

March 11, 2011

Dear Friends,

Welcome to the March 2011 CUNY Science Fair!

Graduate and undergraduate students, postdoctoral fellows, faculty and administrators are gathered together today to share their research in science, technology, engineering, mathematics (STEM), in social, behavioral and economics (SBE) fields, and to engage in intellectual conversation across disciplines. The CUNY AGEP Program is pleased to sponsor this event at which science researchers will present their work through oral and poster presentations. We thank Dr. Robert E. Belle, Director of the SREB-AGEP Doctoral Scholars Program, and Clarisa Gonzalez-Lennahan, Associate Director of Graduate Studies at the New Jersey Institute of Technology, for moderating the Oral Presentation Sessions.

AGEP (Alliance for Graduate Education and the Professoriate) is a graduate education program funded by the National Science Foundation, with the goal of diversifying the professoriate in STEM and SBE fields through institutional change. The pathway to the achievement of this goal is the focus of our attention today.

Science researchers are being encouraged to view their work within both local and national contexts. In this connection, Dr. Avrom J. Caplan, Associate University Dean for Research, will discuss Chancellor Goldstein's CUNY Decade of Science Initiative, and Dr. Sylvester (Jim) Gates, Professor of Physics, University of Maryland, College Park, and a member of President Obama's Policy Council of Advisors on Science and Technology, will provide the national context. We are pleased to have Dr. Kurt Becker, Professor of Physics at Polytechnic Institute at New York University, introduce Professor Gates.

Undergraduates, doctoral and postdoctoral fellows are expected to gain insight into the process by which their current research and other interests in science that they may develop in the future can transform them from the status of trainee to that of independent scientist. Career opportunities will therefore be presented by a panel of experts that includes Shaifali Puri, Executive Director of Scientists Without Borders, The New York Academy of Sciences; Yolanda S. George, Deputy Director, American Association for the Advancement of Science; and Shirley Kendall, Manager, Diversity Office & International Services, Brookhaven National Laboratories.

Our keynote speaker, Dr. Sophia N. Suarez, who will be introduced by Professor Steven Greenbaum, embodies the conference theme, "Inspiring the Next Generation of Scientists." As Assistant Professor of Physics at Brooklyn College and the CUNY Graduate Center, she is representative of the Early Career Faculty to emerge from the NSF AGEP Program. Most recently Dr. Suarez has been awarded the 2011 Career Enhancement Fellowship for Junior Faculty by The Woodrow Wilson National Fellowship Foundation.

It is a pleasure to welcome Dr. Wanda E. Ward to the CUNY Graduate Center as moderator of the Professional Opportunities Session and to acknowledge the support of the National Science Foundation in providing resources for our AGEP Research Scientists.

It is important to thank as well William P. Kelly, President of the CUNY Graduate Center, Provost Chase Robinson, Associate Provost for Science Ann S. Henderson and everyone who will be participating in this event. A special thank you is extended to our student volunteers. Most especially, we are grateful to all of the faculty research mentors, who have provided the training to their students that has made it possible for them to display and share their research with us today.

Sincerely,

Gail Smith, PhD.
CUNY AGEP Principal Investigator

CUNY SCIENCE FAIR AGENDA

Inspiring the Next Generation of Scientists
Sponsored by the National Science Foundation AGEP Program
The Graduate Center, CUNY

Friday, March 11, 2011

8:30 AM **REGISTRATION/ CONTINENTAL BREAKFAST & POSTER SET- UP**
(Concourse Lobby & Rooms C201-C203)

9:30 AM **WELCOME** (*Proshansky Auditorium*)
Ann S. Henderson, Ph.D.
Associate Provost and Dean for Sciences (Acting)
The Graduate Center

SESSION 1: CHANCELLOR GOLDSTEIN'S DECADE OF SCIENCE AT CUNY
Avrom J. Caplan, Ph.D.
Associate University Dean for Research
Office of Academic Affairs
The City University of New York

10:00 AM **SESSION 2: ORAL PRESENTATIONS** (Two Concurrent Sessions)
Moderators:

Robert (Bob) L. Belle, Jr. Ed.D. (*Room C204*)
Director, SREB-AGEP Doctoral Scholars Program
Southern Regional Education Board (SREB)

Clarisa Gonzalez-Lenahan (*Room C205*)
Associate Director of Graduate Studies
New Jersey Institute of Technology

11:15 AM **SESSION 3: CAREER OPPORTUNITIES FOR STEM AND SBES RESEARCHERS**
(*Proshansky Auditorium*)

Moderator: Wanda E. Ward, Ph.D.
Senior Advisor to the Director
Office of the Director
National Science Foundation

Presenters: Shaifali Puri
The New York Academy of Sciences
Executive Director
Scientists Without Borders

Yolanda S. George
American Association for the Advancement of Science (AAAS)
Deputy Director
Education and Human Resources Programs

Shirley Kendall
Brookhaven National Laboratory

Manager, Diversity Office & Office of International Services

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12:30 PM **LUNCH – Concourse Lobby**

1:45 PM **SESSION 4: AGEP EARLY CAREER FACULTY** (Proshansky Auditorium)

Gail Smith, Ph.D.

Professor of Classics

NSF/AGEP Principal Investigator, The Graduate Center

KEYNOTE

Sophia Suarez, Ph.D.

Assistant Professor of Physics, Brooklyn College and The Graduate Center

Introduction: Steve Greenbaum, Ph.D.

Professor and Executive Officer, Ph.D. Program in Physics

3:15 PM **BREAK**

3:30 PM **SESSION 5 : PRESIDENT OBAMA’S NATIONAL POLICY COUNCIL ON SCIENCE AND TECHNOLOGY: *The National Context and Its Impact on Science and AGEP***

Sylvester (Jim) Gates, Ph.D.

John S. Toll Professor of Physics and Center for String and Particle Theory Director, University of Maryland, College Park

& Member of President Obama’s Policy Council of Advisors on Science and Technology

Introduction: Kurt H. Becker, Ph.D.

Assoc. Provost for Research and Technology Initiatives and Professor of Physics

Editor-in-Chief, European Physical Journal D

Polytechnic Institute of New York University

4:30 PM **SESSION 6:** Student Poster Presentations (Rooms C201-203)

5:20 PM **RECEPTION AND PRESENTATION OF AWARDS** (Concourse Lobby)

Facilitator:

Lorraine Towns

Coordinator, AGEP/ Bridges Programs

The Graduate Center

PRESENTER BIOGRAPHICAL SKETCHES

KURT BECKER

Polytechnic Institute of New York University

Kurt Becker, PhD, is the Associate Provost for Research and Technology Initiatives at the Polytechnic Institute of New York University (NYU-Poly). Prior to joining NYU-Poly in 2007, he held faculty positions at Lehigh University (1984-88), the City College of New York/CUNY (1988-97), and Stevens Institute of Technology (1997-2007). At Stevens, Dr. Becker served as Head of the Department of Physics and Engineering Physics from 2000 to 2007 and he was the Associate Director of the Stevens Center for Environmental Systems (2003-07).

Dr. Becker is a physicist by training with more than 20 years experience in atomic and chemical physics and in basic and applied plasma science with a specific focus on non-thermal plasmas and plasma chemical reactions. He has published more than 200 papers in peer-reviewed journals, authored, co-authored or edited 7 books and holds 7 patents in the area of plasma applications. He graduated 22 PhD students, including 5 students from traditionally underrepresented groups in the STEM disciplines. Dr. Becker is the recipient of the Thomas Alva Edison Patent Award from the Research and Development Council of New Jersey (2001). He has been invited to give more than 30 Plenary and Invited Talks at International Plasma and Atomic Physics Conferences in the past 10 years and he has served on Organizing and Program Committees of several major international plasma science and technology conferences such as the International Conference on Phenomena in Ionized Gases (ICPIG), the International Conference on Plasma Science (ICOPS), the International Workshop on Microplasmas (IWM), and the Symposium on Plasma Physics and Technology (SPPT). He is a Fellow of the American Physics Society (APS) since 1992 and he received the title of "Honorary Professor at the Leopold Franzens Universität Innsbruck" in 2007. He is also the recipient of the Erwin Schrödinger Medal awarded by the Univ. of Innsbruck in 2010.

AVROM CAPLAN

City University of New York

Avrom Caplan was trained in biology and biochemistry in England, earning a PhD from King's College London in 1987. After postdoctoral work at Southwestern Medical Center and University of North Carolina at Chapel Hill, Avrom was appointed Assistant Professor at Mount Sinai School of Medicine in the department of Cell Biology and Anatomy. His lab studied the role of molecular chaperones in the folding and activation of protein kinases and transcription factors with grants from the National Institutes of Health. Upon moving to CUNY in 2008, the lab continued to study this process as well as the mechanisms by which misfolded proteins are degraded. Avrom was appointed Associate University Dean for Research in the office of Vice Chancellor Gillian Small in the fall of 2008. Avrom administers several CUNY-wide initiatives from this office including internal grant programs, summer undergraduate research programs and the CUNY Science Café, where university researchers talk about their science in a casual setting. He still writes papers and grants and mentors undergraduate, graduate and postdoctoral students in his lab at CCNY.

SYLVESTER J. GATES JR.

University of Maryland, College Park

Professor Gates is the John S. Toll Professor of Physics, and Director of the Center for String and Particle Theory at the University of Maryland, College Park. In 2009, President Obama named Gates as

a member of PCAST - the President's Council of Advisors on Science and Technology and Governor O'Malley nominated him for the Maryland State Board of Education where he currently serves.

Professor Gates is internationally known for his ability to communicate ideas in theoretical physics to a general audience, for his promotion of science education, and for his groundbreaking and ongoing research in the areas of supersymmetry and supergravity - areas closely related to string theory. Gates has been featured on the four PBS television programs including "The Elegant Universe." Gates holds two B. S. degrees (1973) in mathematics and physics, and a Ph.D. in physics all from the Massachusetts Institute of Technology (MIT). His Ph.D. thesis (1977) was the first at MIT on the topic of supersymmetry. He completed his postgraduate studies at Harvard University and the California Institute of Technology.

Gates has authored or co-authored over 200 scientific papers and scientific articles. He authored the popular-level DVD lecture course "Superstring Theory: The DNA of Reality," co-authored "Superspace or 1001 Lessons in Supersymmetry," (with M. T. Grisaru, M. Rocek, and W. Siegel. In 2010 he wrote a Scientific American style article "Symbols of Power" in the British journal Physics World to describe his current work...finding linkages between browser codes and physics equations.

He is the recipient of numerous prestigious awards and is a Fellow of the American Association for the Advancement of Science (AAAS), the American Physical Society (APS), and the National Society of Black Physicists (NSBP). Gates was the first recipient of the APS Bouchet Award and a past president of NSBP.

YOLANDA S. GEORGE

American Association for the Advancement of Science

Yolanda S. George, AAAS, Deputy Director, Education and Human Resources Programs, has served as Director of Development, Association of Science-Technology Centers (ASTC); Director, Professional Development Program, University of California, Berkeley; and as a research biologist at Lawrence Livermore Laboratory, Livermore, California. George conducts evaluations, project reviews, and workshops for the National Institutes of Health and National Science Foundation, as well as proposal reviews for private foundation and public agencies, including Carnegie Corporation of New York, the Ford Foundation, and the European Commission.

Ms. George serves on boards or advisory groups for the International Network of Women Scientists and Engineers (INWES); South Dakota Biomedical Research Infrastructure Network; McNeil/Lehrer Productions Science Reports; The **Center for Advancement of Informal Science Education (CAISE)**; Burroughs Wellcome Fund, Science Enrichment Program Grants; and The HistoryMakers (ScienceMakers Project).

Over the last 25 years she has raised over \$80 million for a variety of SMT education initiatives for colleges and universities, associations, and community-based groups. George has authored or co-authored over 50 papers, pamphlets, and hands-on science manuals. She received her BS and MS from Xavier University of Louisiana and Atlanta University in Georgia, respectively.

CLARISA GONZALEZ-LENAHAN

New Jersey Institute of Technology

Clarisa Gonzalez-Lenahan, MSW is currently the Associate Director of Graduate Studies at the New Jersey Institute of Technology (NJIT) where she manages the day-to-day operations. She works directly with the Dean of Graduate Studies and the Assistant Vice President for Academic Affairs.

Ms. Gonzalez-Lenahan is one of the two key people at NJIT for initiatives of importance on behalf of underrepresented minorities beginning at the undergraduate level, through the Masters, doctorate, and post doctoral periods. Ms. Gonzalez-Lenahan has made presentations discussing strategies for retention of underrepresented minority students in higher education at the American Society for Engineering Education and is active with the Council of Graduate Schools and the

Northeastern Association of Graduate Schools. She is past secretary and Council member of the Hispanic Association for Higher Education in New Jersey, Inc. (HAHENJ) and a former member of the Executive Board for the New Jersey Educational Opportunity Fund Professional Association (NJEOFPA). For three years, she served as Professional Staff Association representative for the American Association of University Professors (AAUP). At NJIT she has been directly involved with the AGEP Consortium, the GEM program, the Minority Academic Careers and Project 1000. She was heavily involved with the Caribbean student organization and the Hispanic Organization for Students in Technology.

Clarisa Gonzalez-Lenahan received her BA in Psychology and a BSW and MSW as an advanced generalist practitioner from Rutgers University. She has worked at the New Jersey Institute of Technology since January 1988.

Clarisa resides in Elizabeth with her husband of 23 years and their three children (ages 19, 17 and 13).

STEVE GREENBAUM

Hunter College & The Graduate Center, CUNY

Dr. Steve Greenbaum is a Professor of Physics at Hunter College in the City University of New York (CUNY) and also serves as Executive Officer of the Ph.D. Program in Physics at the CUNY Graduate Center. Dr. Greenbaum earned his Ph.D. in Experimental Condensed Matter Physics from Brown University. He spent two years in the Semiconductor Branch of the US Naval Research Laboratory in Washington, D.C. as an NRC Postdoctoral Fellow, and also spent three sabbatical years as (i) Fulbright Scholar at the Weizmann Institute of Science, (ii) NASA/NRC Senior Research Fellow at the Jet Propulsion Lab, California Institute of Technology, and (iii) Visiting Professor in the Chemistry Department at Stony Brook University and the Materials Science and Engineering Department at Rutgers University. Dr. Greenbaum's main research interest involves spectroscopic studies of disordered solids by magnetic resonance and synchrotron x-ray absorption, most of which has recently centered on materials for electrochemical energy storage and conversion (i.e. batteries and fuel cells). He has authored or co-authored over 180 peer reviewed publications and given over 50 invited talks at national or international conferences. He was the 2001 recipient of the Roosevelt Gold Medal for Science, bestowed by the New York Council of the United States Navy League, and the 2002 Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring, awarded jointly by the National Science Foundation and the White House Office of Science and Technology Policy. Dr. Greenbaum is a Fellow of the American Physical Society.

ANN S. HENDERSON

The Graduate Center, CUNY

Ann S. Henderson, PhD, Associate Provost and Dean for the Sciences at the Graduate Center of the City University of New York has participated in scientific and graduate research and graduate education since the mid 1970's. She is a Professor of Biological Sciences at Hunter College and a member of the Programs in Biology and Biochemistry at the Graduate Center. She has been involved with RCMI, MARC, MBRS, AGEP, McNair, AMP and other STEM programs that sponsor underrepresented minorities.

Dr. Henderson received the PhD in Genetics and Molecular Biology from the University of North Carolina. She is a recipient of the Yasuda International Award for Research and the Leukemia Society of America Scholar Award. She has authored more than 200 publications on Genetics, Cell Regulation and Environmental Hazards.

SHIRLEY KENDALL

Brookhaven National Laboratory

Shirley Kendall is the Manager of the Diversity & Inclusion Office and the Office of International Services at Brookhaven National Laboratory. She is responsible for driving Brookhaven National Laboratory's diversity management and affirmative action strategies to facilitate "Employer of Choice" standing. Her goal is to partner with business leaders, world-class scientists, and talented employees to create high performance teams that will assist Brookhaven National Laboratory in becoming a frontrunner in advancing the frontiers of science and energy-related research among the Department of Energy's national laboratories. By positioning diversity as both dynamic and interactive, she focuses on diversity as a journey and not a destination. Through management partnerships, awareness education and skills training she promotes valuing diversity and accountability, at both the organizational and individual levels.

Prior to joining Brookhaven National Laboratory in 2003, she served in a variety of diversity leadership roles at the City of Rochester, State University of New York and Independent Media and Sales. Her experience in the diversity arena spans 20 years. She is also president of the Long Island - Industrial Liaison Group, an OFCCP partner association.

Education:

- Cornell University ILR School of Industrial and Labor Relations; M.S and B.S. in Education & Mathematics.
- Cornell Certified Diversity Professional (CCDP)

SHAIFALI PURI

Scientists Without Borders

Shaifali Puri is the Executive Director of Scientists Without Borders, a public/private partnership conceived of by the New York Academy of Sciences in conjunction with the United Nations Millennium Project and the Earth Institute. Scientists Without Borders provides a free web-based platform that uses open and collaborative innovation to generate, share, and advance innovative science and technology-based solutions to the world's most pressing global development challenges. Through its open platform, Scientists Without Borders enables and leverages its worldwide user base and strategic partner network to frame and collaboratively tackle specific scientific or technological challenges in areas of critical global need, and to exchange resources and expertise. Scientists Without Borders's partners and supporters include a diverse array of leading NGOs, research institutions, and multi-national corporations.

Prior to being named Executive Director of Scientists Without Borders, Shaifali was the Senior Advisor to the President of the Empire State Development Corporation, the economic development arm of the State of New York. In that capacity, she helped to supervise the operations of the 550-employee agency with a \$50 million annual operating budget and a \$500 million capital and program budget. Shaifali also helped to devise and direct strategy for major economic development projects and programs in New York. Earlier in her career, she was an Assistant Solicitor General for the State of New York and a journalist at *Fortune* magazine.

Shaifali received her AB from Princeton University and her law degree from Stanford Law School. In addition to being a Term Member of the Council on Foreign Relations, Shaifali serves on the Advisory Council for the Digital Health Initiative of the United Nations Office of Partnerships, and in January 2011, she was nominated by Mayor Michael R. Bloomberg to the Board of the New York City Economic Development Corporation. Shaifali has spoken at and presented at numerous conferences on fostering international science collaboration, the use of science, technology, and innovation to tackle global development challenges, and social innovation and entrepreneurship.

GAIL SMITH

The Graduate Center, City University of New York

Gail Smith received her Ph.D. in classical philology from New York University with a thesis entitled *The Importance of Miracle to the Religion of Plutarch of Chaeroneia*. Since 1999 she has served as Principal Investigator/Program Director for two CUNY-wide graduate education programs geared toward broadening participation in the STEM and SBE sciences: the National Institutes of Health/Bridges to the Doctorate Program and the National Science Foundation Alliance for Graduate Education and the Professoriate (AGEP) Program. In this capacity, Dr. Smith works with administrators and faculty throughout CUNY as well as with CUNY's partnering institutions - New Jersey Institute of Technology, Polytechnic at New York University, Stevens Institute of Technology, University of Michigan, Michigan State University and Wayne State University - to provide financial, social and professional development support for master's and doctoral students from underrepresented groups in STEM and SBE fields with a view to diversifying the professoriate.

Prior to this, from 1991-2007 Dr. Smith, as Director of the Office of Educational Opportunity and Diversity Programs (OEODP), directed the CUNY Pipeline Program for Careers in College Teaching and Research, funded by the Irene Diamond Fund and the City University of New York. This is an undergraduate program designed to encourage CUNY honors students from underrepresented groups to enter doctoral study in preparation for an academic career.

Dr. Smith combines her commitment to this mission with research in classical studies as professor of classics at Brooklyn College, where she served as Acting Chair of the department in Spring 2010. A former editor and book reviewer for *The Classical Outlook*, she has published on ancient drama and is completing books on Euripidean tragedy and on Plutarch's religious philosophy.

SOPHIA N. SUAREZ

Brooklyn College, CUNY

Dr. Sophia Suarez is an Assistant Professor in the Physics Department at Brooklyn College at the City University of New York (CUNY) and a member of the CUNY Graduate Center Doctoral Faculty in Physics. Dr. Suarez received her BA/MA IN Physics from Hunter College and her Ph.D. in Experimental Condensed Matter Physics from the CUNY Graduate Center. She spent two and a half years in the Chemistry Division at the US Naval Research Laboratory in Washington, DC, as a National Research Council (NRC) post-doc fellow. There she designed and developed high-pressure Nuclear Magnetic Resonance (NMR) technique for the study of polymeric systems. After completing her post-doc, she spent two years as a Lecturer in the Physics Department at Howard University in Washington, DC. She has authored and co-authored several peer reviewed publications. She is also the recipient of several fellowships and awards.

Her research was and is focused on the use of NMR to study various types of materials, mainly with application in electrochemical devices such as lithium ion batteries and fuel cells. Materials studied includes proton conduction electrolytes for use in proton conduction membrane fuel cells, lithium ion conductors for use in lithium ion batteries, and various superacids in a fundamental study of proton conduction mechanisms in aqueous systems.

Dr. Suarez is also the Woodrow Wilson National Fellowship Foundation and the Andrew W. Mellon Foundation recipient of the Career Enhancement Fellowship for Junior Faculty for outstanding scholarly and teaching qualifications.

WANDA E. WARD

National Science Foundation

Dr. Wanda E. Ward is Sr. Advisor to the Director for Planning and Assessment at the National Science Foundation (NSF). Throughout her tenure at NSF, Ward has served in a number of science and engineering policy, planning, and program leadership capacities in the Directorate for Education and Human Resources (1992-1997; 2006-2010), Office of the NSF Director (1997-1999; 2010-present); and Directorate for Social, Behavioral and Economic Sciences (1999-2006). From 2001-2002 she was on assignment at the Council on Competitiveness as Chief Advisor to the initiative, BEST (Building Engineering and Science Talent), where she provided leadership in the launch and development of this public-private partnership, established to carry out the implementation of a national diversity initiative called for by the Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development.

Since joining the Foundation, Dr. Ward has also led or served on several NSF and interagency task forces, working groups, commissions and committees. These include: Co-Chair, Subcommittee on Social, Behavioral and Economic Sciences (SBES), the President's National Science and Technology Council (NSTC) Committee on Science (COS , 2004-2005); and NSF representative to the Interagency Working Group on the U.S. Science and Technology Workforce of the Future, NSTC COS (1997-1999). Since 2007, she has served as a member of the International Social Science Council (ISSC) Committee for Developing and Transition Economies (CoDATE).

Prior to joining NSF, Dr. Ward served as tenured Associate Professor of Psychology and Founding Director of the Center for Research on Multi-Ethnic Education at the University of Oklahoma, Norman. She took the B.A. in Psychology and the Afro-American Studies Certificate from Princeton University and the Ph.D. in Psychology from Stanford University. She was awarded the Ford Foundation Fellowship, the 2005 American Psychological Association Presidential Citation, the 2006 Presidential Rank Award for Distinguished Executive and the 2006 Richard T. Louttit Award.

ORAL PRESENTATIONS

ROOM C204

Zoltan Boka

PRAGMATIC AND ASSOCIATIVE WORD LEARNING BY YOUNG CHILDREN

Zoltan Boka, Speech, Language and Hearing Sciences, The Graduate Center, CUNY

Objective: To review the state of current research as it relates to fast mapping and extended fast mapping of words in the context of associative and pragmatic word learning. **Method:** A review of the highlights of thirty-two years of research, with the following questions in mind: (I) How do children learn words? (II) What support exists for the following schools of thought: associative and pragmatic word learning, as well as fast mapping and extended fast mapping? (III) How well do the theories of fast mapping and extended fast mapping answer questions of word learning when it comes to different classes of words such as nouns, adjectives and generics? **Results:** The existing literature showed considerable disagreement between those like Smith and Samuelson (1998) who supported associative learning and Diesendruck (2005) who favored pragmatic learning. Nevertheless there was more agreement when it came to the validity of Carey (1978)'s work on fast mapping; there the issues were whether fast mapping was useful in different categories of words. The general consensus was that nouns were most amenable to the process of fast mapping and extended fast mapping. **Conclusions:** A number of potential research areas are suggested and discussed, including fast mapping and special populations, with a focus on second language learners and autism, and the impact of external disturbances such as noise on fast mapping.

Author Keywords: Adjectives, Associative Learning, Extended Fast Mapping, Fast Mapping, First Language Learning, Generics, Nouns, Pragmatics. From spatial learning to disease control: A case study of *Nautilus pompilius*

Gregory Barord

FROM RESEARCH TO ANTIBIOTICS: A CASE STUDY ON THE CHAMBERED NAUTILUS

Gregory J. Barord, Jennifer A. Basil, Cheng Hui Ju

The City University of New York Graduate Center and Brooklyn College

The chambered nautilus, *Nautilus pompilius*, is being used as a model organism to determine how the nervous system of cephalopods has evolved. The specimen detailed here was intended for trials but soon after arrival, developed an infection characterized by substantial mucus production. All extant species of nautilus are only found throughout the Indo-Pacific region so they must be caught and shipped thousands of miles to the laboratory and several problems may arise as a result. Upon arrival from the field, some nautilus may be positively buoyant for an indeterminate amount of time and unable to regulate their buoyancy and behave normally in the captive environment. This problem usually remedies itself once the specimen has acclimatized to its new environment and no human intervention is required. Additionally, captive nautilus develop black markings along their shell during growth but this occurrence does not appear to affect the nautilus in any negative way. Finally, some nautilus may develop an infection characterized by mucus production around the eyes, hood, or tentacles. While the first two problems, buoyancy regulation and black shell growth, are not necessarily fatal, the production of mucus, especially around the tentacles, appears to be deadly in a majority of cases. The specimen in this case study exhibited all three of these problems, most notably the mucus infection.

The specimen was acclimatized to its holding center in Brooklyn College along with 4 other specimens for approximately one hour with no problems. Soon after, mucus was observed around its left eye and immediate action was taken. The nautilus was transferred to a 'hospital' system for isolation and treatment. At this time the mucus was removed with an alcohol pad or q-tip and 10%

argentyne was flushed around the eye, hood, and tentacles. This process was repeated several times and although the mucus did subside for one or two days, it eventually came back. After much consultation and research, a secondary treatment protocol was developed. The nautilus was given a bath treatment in a saltwater solution containing oxytetracycline (50mg/L) for 15 minutes every other day for one week. The argentyne treatment was also continued during this week on the off days. Upon completion of this treatment protocol, the specimen was closely observed in the hospital system for 30 days and no further mucus production was recorded. The specimen was moved back to the population and is currently being used in spatial experiments with no further problems. It can be difficult to develop treatment protocols for cephalopods because of their short life spans; senescence may be mistaken as a disease and any treatment would therefore be useless. Nautiluses, however, are long-lived cephalopods and successful protocols can be developed. The difficulty in this, however, is that by the time the infection produces observable symptoms, the infection may be systemic. The treatment protocol outlined here is crucial for disease treatment because this method proved effective against a common and deadly infection. In this case, the mucus was recognized early enough and the aggressive antibiotic treatment of oxytetracycline coupled with argentyne eliminated the problem. Nautiluses are becoming threatened in many native areas, so successful treatments are crucial to continued laboratory study aimed at gathering additional evidence to provide nautiluses with proper protection in the wild.

Nathan Hossannah

EFFECTS OF AEROSOLS ON MICROPHYSICS AND WARM SEASON PRECIPITATION IN A COMPLEX URBAN ENVIRONMENT

- 1) Nathan Hossannah, Mechanical Engineering, CUNY Graduate Center/CCNY
- 2) Dr. Jorge Gonzalez, Mechanical Engineering, CCNY, CUNY
- 3) Dr. Daniel Comarazamy, Post Doctoral Fellow, CCNY, CUNY

Studies have found evidence of warm-season rainfall increases over and downwind of major cities, such as Atlanta, Phoenix, Mexico City, St. Louis, and Chicago. This precipitation increase has been predominately attributed to the induced updraft of warm air masses. Aerosols are abundant in urban environments, and it has been hypothesized that they play a role in the water balance of humid regions. High concentrations of cloud condensation nuclei (CCN) may induce precipitation in humid urban environments; however, it is also noted that precipitation may also be reduced due to excess CCNs or by the presence of large aerosols, known as giant cloud condensation nuclei (GCCN). The present research is directed towards improving our understanding of the role of aerosols in cloud processes in complex coastal urban environments, through ground observations obtained from AERONET, and weather stations across the New York City and New Jersey region and by use of numerical modeling. Growth of particles from CCN to rain droplet sizes is explored for characteristic aerosol distributions obtained from these observations. The role of aerosols in precipitation is investigated through numerical analysis of cloud microphysics by implementing population growth by condensation, collision, and coalescence within the computational model. In-situ microphysics data from observations is ingested into the urbanized mesoscale Regional Atmospheric Model System (RAMS) to explore fundamental questions aimed at discerning local precipitation attributed solely to the presence of atmospheric aerosols and precipitation caused by convection.

ORAL PRESENTATIONS

ROOM C205

Brooke Odle

TOWARDS THE DEVELOPMENT OF A COMPUTATIONAL MODEL FOR WHEELCHAIR PROPULSION

Brooke M. Odle^{1,2}, Gail Forrest^{2,3}, Trevor Dyson-Hudson^{2,3}

1. New Jersey Institute of Technology, Department of Biomedical Engineering, Newark, NJ, USA
2. Kessler Foundation Research Center, West Orange, NJ, USA
3. University of Medicine and Dentistry of New Jersey, New Jersey Medical School, Newark, NJ, USA

Manual wheelchair using individuals with spinal cord injury (SCI) are at risk for developing shoulder injuries; and computational biomechanical models have been developed to investigate shoulder biomechanics during propulsion to elucidate potential causes of shoulder pain and injury. However, none of the current models are specific to individuals with tetraplegia, who may be at an even greater risk due to partial innervation of the shoulder muscle complexes. Therefore, the aim of this research project is to develop a computational model of the shoulder to simulate wheelchair propulsion in individuals with tetraplegia.

The model will be developed with OpenSim, open-source software that allows for the integration of kinematic, kinetic, and fine wire electromyographic (EMG) data to drive a neuromuscular biomechanical model. The model will include head, trunk and upper limb segments and 13 major muscles of the upper limb. Data from 21 individuals with tetraplegia collected during trials of manual wheelchair propulsion, will serve as inputs to the model. Model outputs include parameters such as: muscle activation, muscle force and joint torques during wheelchair propulsion.

OpenSim allows users to develop neuromuscular models by modifying existing library models. The first version of our model was developed by modifying and combining: i) Stanford VA Model by Holzbaur and colleagues and ii) Head and Neck Model by Vasavada and colleagues. Although, this model consists of a head, trunk, and upper limb, a major limitation is that it does not accurately reflect wheelchair propulsion. Specifically, the shoulder moves as a function of the scapula while the trunk is fixed, which is not how wheelchair users propel their wheelchair. Also, the combination model is purely descriptive, based on kinematics and cannot be utilized for forward simulations. An updated and second version of our model is currently being developed using the Arm26 Model - a planar arm model. This model also has limitations, so further modifications are anticipated to satisfy the research goals, including: i) Adding degrees of freedom to the shoulder and wrist; ii) Adding upper limb muscles; iii) The shoulder joint will need to be further modified so that it moves along the ribcage, which is more accurate for simulating the movement of the shoulder during wheelchair propulsion.

Our research is extremely novel to shoulder biomechanics and wheelchair propulsion. Critical to the clinical interpretation and understanding of the relationship between manual wheelchair propulsion and upper limb pain/injury, is the accuracy, reliability and repeatability of our model. Subsequently, the development of the model could undergo a number of iterations before an optimal model is completed. Ultimately, our model could have a strong clinical impact in the diagnosis, cause and treatment of shoulder injury for individuals with tetraplegia who are manual wheelchair users.

Kerry-Ann White

A QUALITATIVE ANALYSIS AND COMPARISON OF THE EDUCATIONAL TECHNOLOGY DIFFUSION AND ATTITUDE TOWARD COMPUTING TECHNOLOGIES, OF THE MINISTRY OF EDUCATION, PRINCIPALS, AND TEACHERS, IN PRIMARY AND SECONDARY PUBLIC SCHOOLS IN JAMAICA

Kerry-Ann White, Polytechnic Institute of NYU

Given the lack of computer diffusion studies in the Caribbean, and coupled with the necessity to understand Jamaica in efforts to get a clearer global picture on the digital divide, this study takes an exploratory approach and examines the differences of the computer technology adoption and diffusion attitudes and viewpoints between the three levels of administration and how it defers from the attitudes and viewpoints of the parents. Using a technology management lens influenced by educational technologies and the digital divide, this study explores qualitative data collected from three to four schools in each of the selected parishes. The data will be analyzed using open coding approach and a qualitative software tool to uncover emerging themes in the data. These themes will be linked and discussed throughout the chapter dedicated to the results of this research. As such, I aim to understand and expose issues related to the extent to which Jamaican primary and secondary schools adopt computers. The findings of this qualitative study will be published and may serve as a catalyst of change for the Jamaican education system regarding computer adoption and diffusion in public primary and secondary schools.

Nathan Woods

ENVIRONMENTAL EXPERTISE IN THE AGE OF RESEARCH: INSTITUTIONAL PROCESS AND ENVIRONMENTAL SCIENCE IN THE AMERICAN FAR WEST, 1950-2009

Nathan D. Woods

Department of Anthropology, CUNY Graduate Center

The mid 1960's witnessed the beginning of an institutional movement to develop distinct academic programs centered upon the interdisciplinary integration of environmental research. While the current literature suggests that environmental expertise grew in reaction to institutional pressures created by the implementation of NEPA and political pressure from the Environmental Movement, this study asks whether the long term trajectory of professional development in environmental research has been driven by patterns of disciplinary innovation, by emerging areas of environmental concern, or by a perceived market demand for environmental expertise. Based on a multi-method fieldwork design, this study establishes a comparative, regional chronology for this development based on three case studies in the American Far West--The University of California-Santa Barbara; Oregon State University; and Washington State University. It argues that the institutional growth of the environmental sciences for these cases has been driven as much by patterns of scientific change as by the changing efforts to legitimize science-based policy as a public good. At the regional level, early efforts to institutionalize environmental science programs were shaped equally by the disciplinary make-up and academic ambitions of the Universities, and by the professional and informal institutional networks integrating universities into regionally distinct economies—a process that often involved local nonprofits, government agencies, and groups such as Agricultural Extension. These institutional conditions shaped the evolving curricula, and created a context for the public, regional image of the environmental scientist, as well as the incorporation of environmental scientific expertise into regionally relevant networks. The study suggests that understanding how environmental expertise has been variously incorporated into regionally distinct institutional geographies has bearing on current efforts to develop science policy sensitive to the increasingly fluid, interdisciplinary, and problem based social organization of scientific knowledge.

POSTER PRESENTATIONS

ROOM C201-C203

Oreoluwa Adetola, et al.

EVALUATION OF PHYTOTOLERANCE OF HEAVY METALS TOXICITY BY SELECTED RICE *ORYZA SATIVA* L. CULTIVARS

Oreoluwa Adetola¹, Jeffrey Guard^{1&2}, Michael Gordon³, Jessica Donnelly³, CM Maliti¹, T Jaradat¹, Francisca Villar^{1&2}, Edward Thomas¹, Kojo Wallace¹, Terrance Burks¹, Abubakar Jalloh¹, DV Basile²,
¹Bronx Community College, ²Lehman College, CUNY, ³Dominican College of Blauvelt New York.

Rice is an important food crop. Toxicity of aluminum, cadmium and zinc exacerbated by mining and industrial activities, significantly limits rice production. Accumulated toxic metals in edible plants are harmful to humans. Urgent remediation of Al, Cd and Zn contaminated soil sediments and aquatic systems in order to minimize exposure of humans to the toxicity is required. In this study, tolerance properties of selected cultivars cell lines were evaluated using tissue culture techniques *in vitro*. Our experiments involved greenhouse and *in vitro* studies of B217, IR36, and A301 cultivars. In the *in vitro* studies, F tests and t-tests of growth parameters of 7 day old A301 seedlings, treated with 50 mg/L Al (NO₃)₃, 50 mg/L CdSO₄ and 50 mg/L ZnSO₄ were carried out for mean separation of growth parameters. The cell proliferation in B5 and MS culture media supplemented with the selected heavy metals was evaluated based on callus fresh weight and biomass accumulation in mg. Preliminary results indicate minimal level tolerance to the metal toxicity based on differences in both fresh weight and biomass (mg) accumulation in cell lines of A301, B217, and IR36 treated with the heavy metal relative to the control treated with potassium at p = 0.05. In A301, the results were Al³⁺ (72.00 ± 8.09), Cd²⁺ (91.00 ± 9.16), Zn²⁺ (93.33 ± 13.48), and the control (K) mean value was 80.25 ± 7.00. Experiments are in progress to evaluate the comparative phytoextraction capacity of the selected cultivars and the cultivars potential of phytoremediating toxic heavy metal ion contaminants in fresh water systems and soil sediments.

Laura Aguilera

AGE-RELATED CHANGES IN BONE TISSUE PROPERTIES IN THE *OIM/OIM* MOUSE MODEL OF OSTEOGENESIS IMPERFECTA

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Osteogenesis Imperfecta (OI) is a rare disease that results in bone fragility; the phenotype of patients range from mild to severe. *Oim/oim* is a well characterized mouse model of type III OI. The purpose of our study is to characterize the changes in tissue-level properties of *oim/oim* mouse bone with age and determine whether they parallel the changes observed in human diseased tissue. Microcomputed tomography (Micro-CT), attenuated total reflection spectroscopy (ATR), x-ray diffraction (XRD), and bioassays to measure calcium, phosphate, and collagen content, were used to characterize bone tissue from *oim/oim* mice at 3 and 6 months as well as their wild-type counterparts.

Our results indicate that the carbonate content of the bone mineral increases with aging in both *oim/oim* and WT (ATR), that the mineral content decreases in *oim/oim* but increases in WT (ATR and Ca/PO₄), and the mineral crystal size decreases with aging in the *oim/oim* while increasing in WT tissue (ATR and XRD). The hydroxyproline assay shows that the collagen content decreases with aging in

oim/oim, while it increases in WT, but the degree of collagen cross-linking of the bone tissue increases with aging in both *oim/oim* and WT.

By identifying changes within the tissue properties, our goal is to understand how the relationship between the specific tissue parameters manifests themselves in the mechanical properties of bone in fragility diseases. Generally, characterizing the tissue properties of this model with age will help us to better understand bone disease and relationship between tissue level properties and bone mechanics.

Adanna Alexander

SEARCHING FOR APL-1 INTERACTING PARTNERS AND THEIR IMPLICATIONS IN SOLVING THE MOLECULAR PUZZLE OF ALZHEIMER'S DISEASE

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Alzheimer's Disease (AD) is a progressive neurodegenerative disorder and is a major cause of dementia in the United States of America. One of the characteristic pathologies of AD is the presence of beta-amyloid plaques in the brains of patients. In humans and mice, beta-amyloid is a cleavage product of amyloid precursor protein (APP), which belongs to a family of proteins, all possessing high sequence similarities. This makes it difficult to study AD in mammalian systems. Fortunately, the nematode *C. elegans*, contains only one APP related gene: *apl-1*. APL-1 is comprised of a cytosolic domain, a transmembrane domain and an extracellular domain (APL-1EXT).

Loss of APL-1 results in larval lethality, due to impaired molting and morphogenesis. Experiments, in which these APL-1 domains were sequentially removed, showed that APL-1EXT expression from neurons was sufficient for *C. elegans* viability. However, when APL-1 is knocked down using RNAi, these animals do not survive. Although this is known, the precise function and interacting partners of APL-1 and APL-1EXT remain a mystery. To address this problem, a genome wide RNAi screen and EMS screen are being employed.

In this study, RNAi is used to knock down the gene product of each gene in the *C. elegans*' genome, in heterozygous animals, containing only one functional copy of *apl-1*. From this screen, I expect to find suppressors of *apl-1* lethality, that is, animals that are able to survive due to the knockdown of a specific gene, in the absence of *apl-1*.

An EMS screen is also conducted, using animals that contain only APL-1EXT. EMS causes random point mutations in random genes; I am searching for a mutation that will allow these animals to survive when APL-1 is knocked down using RNAi. This screen will identify genes and protein domains that are necessary for APL-1 signaling.

Together, these screens will allow for the identification of gene products that are present in the APL-1 pathway, taking us a step closer to solving the puzzle of AD.

Travis Alvarez

ELEVATED BRIEF SYMPTOM INVENTORY SCORES IN OUTPATIENTS WITH ACQUIRED BRAIN INJURY: PSYCHOPATHOLOGY OR COGNITIVE/PHYSICAL SYMPTOMS?

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Our goal was to create and compare three BSI subscales (psychiatric, brain injury, and cognitive deficit) in ABI patients and non-ABI controls. We also sought to demonstrate the probable misinterpretation of elevated BSI scores for ABI patients as an indicator of psychopathology as opposed to merely reflecting the cognitive/physical symptoms of the brain injury. Participants included 60 ABI patients and 30 non-ABI controls systematically selected from the NYU Rusk Institute of Rehabilitation Medicine.

Participants completed the BSI, a 53-item written self-report inventory intended to measure psychological symptom patterns. Data Analysis: Three BSI subscales were created and compared: brain injury, cognitive deficit, and psychiatric. The 11 brain injury subscale items included symptoms frequently occurring after brain injury (e.g., feeling easily annoyed or irritated). The 6 cognitive deficit subscale items included symptoms likely to result from neuropsychological impairment (e.g., trouble remembering things). The 5 psychiatric subscale items included psychiatric rather than neuropsychological symptoms (e.g., the idea that someone else can control your thoughts). Independent samples t-tests were used to compare group means across the three subscales. Effect size calculations utilized Cohen's d. Results: The ABI group's mean scores for the brain injury and cognitive deficit subscales were 2 and 3 SDs, respectively, above the control group's means ($p < .01$). The ABI group's mean score for the psychiatric subscale was 1 SD above that of controls ($p < .05$). Effect sizes for the brain injury and cognitive deficit subscales were large and were medium for the psychiatric subscale. As anticipated, the ABI group had statistically and clinically elevated scores for all three subscales as compared to controls. These preliminary findings highlight the need for separate BSI norms for ABI patients. BSI scores for ABI patients are greatly elevated, but the reasons for these elevations must not be misinterpreted clinically.

Carolyn Aquino

THE 12 JANUARY, 2010 EARTHQUAKE TURBIDITE, OFFSHORE PORT AU PRINCE, HAITI

Carolyn Aquino and Cecilia McHugh

School of Earth and Environmental Sciences

Queens College, CUNY

An earthquake-generated deposit was characterized in order to reconstruct the subaqueous paleoseismic history of the Enriquillo-Plantain-Garden Fault (EPGF) offshore the southern peninsula in Haiti. As part of an NSF RAPID response to the Jan 12, 2010 earthquake, we mapped the offshore structures associated to the Enriquillo Plantain Garden Fault offshore and recovered gravity cores from 4 m to 1750 m from the *R/V Endeavor*. Mass-wasting and gravity flow deposits from the last and older earthquakes were tracked from the Léogâne delta and along the coast to the deepest depocenter. ^{234}Th and ^7Be with half-lives of 24 and 53 days respectively verified the January 12 turbidite and indicated an influx of terrigenous sediment mixed with marine sources. An $\sim 0.03 \text{ km}^3$ and $>1 \text{ m}$ thick turbidite was deposited over 50 km^2 in the deepest basin within the Canal du Sud depocenter (1750m). The sandy parts of all cores recovered from 1,700 m water depth in the Canal du Sud reveal alternate episodes of traction deposition and erosion that reflect pulses of increased energy fluctuations consistent with long waves. These currents are likely generated by seiches and tsunamis. In the deepest waters of Canal du Sud at 1750 m, we observed a 600 m thick layer of sediment that was still in suspension almost two months after the earthquake. Deep marginal basins adjacent to strike slip margins are important sites for tracking paleoseismic records critical for understanding the rupture history of these faults.

Hanying Bai

BIOMINERALIZATION STRATEGY FOR FABRICATION OF NANOMETER-SIZE DEVICES

Hanying Bai, Parminder Jeet Kaur, Hiroshi Matsui*, Hunter College, CUNY

There are numbers of strategies to synthesize crystallized nanomaterials, such as liquid-liquid interface interaction, surfactant capped and stabilized, seed induced crystallized growth, catalysis, etc. Our research focuses on biomineralization process through mineral-coating on biotemplates that were pre-bound with powerful functionalized peptides. The basic idea is that biological molecule was used as biotemplate, which has two characters, one is uniform size and rigid structure, and another is catalysis function coming from amino acids included in the molecule itself, those biotemplates can not only react with inorganic precursors, but also pre-bind with specific function small peptides via hydrogen-

bond and make following synthesis procedure. Due to small peptides' specific or catalytic function, some semiconductor coatings could be developed at room temperature or lower on the biotemplate.

Vivienne Baldassare

DEREDDENING THE INFRARED SPECTRA OF LOW GRAVITY L DWARFS

Vivienne Baldassare (Hunter College), Kelle Cruz (Hunter College)

The spectra of young brown dwarfs, which are cool, substellar objects, differ from those of older brown dwarfs due to dust and clouds in the atmospheres of the young objects. The goal of my research is to study the nature of this dust in order to understand the physical processes that help shape the spectra of brown dwarfs.

Brown dwarfs never get hot enough to fuse hydrogen to helium as normal stars do. They have surface temperatures below ~3000 K, and they fade with time. The coolest brown dwarfs can be ~800 K. These objects are numerous in our universe and have masses that fall in between those of stars and planets.

There is an interstellar reddening law that is applied to correct the spectra of stars that have interstellar dust in front of them. When applying this law to the spectra of the young, dusty brown dwarfs, their spectra begin to look like those of the older brown dwarfs. This is unexpected; the law is intended for objects that have dust somewhere between them and us, and the brown dwarfs have dust that is very close to them, contained within their atmospheres. By applying this law to the young brown dwarfs, we are hoping to understand why a law that is intended to correct for interstellar dust works when trying to correct for the dust in the atmosphere of brown dwarfs. If we can understand why this law works, we may be able to better understand the atmospheres of brown dwarfs and why the young brown dwarfs have dustier atmospheres than old ones.

Mohammed Benalla

THE DETERMINATION OF THE LACUNAR-CANALICULAR PERMEABILITY OF BONE USING CYCLIC LOADING

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Bone interstitial fluid movement is essential for the viability of osteocytes and believed to play a major role in the bone mechanosensory mechanism. However, the intrinsic permeability that is one of the most important properties of the osseous fluid is still not accurately determined. The objective of this study is to relate the lacunar-canalicular permeability to a particular phase angle that is measurable when the bone is subjected to infinitesimal cyclic strain. The phase angle of interest is the lag angle between the applied strain and the resultant stress. For this reason a poroelastic model of the phase angle is developed from the governing equations of the theory of anisotropic poroelastic materials that represents the lag angle between the applied strain and the resultant stress. The analytical model of this paper is extended to be combined with the experimental results in order to determine the lacunar-canalicular permeability of bone tissue. For this reason, the experimental results will be curve fitted with the theoretical model in order to determine the PLC permeability. And, an accurate determination of the PLC permeability will improve our ability to understand mechanotransduction and mechanosensory mechanisms, which are fundamental to the understanding of how to treat osteoporosis, how to cope with microgravity in long term manned space flights and how to increase the longevity of prostheses that are implanted in bone tissue.

Shawna Benjamin

EFFECT OF CO-ENZYME ON CANCER CELL PROLIFERATION AND SURVIVAL

Shawna Benjamin*1, Maria L. Cotrina, Ph.D. 2 and Regina Sullivan, Ph.D.1
Queensborough Community College, Bayside, N.Y.1 and Columbia University, N.Y. 2

Cancer cells are characterized by a high-energy demand required by increased proliferative rate of the tumor. Paradoxically, cancer cells utilize aerobic glycolysis instead of oxidative phosphorylation as the main glucose metabolic pathway (the so-called Warburg effect). We hypothesized that favoring oxidative phosphorylation in cancer cells may promote a metabolic switch back to the more efficient glucose utilization pathway and this, in turn, may reverse cancer cells towards their normal phenotype, by decreasing proliferation and increasing cell death. In this study we tested the effect of co-enzyme Q10 (CoQ10) on proliferation and cell survival of the breast adenocarcinoma cell line MDA-MB-231. CoQ10 is a naturally occurring substance directly involved in the electron transport chain and is commonly prescribed for the treatment of mitochondrial disorders and heart failure. We first incubated cultured 231 cells with 1-100 M CoQ10 for 2-24 hours and then analyzed cell proliferation by indirect immunofluorescence using the antibody Ki67, and indicator of mitosis. Cell death was concomitantly monitored with propidium iodide, a cell death marker that only labels nuclei of dying cells. Changes in mitochondrial morphology (indicator of respiration activity) were also studied with the use of the fluorescent indicator MitoTracker, which labels mitochondria in active, living cells. These experiments will establish a standard protocol to evaluate the potential of energy enhancing compounds as anti-cancer therapy. Our preliminary results show that CoQ10 may influence MDA231 cell proliferation and the experimental system is applicable to the study.

Liufei Cai

JOSEPHSON JUNCTION AS A MAGNETIC SWITCH

Liufei Cai and Eugene Chudnovsky
CUNY Lehman College and Graduate Center

Can we switch a nanomagnet qubit by applying a voltage only? In this work, we study electromagnetic interaction of a nanomagnet with a weak superconducting link. Through numerical investigation, we show that despite very weak magnetic field generated by the weak link, a time-dependent bias voltage applied to the link can initiate a non-linear dynamics of the nanomagnet that leads to the reversal of its magnetic moment. We also consider quantum problem in which a nanomagnet interacting with a weak link is treated as a two-state spin system due to quantum tunneling between spin-up and spin-down states. Hence a model for building a quantum storage is proposed.

L. Cai and E. M. Chudnovsky, Phys. Rev B **82**, 104429 (2010).

Natalie Dastas

PALYNOMORPHS OF THE CLAYTON FORMATION, SOUTHEASTERN MISSOURI, AS AN INDICATION OF TIME THROUGH THE K/T MASS EXTINCTION EVENT

Dastas, Natalie, Brooklyn College, Dept. of Earth & Environmental Sciences

A sequence of Late Cretaceous to Early Tertiary deposits are exposed in the southeast region of Missouri's boot-heel; the sequence is composed of three main units, the Owl Creek, Clayton and Porters Creek Formations which are evidence in support of the K/T extinction event. One of the main problems that this research project aims to resolve is to determine the timing and process related to the coquinite zone located in the base of the Clayton Formation, in relation to the impact. The deposition of the Clayton Formation was believed to have formed after the Earth experienced a devastating impact by an asteroid approximately 65.5 million years ago in the late Cretaceous. Campbell et al. has postulated that the coquinite represents reworking due to a tsunami produced by the impact. In this circumstance, all of the fossils within the coquinite layer including the microfauna and microflora should

be Cretaceous in age. A second hypothesis relates the coquinite to long term reworking of the underlying Owl Creek Formation, forming a lag deposit during an early Tertiary sea level rise. Cretaceous macrofossils with Tertiary microfossils might suggest this scenario. A third possibility is that some of the Cretaceous fauna, such as ammonites, survived for a time after the impact. Ammonites with Tertiary microfossils preserved in the phragmacones would be strong evidence for this last hypothesis. The project encompasses palynological analysis and identification of palynomorphs with focus on dinoflagellates, for all three formations aforementioned. Palynological analysis is used to correlate and establish relative ages of rock strata using fossil assemblages. Samples have been collected systematically throughout the sequence and will also include analysis of sediment preserved within the phragmacone of a baculite and scaphite discovered at the site. The analysis aims to provide evidence for the cause of deposition of the Clayton formation and may provide clarity as to whether deposition was caused by a megatsunami or is possibly a transgressive lag deposit.

Carolyn Diaz

FORWARD GENETIC SCREEN FOR GENES REQUIRED FOR NEURONAL MORPHOGENESIS IDENTIFIES AUTOPHAGY-RELATED 1 (ATG1)

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Neurodegeneration causes a gradual loss of the branches associated with and dendrites, affecting the connectivity of neurons. Axon and dendritic branches must grow to their proper shapes, but then must also be maintained in order from proper nervous system function. Elucidating the molecular and genetic causes of morphogenesis and neurodegeneration has importance for understanding diseases of the nervous system, such as Parkinson's, Alzheimer's and Huntington. In an attempt to better understand these processes, we used a forward genetic screen in *Drosophila melanogaster* to identify a complementation group consisting of four alleles that all showed similar dendritic abnormalities. We named this group *dar9*, for *dendritic arbor reduction 9*. All *dar9* mutants exhibited reduced dendritic branching phenotypes. One line, *dar9[1342]*, had an additional defect in axon guidance. We performed mapping experiments to identify the gene mutated in these lines, and to determine whether the axon guidance phenotype in *dar9[1342]* was simply a stringer allele, or was due to a second mutation. To map the line we performed genetic crosses between the mutant line and several deficiency strains containing large deletions on the third chromosome. We identified one strain that was lethal with *dar9[1342]*, and localized the mutation to cytological interval 73-84. One of the genes within this region is *Autophagy-related 1 (Atg1)*, also known as *unc-51*. Atg1 is a serine/threonine kinase responsible for the formation of autophagosomes and cytoplasm-to-vacuole targeting vesicles. We found that *dar9[1342]* is lethal in combination with *atg1*, and phenotypic analysis indicates that the axon defects of *dar9[1342]* arise at least in part from mutation of *Atg1*. The mechanisms of control of axon morphology by Atg1 await investigation but could involve defective autophagy or defects in axonal trafficking. By contrast, other *dar9* alleles were not lethal with *atg1*, or with a deficiency that removes *atg1*, suggesting that different mutations may be responsible for the axonal and dendritic defects observed. Indeed, we have mapped these other lethal mutations using deficiency mapping to a different genomic interval, and are currently carrying out complementation analysis and phenotypic analysis of candidate genes to identify the gene that is responsible for the *dar9* morphology. Our results suggest a role for Atg1 in sensory axon morphogenesis, and uncover a new genomic region that is important for proper dendritic development. We expect that follow-up studies on these lines will aid in understanding the mechanisms of neuronal morphogenesis and maintenance.

Karla Dixon

THE EFFECT OF TYPE III NEUREGULIN1 ON THE DEVELOPMENT OF CHOLINERGIC NEURONS IN BASAL FOREBRAIN NUCLEI

Karla S. Dixon¹; Marjolijn Mertz²; Lorna Role, Ph.D.²; and David Talmage, Ph.D.²
CUNY Brooklyn College, Brooklyn, NY¹ and SUNY Stony Brook University, Stony Brook, NY²

The chemical compound acetylcholine (ACh) is a neurotransmitter in both the peripheral nervous system and central nervous system in many organisms including humans. In the brain, ACh signaling is important for attention, motivation and memory; disruption in ACh signaling has been reported in brain disorders as diverse as schizophrenia and Alzheimer's disease.

In the spinal cord and brain stem, Type III Neuregulin 1 (NRG 1) is necessary for the survival of acetylcholine producing, or cholinergic neurons. At present, we do not know if NRG1 is required for the survival and/or function of cholinergic neurons in the forebrain and the intent of this research was to assess this relationship. Our hypothesis was that a genotypic disruption of NRG1 would disrupt cholinergic neurons and could be causal in disorders like schizophrenia because NRG 1 is a susceptibility factor in schizophrenia.

This project has implications for the development of novel therapeutic approaches to treatment of some symptoms of schizophrenia. Schizophrenia is a mental disorder that distorts ones' ability to think logically. Alterations in the expression of the NRG 1 gene have been shown by both association and linkage studies to be a susceptibility factor for schizophrenia. Since NRG 1 is also known to regulate cholinergic signaling in the brain it is hoped that studies elucidating how Nrg1 and ACh expression in the brain are co-regulated could lead to new insights into complex neuropsychiatric disorders such as schizophrenia.

In order to begin to address the role of NRG1 signaling in the proper development and function of forebrain cholinergic neurons, we have developed a line of mice, the ChAT-eGFP; Nrg1tm1Lwr line in which green fluorescent protein is expressed in all ACh synthesizing neurons, and one copy of the Type III Neuregulin 1 gene is disrupted.

An anti-eGFP antibody has been used to further enhance the detection of cholinergic neurons and their projections in brain sections. My project involved preparation of the brain sections and comparison of the number and projections of cholinergic in wild type e-GFP ChAT mice with those on the e-GFP-ChAt X Nrg1 tm1lwr heterozygote's. Preliminary analyses suggest that the number of cholinergic neurons in some parts of the forebrain was significantly reduced in wild type e-GFP ChAT mouse verses the e-GFP-ChAt X Nrg1 tm1lwr heterozygote's. These results support the predictions of our hypothesis and imply that NRG1 signaling may be implicated in disorders involving disruptions in ACh signaling. The fiber densities of the neurons in the two mice models are still being quantified, and will be compared to the results of cell counts. Future studies would involve comparing the cholinergic cell number and fiber density in a larger number of mouse sibling pairs.

Author K.D. was supported by NIH-NIGMS MARC grant #GM008078

Charles Michael Drain

RESEARCH AND TRAINING OPPORTUNITIES IN RADIO CHEMISTRY AT HUNTER COLLEGE: RETURNING THE RADIO TO CHEMISTRY

Charles Michael Drain, Lynn C. Francesconi, Pamela Mills
Hunter College of the City University of New York

A new Ph.D. Program designed to stimulate a renaissance in radiochemistry has been established with funding from the National Science Foundation- Integrative Graduate Education and Research Traineeship (NSF-IGERT) Program. Ph.D. students will be involved in the global network of radiochemistry and applications. The research and education/training programs will involve partnerships between Hunter College/CUNY with Memorial Sloan-Kettering Cancer Center, a premier

research institute for radiochemistry applications, as the major partner. Albert Einstein College of Medicine and Cornell Medical College are partners for research and education in medical applications. Argonne and Brookhaven National Laboratories and academic institutions with extensive radiochemistry infrastructures, University of Missouri-Columbia and University of Nevada Las Vegas, UNLV, are also partners for research (fuel cycle, environmental) and education/training. Ph.D. students will matriculate at Hunter/CUNY in any subdiscipline (organic, inorganic, analytical, physical, nanotechnology and materials, biochemistry). A common radiochemistry course with laboratory will be offered at Hunter College and Memorial Sloan-Kettering. Advanced courses will be offered at CUNY, Memorial Sloan-Kettering, Einstein, with distance learning capabilities to include Missouri and UNLV. *Every IGERT Student will experience: Multi-institutional training and opportunities; A unique experience with 2 co-mentors at different institutions; Student Travel funds for both domestic and international travel; \$30,000 An annual Stipend to cover living expenses.*

Wycliffe A Graham

MAGNETIC "TEFLON": PERFLUORO ALKYLATED LANTHANIDE SANDWICH COMPLEXES. A NEW CLASS OF SINGLE MOLECULAR MAGNETS

Wycliffe A Graham, Ph.D. candidate and Prof. Sergiu M. Gorun

Materials Science and Engineering Program and the Department of Chemistry and Environmental Science, New Jersey Institute of Technology, Newark, New Jersey 07042

The first representatives of a new class of phthalocyanine sandwich complexes, the anionic bis[*octakis(i-C₃F₇) octakis(perfluoro)phthalocyaninato(2-)]M(III)*] complexes, abbreviated $(F_{64}Pc^{2-})_2[M^{3+}][H^+]$, M = Y, Lu, Tb, Dy were synthesized using a microwave assisted method. These metal-organic complexes do not contain C-H bonds, thus being chemically robust and thermally stable up to 450°C in air. Complexes with M = Tb and Dy are paramagnetic with a Weiss temperature of -0.1 and -0.3 K, respectively, while the Lu and Y complexes are diamagnetic. The fluoroalkyl substituents render the complexes soluble in polar solvents and suppress their electrochemical oxidation. Single molecular magnetic (SMM) behavior for M = Tb and Dy was established in frozen solutions by Magnetic Circular Dichroism and in the solid-state via AC SQUID magnetometry. The compositional, thermal and chemical properties of the new class recommend them for spintronics devices operating under harsh environmental conditions.

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David Jacome

STUDY OF THE OPERATIONAL PROPERTIES OF THE CAPILLARY PLASMA ELECTRODE (CPE) DISCHARGES

David Jacome, Department of Physics, Stevens Institute of Technology. Margaret Figus, Merck & Co., Inc. (Rahway). Kurt H. Becker, Polytechnic Institute of NYU.

Advisors: Prof. Jose Lopez and Prof. Wei-Dong, Center for Microplasma Science and Technology, Department of Physics, Saint Peter's College.

Various approaches have been pursued to create stable atmospheric pressure discharges by extending the lifetime of the diffuse phase of the discharge to hundreds of microseconds. Previous research showed that the stability of the diffuse mode is dependent on the frequency (in the kHz range), gas type, power, mode of the excitation, and geometrical confinement. Some of the most promising approaches are based on the recognition of the arc formation in high-pressure plasmas can be avoided and stable high-pressure plasma can be generated and maintained when the plasma are spatially constricted to the dimensions of tens to hundreds of microns. The Capillary Plasma Electrode (CPE) discharge is stable to produce stable atmospheric pressure nonequilibrium plasma. The CPE is similar in design to the Barrier Electrode Discharge, but has perforated dielectrics. The configuration, aside from exhibiting

a diffuse mode of operation, also exhibits the so-called “capillary jet” mode, in which the capillaries “turn on” and a bright plasma jet emerges from the capillaries. The capillary jets from adjacent capillaries overlap so that the discharge appears uniform when the electrode contains an array of holes. There appears to be a threshold frequency for the capillary jet formation, which is strongly dependent on the L/D ratio of the capillaries, where D is diameter of the capillary and L its length. However, the operating principles and basic properties of this behavior are not well understood. The current work explores these modes of operations of the CPE by characterizing the electrical and optical emission properties of this discharge by examining a multi-hole discharge as well as a single capillary discharge reactor.

Kay Hiranaka

APPLICATION OF MIE THEORY TO THE ATMOSPHERE MODEL OF BROWN DWARFS

Kay Hiranaka and Professor Kelle Cruz, Hunter College, CUNY

Brown dwarfs are substellar objects which are too low in mass to sustain hydrogen fusion. They have masses less than 0.075 solar mass and effective temperatures of 2000-3000K at the beginning of their lives but get cooler as they age. The temperature can get below 1000K for the low mass brown dwarfs. They are about the same size as Jupiter. It is important to study brown dwarfs because they are likely to share the atmospheric properties with warm exoplanets.

Brown dwarfs have clouds that affect emergent spectra. I am currently working on developing the next generation of atmosphere and evolution model with improved dust and cloud treatments. In particular I will incorporate the effect of latent heat into the current cloud model. Latent heat is the heat absorbed or released by a chemical substance or a thermodynamic system during a phase transition. To begin with, I studied the Mie theory, which is an analytical solution for scattering by spherical particles.

Jason Macias

DOWNREGULATION OF LAMININ B1 EXPRESSION IN THE HIPPOCAMPUS OF A MOUSE MODEL OF ALZHEIMER’S DISEASE

Jason Macias, Karim Sharif (Mentor, PI) Dept. of Natural Sciences, LaGuardia Community College, CUNY

Alzheimer’s disease (AD) is a progressive neurodegenerative disease responsible for dementia in the elderly. Symptoms include a loss of short-term memory and disorientation followed by a progressive loss of mental faculties. The hippocampal region CA1 is among the first areas affected by the disease. Autopsies of AD patients reveal a presence of senile plaques (SP), predominantly composed of Amyloid β -peptides, and neurofibrillary tangles (NFT), a fibrous structure within nerve cells. The molecular mechanisms underlying neurodegeneration in this debilitating disease are not clear. Laminins (LM), a family of trimeric proteins, have been implicated in diverse biological functions, including neuroprotection and neurodegeneration. Among them LM-111 (inhibitor of Amyloid β aggregation) and LM-511 (involved in neuroprotection) are expressed in the hippocampus of a healthy brain. Therefore, we hypothesized that LM-111 and/or LM-511 might be dysregulated in the AD brain. Since laminin β 1 subunit is found in both of these laminins, we attempted to evaluate its expression pattern in the hippocampus of a mouse model of AD brain in immunohistochemical analyses using anti-laminin β 1 antibody as a probe. Our results indicate that the expression of laminin β 1 subunit is downregulated in the granule cells of the dentate gyrus and in the pyramidal neurons of the hippocampal regions CA1 and CA3 in the AD brain. These regions are part of the trisynaptic circuit involved in the learning and memory. Our results suggest that a downregulation of laminin, possibly LM-111 and/or LM-511, might be playing a role in the neurodegeneration in the AD.

Adam McConnell

EFFECT OF L-CARNITINE ON BREAST CANCER CELL MIGRATION

Adam McConnell* Maria Cotrina, Ph.D. and Regina Sullivan, Ph.D.

Queensborough Community College, Bayside, NY Metastasis, a deadly event in cancer progression, occurs when a subgroup of primary tumor cells infiltrates surrounding normal tissues and forms secondary tumors. Recent studies suggest that metastatic potential may be supported by mitochondrial dysfunction. This dysfunction leads to an excessive generation of reactive oxygen species, which may increase the cancer cell's ability to proliferate, migrate and, eventually, metastasize. To evaluate the importance of mitochondrial alterations in the migratory behavior of cancer cells we have tested the effect of L-carnitine on the ability of cancer cells to migrate. Cell migration is an early and significant event in the metastatic process. Carnitine is a quaternary amine with important mitochondrial functions including the transport of lipids into mitochondria for oxidation and the export of toxic compounds from the mitochondria. In this study, we pre-incubated the highly metastatic breast carcinoma cell line MDA-MB-231, with 150 M of L-carnitine for various time periods. Cell migration was assayed using the wound healing assay. Concomitant experiments evaluated changes in mitochondrial morphology with the fluorescent indicator MitoTracker, which labels mitochondria in active, living cells and it is an indicator of cellular respiration. Obvious changes are not observed in mitochondria morphology after carnitine morphology. Preliminary results are inconclusive but may show L-carnitine inhibits the MDA 231 cell migration in a wound healing assay. These experiments will help determine the potential of L-carnitine and energy enhancing compounds as anti-metastatic therapy.

Lorenz S. Neuwirth

THE CHARACTERIZATION OF Pb²⁺ TOXICITY IN RAT NEURAL DEVELOPMENT: AN ASSESSMENT OF PB²⁺ EFFECTS ON THE GABA SHIFT IN NEURAL NETWORKS

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Lead an environmental contaminant has become increasingly recognized as a neurotoxin that in high concentrations causes slowed nerve conduction and/or transmission, reduced sensations, and neuropsychological impairments (e.g. memory, executive functioning). Pb²⁺ mechanisms of cellular action have been shown to mimic Ca²⁺ signaling [1]; thus, Pb²⁺ disrupts events that maintain calcium-dependent cellular homeostasis. In particular Pb²⁺ has been shown to inhibit VSCCs [2], which are important for allowing Ca²⁺ influx into the cytosol and subsequent membrane depolarization [1]. In mature brain the two major neurotransmitters: GABA and glutamate mediate a balance of inhibition and excitation of neuronal networks respectively. However, in the immature brain the GABAergic system is initially excitatory and precedes the subsequent functional excitatory activity of the Glutamatergic system. Therefore, presynaptic GABA-releasing neurons can excite immature post synaptic neurons expressing GABA_A receptors. This critical developmental process is regulated by Ca²⁺ influx. Thus, GABA excites the post synaptic cells and in turn synergistically excites the NMDA receptors which facilitate synchronized activity between the two systems via Ca²⁺ wave oscillations or GDPs and has been identified as the hallmark principle for developing neuronal networks [3]. The major regulator of the GABA excitation to inhibition shift is the KCC2. The shift is a calcium-mediated process in which KCC2 is expressed as a result of VSCC activation secondary to GABA-mediated depolarizations [3]. We investigated how neurons in development respond to gestational Pb²⁺ exposure. Since Pb²⁺ has been shown to inhibit the activation of VSCCs we suggest that Pb²⁺ in early development may disrupt

the GABA activation of the NMDA receptors and VSCCs. This in turn produces perturbations in KCC2 expression and maturation; therefore delaying the shift in GABA function. Thus, resulting in altered or absent Ca^{2+} wave oscillations or GDPs. Pb^{2+} disruption of immature synchronized GDPs activity may be the best explanation for the various forms of neuropsychological impairments of exposure to environmental Pb^{2+} .

References

[1] G.J Audesirk, R.B. Tjalkens, Humana Press.: Totowa. N.J. (2004) pp 59-94.

[2], R.S. Saliba, G. Zhenglin, Y. Zhen, S.J. Moss, *Journal of Bio Chem* (2009) 284.

[3] Y. Ben-Ari, *Nature Reviews Neuroscience* (2002) 3.

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Danny Palacios

VACUUM ULTRAVIOLET (VUV) EMISSION FROM A FAST-PULSED DIELECTRIC BARRIER DISCHARGE IN ARGON

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The vacuum ultraviolet (VUV) emissions from a planar, fast-pulsed dielectric barrier discharge (DBD) in pure Ar were measured. The DBD reactor is a rectangular quartz tube with a discharge gap of approximately 0.7 cm. It has a magnesium fluoride window at the front of the plasma chamber to allow for VUV measurements. Moreover, there's a fast, high-voltage switch supplies a shorting pulse with a fall time of approximately 20 ns, resulting in a diffuse, uniform discharge. The relative emission intensity of the Ar_2^* excimer is around 126 nm, as well as NI, OI, and N2 emissions due to impurities from air, as a function of pressure (50 – 600 Torr), applied voltage (3-5.5 kV), and frequency (10 – 30 kHz) is reported. These results are compared to the VUV emissions from the same reactor using an AC high voltage source. We observed that stopping the flow of Ar resulted in a more pronounced excimer emission at 126 nm.

Andres Perez

OPIATE STIMULATION HAS A SIMILAR EFFECT TO THAT OF OPIATE BLOCKADE UPON PERFORMANCE OF LEARNED SONG IN ZEBRA FINCHES

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Songbirds serve as a useful model for investigating the neural basis of vocal learning. Learned song is produced in two contexts: directed towards another individual or undirected, a behavior that can be performed in isolation. Undirected song (US) is necessary for the process of vocal learning, where it appears to function as vocal practice. The motivation for performing directed song (DS) is another individual, but the motivation for US is unknown. We hypothesize that US is driven by opiate release within the brain's mesolimbic reward system. We have previously reported through immunocytochemical and neuropharmacological data that 1) systemic opiate blockade inhibits US and

that 2) US correlates with high levels of immediate early gene expression within opioid neurons of the nucleus accumbens, whereas DS does not. The present study investigates the effect of systemic administration of the synthetic opiate DAGO (□ opioid receptor agonist) upon US at a dose of 5 mg/kg. Birds in 5 cohorts of 4 birds each were tested sequentially each bird receiving two injections of either vehicle or drug on alternate days through a four day period. Song motifs were then counted in 30-120 min blocks post injection. Although originally hypothesized to stimulate US in male zebra finches, moderate to strong singers of US (> 1 song motif per 30 min) were significantly *inhibited* by systemic DAGO; weak singers, however, revealed mixed responses. We conclude that individual differences in baseline opiate release could be responsible for individual differences in the response to artificially increased opiate levels. In sum, we hypothesize that if a hedonic state (high levels of opiate binding) is artificially achieved; reward-driven behavior is inhibited.

Keishan Ragoo

THE ANALYSIS OF NEWTOWN CREEK ESTUARY

Keishan Ragoo and Dr. Sarah Durand

LaGuardia Community College, Natural Sciences

The study examines bacterial contamination and physical parameters of the Newtown Creek waterway, which flows between Brooklyn and Queens New York and has recently been designated a superfund site. A long history of industrialization has led to an estimated 30 million gallons of spilled oil and years of accumulation of toxic pollutants. Furthermore, the waterway faces the additional threat of raw sewage from combined sewage overflow (CSO) following heavy rain events that divert wastewater from the Newtown Creek water treatment plant. Our study tests the hypothesis that the nature and extent of bacterial contamination of the waterway correlate solely with CSO events. All water samples were collected from a promontory at the site of the treatment Plant. Water samples were collected from 3 depths; surface, 1m and 2m, with measurements being conducted at each depth for salinity, dissolved oxygen and temperature. Water samples were subsequently tested in the lab for turbidity and pH readings and analyzed for bacterial content using the IDEXX “quantitray” culture system for *Enterococcus* and for coliform bacteria, and the “simplate” culture system for estimating total number of bacteria. Data suggest that additional variables other than CSO events can determine levels of bacterial contamination. Additional studies will examine the possible contribution of sediment disturbance as a contributing factor.

Evelyn Ramirez

NEURAL SUBSTRATE FOR CHRONIC PAIN USING FUNCTIONAL MAGNETIC RESONANCE IMAGING, fMRI

Evelyn Ramirez , Victoria Luine

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Chronic pain is defined as a persistent, ongoing pain lasting over 6 months, without any visible lesion or injury (Foss et al., 2006). As one of the most disabling and costly illnesses in North America (Eisenberg, 1993), little is known about the fundamental neurophysiology of the disease, resulting in inefficient treatment plans. Although much is known about normal sensation throughout the body and its corresponding regions within the brain, the possibility of a Neural Substrate Chronic pain remains an active area of research. In this report, a sample of 20 Chronic Pain patients with varying painful body parts received passive tactile stimulation of corresponding Painful and Non-Painful body parts, with simultaneous passive viewing of a contrast reversing checkerboard within an fMRI scanner. These images were acquired as part of a clinical service to document the perception of pain resulting from normal light tactile stimulation using the neural correlates revealed from fMRI as biomarkers. This

report represents a preliminary summary of a sequential cohort of 20 patients to describe the common patterns of activity as a possible indicator of a specific neural correlate of chronic pain. Immediately, following each stimulation epoch, the patient provided a rating of the pain experience where 10 was a maximum and 0 was a minimum. Each run lasted 2 minutes and 24 seconds, all functions are run twice, Painful & Non-Painful. Using Brain Imaging Programs such as SPM, Pain and Non-Pain activated Voxels (3 dimensional unit of volume, volumetric pixel) within the brain were quantified and allocated within a series of 48 axial slices, 2 mm each. The highest cluster concentrations shared by all 20 subjects for both (Pain > Non-Pain (n = 20), $p < 0.001$, $k = 10$); and (Non-Pain > Pain.(n = 20), $p < 0.001$, $k = 10$) activated voxels were localized. Each cluster was identified using a 3-dimensional coordinate (X, Y, Z). These coordinates were then used to determine the corresponding cortical regions activated when experiencing Chronic Pain. This study found 17 regions ($p < .001$) throughout all subjects indiscriminate of both body part, suggesting a Neurophysiological basis for Chronic Pain. This observation shows that these patients demonstrated a common neural substrate for chronic pain regardless of the affected region and suggests a future research direction to improve diagnosis and treatment of the illness.

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Steves Richemond

THE IMPORTANCE OF ANTIBODY CONCENTRATION IN DETERMINING THE DIFFERENTIAL EXPRESSION OF LAMININ B1 PROTEIN IN THE BRAIN OF A MOUSE MODEL OF ALZHEIMER'S DISEASE

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Alzheimer's disease (AD) is the most common cause of dementia. Pathologically, AD is characterized by the presence of senile plaques and neurofibrillary tangles in the brain. The loss of cognition is attributed to a progressive neurodegeneration in the hippocampus of the brain. Molecular players involved in the neurodegeneration have not been identified. Studies, however, indicate a differential expression of laminins (LM) in AD brain. Laminins are a family of glycoproteins composed of an alpha, a beta, and a gamma subunit, each having different isoforms that combine to form multiple mature LM proteins. Among these, LM-111 and LM-511 are normally expressed in the hippocampus and are involved in neuroprotection. This suggests that LM-111 or LM-511 may be differentially expressed in the AD brain. We tried to identify the differential expression of laminin $\beta 1$, a subunit of both LM-111 and LM-511, in the hippocampus of a mouse model of AD brain, in immunohistochemical analyses using anti-laminin $\beta 1$ antibody as a probe. We first tested the antibody at a dilution of 1:1000, as previously reported; however, we did not observe a differential pattern of signal intensity. We reasoned that the signal might be saturated due to the antibody concentration. We then assessed the laminin $\beta 1$ expression at a lower concentration of the antibody. The results revealed a significantly differential pattern of laminin $\beta 1$ expression when a 1:2000 dilution of the antibody was used. These results indicate the importance of the antibody concentration in capturing the differential expression of laminin proteins.

Jennifer Rios

HOLOCENE RUPTURES ALONG THE NORTH ANATOLIA FAULT IN THE MARMARA SEA, TURKEY: SEDIMENTARY PROCESSES, SPATIAL EXTENT AND AGE

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The North Anatolian fault (NAF), which extends east west for over 1600 km across Turkey, is one of the world's major continental transforms. Since 1939, a sequence of $M > 7$ earthquakes ruptured

progressively westward the entire NAF east of Marmara. The most recent and westernmost events in this sequence, the Mw7.4 Izmit and the Mw7.2 Duzce main shocks of 1999, ruptured about 160 km of the fault and were particularly destructive (~17,000 deaths). The only portion of the NAF that did not rupture in the last century is the segment beneath the Marmara Sea that is considered a seismic gap and presents high risk to Istanbul and surroundings. To decipher Holocene earthquake ruptures and the processes leading to their signature in the sedimentary record we applied submarine paleoseismology techniques to study a transect of three 10 m long cores recovered from the Central Basin. The sediments were analyzed with x-ray radiography, grain size variability at cm-scale, and calibrated to a chronology developed from short-lived radioisotopes (¹³⁷Cs, ²¹⁰Pb) and radiocarbon.

We sampled turbidites from the deepest part of the Central Basin, from 1248 to 1262 m depth. McHugh et al (2006), previously documented that these turbidites are characterized by multiple sand and coarse silt beds, each normally graded, and that together grade upwards into non-stratified silt that also fines upwards. The non-stratified silt component is referred to as “homogenite”. These complex turbidites-homogenites units are as thick as 1 m and dominate the sedimentation in the basin (~80%). The remainder includes 10 to 20 cm thick deposits fining upwards from coarse to fine silt. We interpret these depositional events to represent large earthquakes, the ones including transport of sand are proximal, and the ones without the sand are distal. Fifteen turbidite-homogenite were preserved within the past 4000 years with an average recurrence interval of 300 years. This is consistent with previous estimates and with a constant slip rate for the NAF for the mid to late Holocene. We have tentatively linked one of the turbidite-homogenite deposits to the 740 AD historical earthquake and two others to possibly the 1912 > Ms 7.4 and more distal 1963 or 1964 events Ms >6.4 linked to the Yalova and Manyas faults, respectively.

Astrid Rodriguez

TEXT LANGUAGE INFLUENCES ON READING COMPREHENSION

Dr. Astrid S. Rodriguez

CUNY Graduate Center, Ph.D. Program in Educational Psychology

Developing literacy and language proficiency in English is essential to thrive in school and in the workforce in American society. Research on cross-linguistic influences on text-level skills is scant, especially studies investigating reading comprehension among language-minority adults. The present study investigated the effects of cross-linguistic input and second language proficiency on second language reading comprehension among Spanish-speaking adults enrolled in English as a Second Language (ESL) classes at a community college in New York City. The main research question was whether language-minority adults would comprehend printed text better if they read it in Spanish (L1) followed by English (L2) than if they read the text twice only in English. An experimental study using a 2 (lower L2 proficiency vs. higher L2 proficiency) x 2 (think-aloud vs. no think-aloud) x 2 (Spanish/English vs. English/English) crossed factorial design was conducted. Eighty students were randomly assigned to the Spanish/English or English/English reading conditions within each L2 proficiency level and think-aloud conditions. Reading comprehension was assessed via a verbal recall task, eight open-ended questions, and a 43-item cloze task. The results revealed that students with lower L2 proficiency benefitted substantially from reading the text in both languages as evident by their performance on the recall and Q&A reading comprehension tasks. In contrast, L1 input did not provide an added advantage over reading the text twice in English for students with higher L2 proficiency. A reactive effect to the think-aloud procedure was found for students with lower L2 proficiency on the Q&A and cloze tasks. On the Q&A task, among those who completed the think-aloud procedure, students who read the text in both languages outperformed students who read the text only in English. On the cloze task, students who did not perform the think-aloud procedure outperformed students who did the think-aloud. In addition, it was found that the reading comprehension assessment methods had a differential effect on students' ability to demonstrate the degree to which they comprehended the text. Results showed that performance was lowest on the recall task across all groups. Other implications follow.

Ozell Sanders

ASSESSMENT OF HYOID BONE DENSITY USING MICRO CT FOR PREDICTION OF FRACTURE

Ozell P. Sanders, University of Maryland, Baltimore County, Baltimore, MD, Dr. L.D. Timmie Topoleski, University of Maryland, Baltimore County, Baltimore, MD

The hyoid bone is a U-shaped bone found in the neck that is fractured in a majority of homicidal strangulation cases. Fracture typically occurs when excessive force is applied to the neck region. Previous studies have shown that older specimens are more susceptible to fracture due to effects from ossification. It is unknown whether the bone density in specimens with ossification contributes to the occurrence of fracture in older specimen. Therefore the present study was undertaken in order to determine if a relationship between bone density and likelihood of fracture in the hyoid bone can be determined. Hyoid and thyroid bone specimen from cadavers, were obtained from The Office of the Chief Medical Examiner for the State of Maryland. Each specimen was dissected transversely resulting in a pair of hyoid halves. The 3D reconstruction created from the micro-CT images will be used to assess bone density for each specimen before and after the bending test. The specimens will be cantilevered in polymer epoxy (BONDO™) and held in a test fixture, approximating their natural geometry. Upon completion of the bending test quantification of the fracture force will be determined using the load at fracture, the macroscopic nature of failure, the cross-sectional dimensions at the fracture point, and the bending moment arm distance, and will be compared with the bone density at the fracture site. Results from the present study will be used to determine the likelihood of fracture in regions of low bone density in the hyoid bone. Future studies in this ongoing investigation involve the assessment of other factors which could influence the cause of fracture in the human hyoid bone. Effects due to age, disease, as well as the effects of soft connective tissue surrounding the bone, could be used to evaluate the chance of fracture. The contributions from the aforementioned studies would lead to the development of a risk factor which could be used to determine the chance of hyoid bone fracture. [*This study was funded, in part, by a fellowship awarded to Ozell Sanders by the LSAMP Bridge to the Doctorate Fellowship Program which is part of the National Science Foundation's Alliances for Graduate Education and the Professoriate (AGEP) program*]

Samantha Sheppard

LIM PROTEINS TRIP6 AND LPP MEDIATE HUMAN TELOMERE PROTECTION

SA SHEPPARD & D Loayza, PhD

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POT1 is the single stranded telomeric overhang binding protein, and is part of the shelterin complex, a group of six proteins essential for proper telomere function. The abrogation of POT1 DNA binding activity results in telomere elongation, or activation of the ATR DNA damage response at telomeres. Therefore, overhang binding represents the functionally relevant activity of POT1. Novel protein associations with the POT1 DNA binding domain are of great interest to explore and these possible interacting factors were sought using the yeast two-hybrid system. Bait containing the POT1 DNA binding domain was used. The screen led to the isolation of LIM domain protein TRIP6 as a novel POT1 interacting factor. TRIP6 could co-immunoprecipitate with other shelterin components, arguing for association with the whole complex. Additionally, TRIP6 was detected at telomeres by Chromatin ImmunoPrecipitation and Immunofluorescence. TRIP6 depletion by siRNA led to the induction of telomere dysfunction induced foci, indicating a role in telomere protection. A closely related LIM protein, LPP, was also found at telomeres and was important for repressing the DNA damage response. A related LIM protein Zyxin, was found not to associate with telomeres. We propose that TRIP6 and LPP play a novel role at human telomeres, and are important to prevent an inappropriate DNA damage response at chromosome ends. These results could advance our understanding on the

repression of telomere-based senescence, an important tumor suppressor mechanism. Research was made possible by NIH-NCRR Grant # RR003037.

Francoise Sidime

PREVENTATIVE ROLES OF TAURINE IN ALLOXAN INDUCED DIABETES

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Diabetes Mellitus (DM), a chronic disease with devastating complications. The hallmark of the disease is high blood glucose level, diabetic neuropathy and retinopathy. In this study we investigate the potential role of taurine in preventing alloxan-induced diabetes. Taurine is a sulphur containing amino acid with several mediate biological processes such as hypoglycemic action, antioxidation, and detoxification. It has been evaluated either in experimental or clinical type 1 and 2 diabetes mellitus and insulin resistance. 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 a drastic and significant increase in the number and size of the islets of Langerhans. Previously, it has been reported that the islets from taurine treated mice had almost double the number of cells immunopositive for proliferating cell nuclear antigen (PCNA). This increase in proliferation was accompanied by a reduction in the incidence of apoptosis in islet cells. The induction of islet cell apoptosis in vivo involves an increased expression of inducible nitric oxide synthase (iNOS) within β cells. Interestingly, taurine has been shown to be a potent inhibitor of iNOS. We also found a correlate to the increase in islets size. Taurine-fed mice were hypoglycemic and showed a moderate increase in plasma glucose levels in a glucose tolerance test. Furthermore, taurine-fed mice were resistant to alloxan-induced hyperglycemia. Since the mechanism of alloxan-induced beta cell death is mediate through free radical production and taurine prevent free radical formation, we hypothesize that supplementation of taurine reduces alloxan-induced apoptosis of pancreatic beta cells. This can also be shown by direct injection of cysteamine prior to alloxan injection. Cysteamine is a precursor for taurine biosynthesis and is a free radical scavenger. Cysteamine completely abolished alloxan-induced hyperglycemia through prevention of beta cell apoptosis.

We suggest that the endocrine pancreas undergoes significant modifications during neonatal life and that apoptosis is an important mechanism in this remodeling. 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 and thus diabetes.

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Shobika Sivaram

OZONE GENERATION AND VOLATILE ORGANIC COMPOUND DESTRUCTION USING A CAPILLARY DIELECTRIC BARRIER DISCHARGE

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This is a study of the plasma surface treatment, ozone generation and removal of volatile organic compounds (VOC) using a capillary dielectric barrier discharge (cap-DBD) device. These experiments were conducted to test different dielectric materials in a cap-DBD at various voltages to determine the voltage-dielectric combination that maximizes ozone gas synthesis. Ozone gas is used in the medical and health fields. The surface cleaning ability of ozone was also examined by staining different materials on fabric pieces and exposing each sample to ozone for 30 minutes each. The effectiveness of plasma in plasmochemical degradation of volatile organic compounds was tested with

helium plasma by utilizing different solvents such as acetone, methanol, and tetrahydrofuran (THF). The emission spectroscopy of the air plasma and the helium were done to determine reactive species produced in the plasma.

Anthony Stewart

THE EFFECTS OF OXYGEN CONCENTRATION ON THE DIRECT CURRENT MAGNETIZATION OF HIGH QUALITY, SINGLE-CRYSTAL BISMUTH STRONTIUM COPPER OXIDE SUPERCONDUCTORS GROWN BY THE FLOATING-ZONE TECHNIQUE

Mario Johnson, Daniel Hart, Anthony Stewart (Southern University and A&M College, Baton Rouge, LA 70813), and Genda Gu (Brookhaven National Laboratory, Upton, NY 11973).

Ever-increasing US energy demands will eventually far outpace the capacity of the current power grid infrastructure due to the inefficient delivery of electricity. A major source of inefficiency is due to resistive losses associated with the use of copper transmission cables. One solution for enhancing overall system efficiency is to replace existing copper transmission cables with high, critical temperature (T_c) superconducting materials which exhibit essentially zero resistive losses below a T_c . It is generally argued that for high-temperature superconductors to be cost-effective in power grid applications, the T_c must be at or above the boiling point of liquid nitrogen, 77 K. As a result, despite their demonstrated technical feasibility, the very high cost of refrigeration has kept many superconducting materials off the market for years. High quality, single crystals of BSCO were investigated to better identify the elusive mechanism of superconductivity in copper oxide superconductors. This material was grown from a single crystal seed of BSCO using the floating-zone technique. The effect of growth conditions and nominal composition of the feed rod on the magnetic properties were investigated using the Superconducting Quantum Interference Device. The temperature dependence of the DC magnetization on oxygen concentration was studied using as-grown and underdoped (oxygen-deficient) samples. Underdoped crystals were achieved by annealing as-grown BSCO in evacuated quartz tubes and flowing argon. The magnitude of the superconducting signal was found to increase nearly an order of magnitude with annealing in flowing argon at 450° C for 24 hours. However, the T_c was only slightly increased from a value of 7 K for as-grown samples to 10 K for samples annealed at 450° C for 24 – 36 hours in flowing argon. The T_c was found to vary with annealing temperature according to an exponential curve which plateaued around 24 hours. These results indicate that annealing in flowing argon is only a slightly more effective method for enhancing T_c of as-grown BSCO. Further work is needed to better understand the mechanism of superconductivity in high- T_c copper oxide superconductors.

Kenville Thompson

ON MOBILE AGENT-BASED LOCATION-TRACKING FOR WI-FI NETWORKS

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The heavy deployment of wireless LANs and the advent of light-weight mobile computing devices have contributed to an increased interest in location-aware applications and services in various fields such as inventory management, tour guides, on site assistance, security, first responders, network planning and health care services such as patient monitoring. The aim of these applications and services is to enable the user to interact more effectively with his environment and to provide location-aware services where Global Positioning System (GPS) fails. While using mobile-agents and data fusion strategies, a three-node (a master and two slaves) triangulation method is often used for location calculation, the process greatly suffers from the issue of backtracking, repeated paths and distance conflict during master

election. In this paper, we propose a novel protocol that addresses distance conflict during election guaranteeing a master will be elected and provides an efficient location management for repeated paths. Through simulation experiments, we show that the proposed protocol reduces the overhead of energy consumption, control signaling and localization time by 50%.

Amy Vogel

METHODS FOR TESTING AGE-RELATED NAMING PROBLEMS

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There is some debate whether, indeed, performance on single-word naming declines with advancing age. In this study, we investigated whether there is a difference in age-related naming performance in healthy younger and older adults on two tests, naming-to-definition and naming-to-picture, with the same set of target lexical items. We employed two tests to assess lexical retrieval in order to better understand if presentation modality influences naming performance with advancing age. We administered the 60-item Response Naming Test (RNT) and the Boston Naming Test (BNT) in a fixed order to two groups of healthy, education-matched individuals: younger adults, aged 20-54 ($M=34.49 \pm 11.03$, $n = 39$) and older adults, aged 55-88 ($M= 69.89 \pm 8.74$, $n = 53$). The t-test results indicated that there were no statistically significant age-related differences in lexical retrieval on either of the two tests (BNT: $p = .41$; RNT: $p = .22$). Means (with standard deviations in parentheses) for the BNT and the RNT for the younger adults and then the older adults are 55.23 (± 4.53), 56.49 (± 3.69); 51.74 (± 6.66), 53.53 (± 5.06), respectively. Our finding suggests that in our participants, who had relatively high education levels (older 15.85 (± 1.75) years; younger 15.33 (± 2.00) years), older adults performed equally on these tests.

Ruixue Wang

ATMOSPHERIC PRESSURE NON-THERMAL PLASMA IN FLEXIBLE TUBINGS

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Atmospheric pressure non-thermal helium plasmas are generated in flexible tubings (Teflon, Peek) as well as in glass tubings. Plasma is ignited when a low frequency (a few tens of kilohertz) AC voltage (15-25 kV) was supplied to two annular electrode on the tubing. "Plasma brush" (or plasma jet array) is realized by opening circular holes on the side walls of the tubings. Individual ballasting on each hole is not necessary, although better stability can be achieved with it. Jets in the jet array can be delivered to various distances from the tubing wall by connecting to the openings dielectric tubings with smaller inner diameters. Interestingly, plasma can be generated in any shape depending on the structure of tubing being used, such as spiral tubing or circular tubing. Clear filament can be observed along the glass tubing and become spiral when introduce a third ground electrode. Due to the high dielectric constant of glass, the air between glass tubing and third ground electrode could be ignited. Electrical and optical characteristics of the plasmas are studied and will be reported in the paper. The flexibility and low temperature operation of these devices make them more attractive in applications such as disinfection of catheters and cleaning of irregular surfaces

"Environmental Expertise in the Age of Research: Institutional Process and Environmental Science in the American Far West, 1950-2009."

Alexandria Wise

ALTERED HABITUATION AND SYNAPTIC PROPERTIES IN DROSOPHILA AKAP (*RUGOSE*) MUTANTS.

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Habituation is a form of non-associative conditioning in which there is a reduction in response to a specific stimulus presented repetitively over time. Components of the cAMP mediated signaling pathway have been previously shown to be important for normal habituation. A kinase anchoring proteins (AKAPS) are a large family of proteins originally identified in mammals which modulate the specificity of protein kinase A (PKA) function by targeting and compartmentalizing PKA to various sub-cellular structures. *rugose* (*rg*) encodes a Drosophila A kinase anchor protein (DAKAP550) which has been previously shown to be required normal pattern formation in the developing eye (Shamloula et al. 2002). We present data which show mutations in *rugose* (*rg*), which encodes a (DAKAP550) alter habituation and synaptic properties. Data from behavioral, electrophysiological and cell biological studies on the adult as well as the larval neuromuscular junction are presented here.

Jose Zhagnay

EFFECT OF CARNITINE ON BRAIN CELL SURVIVAL

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Abstract: Carnitine is an amino acid derivative with important mitochondrial functions. Carnitine transports some lipids into mitochondria for oxidation and energy production. It is also responsible of transporting toxic compounds out of the mitochondria. As heart and liver have some of the highest energy demands, carnitine is commonly prescribed to improve muscle performance and energy levels in a variety of disorders like ischemia, heart disease, cancer and osteoporosis. Little is known about the effects of carnitine in another organs with high metabolism, such as the brain. The objective of this work was to determine if carnitine can improve the mitochondrial integrity and cell survival of astrocytes, the main brain cell type involved in survival and metabolic support of neurons. To this end, we subjected primary astrocytes from mice brain in culture to a non-lethal insult of hydrogen peroxide and treated with carnitine. Using epifluorescence microscopy and propidium iodide, which labels nuclei of dying cells, we found that carnitine decreases astrocytic cell death by about 80%. Reduced cell death was not the result of a reduced inflammatory response because carnitine did not decrease the number of activated microglial cells (the main inflammatory and phagocytic cell type in brain) after hydrogen peroxide exposure. Labeling astrocytes with the fluorescent indicator MitoTracker, which labels mitochondria in active, living cells, showed no changes in mitochondria morphology after carnitine treatment. These results indicate that carnitine improves astrocytic survival by a mechanism independent of mitochondrial integrity. They also reveal the therapeutic potential of carnitine against neurodegeneration.

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