN as classifier. The first set of experiments include logical OR and AND operations on its two inputs. We use these patterns to train and test the network classification performance.

The second set of experiments uses UCLA database Iris which consists of 150 input vectors, evenly distributed across three classes of iris: Setosa, Versicolor and Virginica. Four measurements: sepal length, sepal width, petal length, and petal width were recorded on 50 different plants for each of the three iris classes. Statistically, one of the classes is linearly separable from the other two, but those remaining two are not linearly separable from each other what makes the learning and classification tasks more complex.
Management Information systems focuses on 'doing the right thing' instead of 'doing things right.' From our point of view, management information systems is a framework within which the organization views all its processes as knowledge processes. For instance, every business requires processes involving creation, dissemination, renewal, and application of knowledge toward organizational sustenance and survival.

Management systems information value chain considers technological systems as key components guiding the organization's business processes, while treating humans as relatively passive processors that implement 'best practices' archived in information databases. In contrast, the knowledge value chain treats human systems as key components that engage in continuous assessment of information archived in the technological systems.

Importance of management information system is necessary for companies because what worked yesterday may or may not work tomorrow. Therefore, today's organization is the most important issue for companies to ensure that they focus on the synergy of data and information processing capacity of information technologies, and the creative and innovative capacity of their human members. Advanced information technologies can increasingly accomplish 'programmable' tasks traditionally done by humans. If a procedure can be programmed, it can be delegated to information technology in one form or another. The information and control systems in organizations are intended to achieve the 'programming' for optimization and efficiency.

Here we propose a structure of a management hotel information system, the interaction between different components, how to organize the database of such system, update the content etc.
This study investigates the effects of the short term transition that takes place when college students study abroad and then reenter the United States. Specifically, I ask whether there is a shift in identity as students proceed through cultural adjustment and reentry adjustment. Two questions are posed: (1) whether the country of study collectivists or individualist affects self-concept (S.C.) interdependent or independent and (2) whether type of self-concept (interdependent or independent) affects the level of distress of the re-entry experience. In this study, I have developed two hypotheses: (1) Students who studied abroad in a collectivist country (using Geert Hofstede’s analysis) will score high on the interdependent self-construal scale. Because most Americans score high on independent S.C, I predict that students with higher interdependent S.C will have more difficulty with their reentry adjustment. (2) Students who studied abroad in an individualist country will score high on the independent self-construal scale. Because most Americans have an independent S.C, I predict that the returnees will have less difficulty with their reentry adjustment.
Fully dense, nano-composite Al-MoO3 powders with excess Al were prepared by Arrested Reactive Milling (ARM) as potential components for propellants, explosives, and pyrotechnics. The thermite reaction reducing MoO3 is expected to boost the Al ignition rate. It is desired to determine the minimum concentration of MoO3 that enables rapid and complete combustion of aluminum. In the first part of this investigation, nanocomposite powders with the bulk composition 4AlMoO3 and 8AlMoO3 were produced and their combustion was compared to that of pure aluminum powder in air. The combustion experiments were conducted in a 9.2 L closed vessel. The mass load of aluminum powder was determined from thermodynamic calculations to ensure the maximum flame temperature. To maintain consistency in the experiment, the amount of the nano-composite powder loaded in the vessel was selected to match the volume of the pure Al load. Specifically, 2.89 g, 3.81 g and 3.48 g of Al, 4AlMoO3 and 8AlMoO3 respectively, were aerosolized in the explosion vessel and ignited at its center using a heated wire while monitoring the vessel pressure in real time as the flame propagated outward. The results showed that both the pressure increase and rate of pressure rise produced in the vessel by combustion of the AlMoO3 mixture is greater than that of Al. Furthermore, the mixture with the lesser concentration of MoO3 performed better than the mixture with a greater concentration of MoO3. The project will continue with producing and testing nanocomposite powders with increasingly greater concentrations of Al to establish the minimum concentration of MoO3 needed to achieve rapid and complete combustion. A special care is taken to ensure the similarity of the particle size distributions for different powders used in the constant volume explosion tests.

1 New Jersey Institute of Technology

Soumitri S. Seshadri, Swati M. Umbrakar¹, Vern H. K. Hoffmann¹, and Edward L. Dreizin¹

Mentor: James Hladek
Department of Engineering Science and Physics
Azidotriethylene glycol was chemically modified with biotin using a recently described “click chemistry” approach. In click chemistry, reactive molecules are designed to bind (“click”) covalently and selectively (Kolb et al., 2001) This was clicked on to conducting oligomers via the 3+2 azide-alkyne triazole forming a “click” reaction. An NMR of the polymer was conducted to confirm the attachment of biotin and the formation of the triazole.

The resulting molecule, trimer (OHep)-triazole-biotin PEG amide was mixed with streptavidin-coated quantum dots 655 to form quantum dot networks with conducting polymer bridges. The objective of this research will be to make well-defined quantum dot arrays and networks for possible nanoelectronic applications.

The formation of networks was confirmed using transmission electron (TEM) and confocal (CLSM) microscopies. UV spectra of the polymer mixed with pure immuno avidin were conducted to determine what range the polymer needed to be excited at. The conducting oligomer with varying spacer lengths were prepared and mixed with streptavidin-coated quantum dots to establish a relationship between spacer length and the quantum dot/conducting polymer ratio in order to arrive at an optimum arrangement of quantum dots.

Further studies will involve the use of the Polymer Trimer (OHep)-Triazole-Biotin PEG amide being spin coated on silicon. The biotin displaying silicon chips will be treated with streptavidin in order to arrange quantum dots in a well-defined two-dimensional array. This will be further reacted with biotinylated antibodies to produce biochips for sensor applications.
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* 2006 Summer Undergraduate Research Fellowship recipient sponsored by Northfield Bank
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## Undergraduate Research Conference Committee

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