First Annual Undergraduate Student-Faculty Research Showcases

Celebrating collaborative research excellence between faculty and students

Pleasantville Showcase:
Tuesday, April 10, 2012
2:30 p.m.–4:30 p.m.
Kessel Student Center
Gottesman Room

New York City Showcase:
Wednesday, April 11, 2012
12:30 p.m.–2:30 p.m.
One Pace Plaza
Multipurpose Room

Office of the Provost
Division for Student Success

PACE UNIVERSITY
Work toward greatness.

Congratulations to Participants of the

First Annual Undergraduate Research Showcase at Pace University

It is with pride that I congratulate you on participating in Pace University's first annual Undergraduate Research Showcase. I could not be more pleased to have fifteen of our top students partnering with fifteen of our best faculty to help produce such passionate research projects. Your hard work and dedication over the course of this academic year has been laudable. I am thrilled that this initiative has been so successful.

Your participation in the showcase as a capstone moment of the initiative is meaningful to Pace University because it allows us to show off our best and brightest. And it is my great hope that you have found this experience to be as rewarding as I have detected it has been from reading your blogs, in both personal and academically enriching ways. We hope that this experience will propel you to expand your commitment to scholarly research. Based on your experience this past year, we will be identifying funds to not only continue this initiative, but to build upon it. I know that our incoming provost, Dr. Sukhatme, is fully on board with expansion of research support that involves undergraduate students.

Additionally, it is my hope going forward that based on the bar you have set there will be other students who are motivated to pursue this type of collaborative research. Thank you so much for your dedication to excellence. I look forward to joining you at the showcase!

Dr. Harriet R. Feldman

Interim Provost and Executive Vice President for Academic Affairs

PACE UNIVERSITY | NEW YORK, NEW YORK | PLEASANTVILLE, NEW YORK

FIRST ANNUAL SHOWCASE OF

UNDERGRADUATE RESEARCH

OFFICE OF THE PROVOST
DIVISION FOR STUDENT SUCCESS

Celebrating collaborative research excellence between faculty and students

Pleasantville Showcase:

Tuesday, April 10, 2012

2:30 p.m.–4:30 p.m.

Kessel Student Center

Gottesman Room

New York City Showcase:

Wednesday, April 11, 2012

12:30 p.m.–2:30 p.m.

One Pace Plaza

Multipurpose Room

ORDER OF EVENTS:

Poster Sessions

Introduction and Welcome from the Interim Provost

Presentation of Research Projects

Poster Session Continued

Announcement of Awards

SHOWCASE JUDGES

The Office of the Provost and the Division for Student Success are indebted to the following individuals for devoting their time to serve as Showcase judges:

Dr. Harriet Feldman, Interim Provost and Chief Academic Officer

Dr. Richard Schlesinger, Associate Dean, Dyson College of Arts and Sciences

Dr. Maria Iacullo-Bird, Assistant Dean for Graduate Programs and Undergraduate Research

Dr. Karen Berger, Associate Dean, Lubin School of Business

Sarah Burns-Feyl, Assistant University Librarian for Instructional Services

Karen DeSantis, Instructional Services Librarian

SPECIAL THANKS

The Office of the Provost and the Division for Student Success would like to offer their utmost gratitude to the following individuals and entities for their expertise, time and support in planning this initiative:

Laura Acloque-Charles	**Neil Braun**	**Dr. Melissa Cardon**
Dr. Gerrie Colombraro	**Jennifer Crespo**	**Maria De La Cruz**
MaryAnn Errante	**Dr. Lisa Fastenberg**	**Dr. Harriet Feldman**
Anna Gagliardi	**Darren Hayes**	**Dr. Nira Herrmann**
Dr. Maria Iacullo-Bird	**Will Imbriale**	**Susan Kayne**
Allyson King	**Dr. Constance Knapp**	**Sue Maxam**
Matilda McClean	**Christie Nadratowski**	**Dr. Mark Allen Poisel**
Dr. Richard Schlesinger	**Adrian Simpson**	**Dr. Andrea (Penny) Spencer**
Chartwells	**Special Events**	**Educational Media**

We would also like to extend a very special thank you to President Stephen Friedman for supporting this endeavor, both academically and financially.

FACULTY MENTORS

The faculty of any university serves as the core and principal asset; Pace University is no exception. Therefore, the Office of the Provost and the Division for Student Success would like to offer the sincerest thanks to the following faculty for serving as research collaborators and mentors to our undergraduate student researchers:

Dr. David Caputo
President Emeritus, Professor
Political Science

Dr. Jean Coppola
Associate Professor
Information Technology

Dr. Zhaohua Dai
Associate Professor
Chemistry

Dr. Sister St. John Delany
Associate Professor
School of Education

Dr. Claudia Green
Associate Professor
Management

Prof. Jillian McDonald
Associate Professor
Fine Arts

Dr. Joseph Morreale
Professor
Economics and Public Administration

Prof. Anna Morlan
Adjunct Faculty
English

Dr. Nancy Reagin
Professor
History, Women's and Gender Studies

Dr. Christelle Scharff
Associate Professor
Computer Science

Dr. Nigel Yarlett
Professor
Biochemistry

Dr. Marcy Kelly
Professor
Biology

Dr. Charlene Hoegler
Lecturer
Biology

Prof. Angelo Spillo
Director, Environmental Center
Environmental Studies

Dr. Paul Griffin
Associate Professor
Psychology

STUDENT RESEARCHERS

Daniella Eras

Gabriella Ferrara

Madelyn Farris

Julie Gill

Meghan Kenny

Mark Kowtko

Brent McDonald	**Andrew Newmark**	**Cherelle Palmer**
Neil Patel	**Alison Quirch**	**Boyan Robak**
Michelle Rodriguez	**Julia Yeung**	**Wenyao Zhang**

ABSTRACTS

Acetylcholinesterase Isozyme Banding may be Useful in Revealing Heart Pathology

Dr. Charlene F. Blando-Hoegler
Ms. Cherelle Palmer

Cardiopathology provides insights into the functioning heart and its circulatory vessels. Recent studies have proposed a critical role for esterases in heart failure (Dunlop et. al. 2003). Evidence points to a loss of vagal (parasympathetic) control and a parallel increase in sympathetic activity as the disease progresses. Other researchers (Ojaimi et.al. 2007) used microarray technique on tissues from canine paced heart failure models to show selective re-regulation of genes as the pathology developed. To further explore this connection, a pilot project comparing the enzyme acetylcholinesterase (AChE) from normal (N) and heart failure (HF) specimens was designed. Non-denaturing polyacrylamide gel electrophoresis (PAGE) separated the isoenzyme components. Diazonium salts stained and identified the resulting enzyme/substrate banding patterns. The present study refines previous work by examining AChE activity of non-denatured protein from N and HF tissues. In addition, a variety of non-cardiac tissues and organs were examined to determine the extent of pathological changes

Open Source Assistive Technology Website and Application Development

Dr. Jean F. Coppola
Mr. Marc Kowtko

Information technology is integrated in every aspect of society and infused in every discipline. Today, many young individuals are utilizing information technology for social networking, education, and to advance in their careers. There are also older adults and individuals with disabilities who could use the Internet and other technologies to improve their quality of life. Assistive Technologies (AT) can exist as either specialized hardware or software that allows older adults and people with disabilities to have easier access to computers and their resources. Unfortunately, the majority of devices and software of this type on the market are unaffordable. In this research initiative, a research incubator was created to spawn the research and development of open-source assistive technology software. During this period, research was

conducted to analyze the current situation and awareness of web accessibility and assistive technologies. Other research conducted was the examination of current AT software existing within the Windows and Linux operating systems. In addition, social media connections were utilized to locate programmers and developers to donate code and other assistive open source software. Current research being conducted is the investigation of authentication security for people with disabilities.

Recovering from a Romantic Break-up: Examining the Influence of Attachment, Rejection Sensitivity and Gender

Dr. Paul Griffin
Mr. Boyan Robak

Pop culture has been ingrained in us, as a society, with a very specific and mostly inflated idea of how romantic relationships should work, but also how they should end and what happens next. From classic novels to new box office hits, the brooding male and the socialite female archetypes have dictated how the genders "should" handle rejection. In our research, we seek to test the validity of these stereotypes at the scientific level. Our research focuses on uncovering the nature of how people react to romantic rejection at the mental level, and whether or not those reactions are comparable to other forms of rejection and emotional pain. Through the use of empirical research, we have investigated the roles of self-esteem, life satisfaction, personal responsibility, and sense of meaning regarding how an individual processes romantic rejection. In this study, we search for differentiating views of rejection across the genders as well as the psychological effects of relationship roles on the individual.

Sustainability and the Pace Student Body: Thoughts and Perceptions

Prof. Angelo Spillo
Ms. Michelle Rodriguez

Our research will help us better understand Pace Pleasantville students' thoughts on sustainability and the GreenPace efforts. (GreenPace is the University's effort to become more sustainable. The committee is comprised of eight subcommittees made up of students, faculty, staff. The goal of GreenPace is to encourage sustainable considerations be incorporated into all facets of operations and academics.) To accomplish this, research will identify impressions and

perceptions of Pace Pleasantville students regarding sustainability and their place in the natural world. We hope to gain a clear picture of why there seems to be student indifference and to utilize the data collected to develop a response that will encourage future participation. In addition, the information from this study will be used to develop a report summarizing student thoughts and perceptions. From the report, recommendations will be made to the university-wide GreenPace committee. The hope is that the results will enable GreenPace to better realize some of its goals by being able to connect with and educate a higher percentage of students. We believe the information will be valuable to many other institutions who are also striving to be more sustainable.

Neuroscience and the Reading Process

Dr. Sister St. John Delany
Mr. Andrew Newmark

In recent years, researchers have focused on the brain and learning specifically in the area of literacy and what they have learned is that the brain is not a hard-wired computer. Rather, the concept at the present time is that the brain is a continuously modifiable "plastic" organ. This provides an opportunity for new studies of a more complete understanding of human brain development and cognition particularly for educators. Neuroscience is challenging them to develop instructional strategies that enhance the brain's learning capacity.

Characterization and Inhibition of Deoxyhypusine Synthase in Cryptosporidium parvum

Dr. Nigel Yarlett
Ms. Alison Quirch

Deoxyhypusine synthase (DHS) serves as the enzyme responsible for catalyzing the first post-translational modification step in the synthesis of the residue hypusine. Hypusine (N-(4-amino-2-hydroxybutyl) lysine) is a unique amino acid that is critical for the activation of the protein, eukaryotic initiation factor 5A (eIF5A). During modification an aminobutyl moiety is transferred onto a lysine unit of eIF5-A precursor protein yielding the intermediate eIF5A-deoxyhypusine. This process is critical for optimal progression of cell growth in all eukaryotes examined to date. This study was aimed at characterizing this post-translational pathway in the intestinal parasite Cryptosporidium parvum. C. parvum is a waterborne opportunistic parasite that causes significant morbidity and mortality in immuno-compromised individuals. Sequence alignment of

the putative C. parvum DHS gene (CpDHS) with known sequences from a range of phylogenetically distant eukaryotes demonstrated that CpDHS gene has a highly conserved substrate-binding site but contained a unique 65 base pair intron that differed considerably from the human DHS gene. Using a highly specific radiolabel assay the substrate specificity of the recombinant C. parvum DHS enzyme had similar activity with eIF-5A from several sources including human, Leishmania, and yeast, and C. parvum; results indicated that the highest activity with C. parvum eIF-5A. The ability of several guanyl-modified substrates, including GC7 (N-guanyl-1,7-diaminoheptane), GC7G (N-1,N-7-bisguanyl-1,7-diaminoheptane), GC8 (N-guanyl-1,8-diaminooctane), GC8G, GC6, GC6G, and Guazatine were tested for ability to inhibit activity of the C. parvum DHS. The results point to the potential of this C. parvum DHS as a chemotherapeutic target for the treatment of cryptosporidiosis.

Horror Stories: A Web-based Artwork

Prof. Jillian McDonald
Ms. Julie Gill

Horror Stories **is a web-based artwork that enables an interactive and collaborative film-making experience. Upon encountering the artwork, viewers are invited to create a customized short film based on various parameters including monsters, location, mood, landscape, etc.; see the results generated by previous visitors; or write about what scares them most. Essentially this is a visual story re-mixer driven by a database of film clips that are categorized according to the parameters named above. No two short films unfold in precisely the same way. Video and audio clips can also be contributed to the databank through an online interface using networked devices.**

Impact of the Great Recession on Middle Class Americans

Dr. Joseph Morreale
Ms. Julia Yeung

This research project will showcase the effect of the Great Recession (late-2000's recession) on middle-class Americans. It will analyze and cover the extent of the impact through evaluating data on several factors, such as the unemployment rate, percent of the middle class in college, percent of female participation rate and single parent households, etc. from years 1970 to 2010.

This research will offer insight into the extent of the impact of the Great Recession on the middle-class, as well as demonstrating how this recession has differed from the previous post-WWII recessions, specifically the 1973-75 Recession and the Early 1980's Recession.

The Evolution of Information Technology in "Star Trek:" Fact vs. Popular Culture

Dr. Nancy Reagin
Mr. Brent McDonald

In the mid-twentieth century, science fiction writers claimed that their genre was rooted in "science fact," and the popular "Star Trek" franchise was no exception. Its script writers and producers incorporated assumptions about where information technology developments were headed and how this would influence social life and the workplace. This project examines how the "Star Trek" series used trends current at the time of their production - especially the 1960s, although later Trek series are included - to make projections about information technology and IT professionals. Gene Roddenberry, the series' creator, was a futurist who included (accurate) predictions about the development of technologies like cordless phones, headsets, plasma screens, supercomputers, tablets and pads, and removeable computer memory (flashdrives). At the same time, even later Trek series did not anticipate or include the Internet, with its huge impact on social organization. This essay will be published next year as a chapter in a popular history anthology edited by Professor Reagin, "Star Trek and History."

Students and Sustainable Tourism

Dr. Claudia Green
Ms. Gabriella Ferrara

In our increasingly interconnected world, travel has become part of the college experience for many students in the United States. Besides the numerous study abroad programs and travel courses, there are also a greater number of international students studying at American universities than ever before. The aim of this research is to understand students' perceptions of sustainable tourism as well as their practices when they visit countries outside of their own. In doing so, we hope to develop a better understanding of the gaps in students' knowledge about sustainable tourism practices, and provide suggestions for ways that these gaps might be filled.

Bring on the Velvet Revolution: The Politics of Individual Subjectivity in Tom Stoppard's "Rock 'N' Roll"

Prof. Anna Morlan
Ms. Madelyn Farris

Theatrical plays, with the rare exception of the one-man-show, are by definition stories with multiple narrators. This naturally polyvocal storytelling sets theater apart from other art forms and provides an excellent opportunity for the revaluation of established historical narratives. In Rock'N'Roll, Tom Stoppard takes even further the fragmented nature of his play's narrative to suggest that it was the apolitical individual subjectivity which had the greatest capacity in bringing about social change in Czechoslovakia, its location of being external to the system responsible for its subversive power. Stoppard's critique of the official history of the Czech Velvet Revolution thus has the potential to undermine our understanding of what propels history in general, shifting our focus away from economic necessity or ideology as causes of political change, and asking us to reconceptualize individuality, whose agency has been problematized by postmodernism, as being the x-factor in not just the telling, but also the making of history.

Presidential Signing Statements

Dr. David A. Caputo
Ms. Daniella Eras

There are approximately 1600 Presidential signing statements dating back to President Monroe. They vary from presidential support for the legislation signed to a detailed argument as to why the president is not going to enforce certain aspects of the law he is signing. In effect, the president is determining what is constitutional and what is not, and not the courts. Presidential signing statements are controversial to say the least and not well understand by the public and little empirical research has been done involving the signing statements. We specifically investigated when these are most likely to be used by a president (first term versus second and year of term) and whether there is a general pattern (domestic versus foreign oriented legislation) of how a president uses the signing statements.

Mobile Technology and the Environment

Dr. Christelle Scharff
Ms. Meghan Kenny

Today, more than 6 billion people depend primarily on non-renewable resources for survival. What many fail to recognize is that burning fossil fuels, such as coal, oil, and natural gas, is reaching a dead end and also has debilitating immediate effects on our surroundings. The "environment" is no longer limited to species' natural habitat, where one solely imagines the seven biomes. Instead it encompasses human interaction within the biotic, abiotic, cultural, and social worlds. Dirty energy sources are a major example of how humans drastically alter not only the physical environment, but the economy as well. While the increase of forest fires, heat waves, droughts, floods, heavy precipitation and disease is a reality for most, others still deem Global Warming as a myth. Mobile technology can play an important role in making the Earth's population more aware of these dramatic consequences and how to contribute to avoiding them.

Mobile technology comprises mobile applications (e.g., iPhone, Android, Blackberry and Java ME), mobile web sites, SMS and voice solutions. Mobile phones are always at an arm's length of their owners and have the potential to reach masses of people and thus, make a difference. More specifically, they can be used to educate users about anything related to going green in an entertaining or serious way, on the fly or in a studious environment. In this research, we are studying how mobile technology can be used to create a more sustainable future. We will present the work accomplished in a project where a multi-disciplinary team of students distributed across the US, India and Senegal collaborated in the development of mobile solutions to raise awareness concerning environmental issues. We will also present the preliminary results of a study that looks at how mobile developers are addressing the issues of environment in apps based on screening the apps marketplaces: Google Play, Apple App Store, Blackberry App World and Nokia Store.

Chiroptical Fluorescent Sensors for Mercury

Dr. Zhaohua Dai
Mr. Wenyao (Nick) Zhang

Two multi-mode Hg(II) sensors, L-MethBQA and L-CysBQA, were obtained by fusing methionine or S-methyl cysteine, into a bis-quinolyl amine based chiral podand scaffold. Quinolyl groups serve as the fluorophore and possess nitrogen lone pairs capable of chelating metal ions. Upon exposure to Hg(II) or Zn(II) these sensors show signal enhancement in fluorescence. However, Cu(II) quenches their fluorescence in 30:70 acetonitrile/water. L-CysBQA complexes with Hg(II), producing an exciton-coupled circular dichroism spectrum with the opposite sign to the one that is produced by Cu(II) or Zn(II) complexation. L-CysBQA binds Hg(II) more strongly than Zn(II) and is shown to differentiate Hg(II) from other metal ions, such as Zn(II), Cu(II), Ni(II) and Pb(II), exceptionally well. The synergistic use of relatively soft sulfur, quinoline based chiral ligands and chiroptically enhanced fluorescence detection results in high sensitivity and selectivity for Hg(II).

The Effects of Glutathione and its Derivatives on the Survival of Mycobacterium bovis-BCG Vegetative and Persistent Organisms

Dr. Marcy Kelly
Mr. Neil Patel

Mycobacterium tuberculosis is responsible for nearly 2 million deaths yearly. Upon inhalation, mycobacteria are engulfed by alveolar macrophages. The immune defenses of these cells include the production of reactive oxygen and nitrogen intermediates (ROI's and RNI's). Mycobacteria can evade these defenses and persist. Formation of a tubercle to sequester the infected macrophages initiates latent tuberculosis infection, in which the mycobacteria enter a state of non-replicative persistence (NRP). Glutathione (GSH), a host tripeptide thiol-based

detoxification molecule, protects host cells from ROI/RNI toxicity. Studies have suggested that GSH is toxic to mycobacteria. In order to further elucidate the impact of GSH and its oxidative derivatives on mycobacteria, we exposed mid-logarithmic (mid-log) and NRP-induced M. bovis-BCG to glutathione in its reduced (GSH), oxidized (GSSG), and nitric oxide associated (GSNO) forms for five days. Each day, we evaluated growth inhibition, killing and ATP production by the cells. Mid-log BCG exposed to 8 mM GSH are killed by day four. This is supported by the fact that amount of intracellular ATP released by these cells reached 2.28 uM by day four. By day five, after cell death, ATP release declined to 0.78 uM. The growth of NRP BCG exposed to 8 mM GSH was stimulated on day 5 resulting in a 4 fold increase in cell density. Very little intracellular ATP was detected over the five days for the NRP BCG exposed to 8 mM GSH. This suggests that the ATP synthesized was immediately used by the bacterial cells in order to provide the energy for exit from the NRP state. Although both 8 mM GSSG and GSNO inhibited the growth of mid-log BCG, there was no significant difference with respect to the amount of ATP released by exposed and unexposed cells. Additionally, the presence of either 8 mM GSSG or GSNO did not seem to impact NRP BCG as both the exposed and unexposed cells did not demonstrate significant increases in cell density over the five days. ATP production by all exposed and unexposed NRP BCG was similar over the five days as well. Taken together, these results suggest that 8 mM GSH, but not GSSG or GSNO, provides a stimulus for BCG to exit the NRP state. These data are significant because they suggest that GSH may be a responsible for mycobacterial growth initiation during re-activation tuberculosis.