



VOLUME 6, ISSUE 2 / FALL 2011

Research Newsletter

Produced by the Office of the Vice Chancellor for Research

From the Vice Chancellor

Let me start by welcoming everyone to the 2011-12 Academic year. I hope you had a relaxing summer and were not adversely affected by the recent storm that swept through our area.

The research office kept busy during these summer months working on a number of on-going as well as new initiatives. In addition to overseeing the second year of the CUNY Summer Undergraduate Research Program (C-SURP), we have scheduled a number of events for the upcoming semester, including the fall line-up for our regular Science Café and the CUNY Advanced Science Seminar Series (CASS). We are also hosting a Town Hall meeting on September 9 to discuss upcoming changes in Human Research Protection Programs and Institutional Review Boards at CUNY, as well as a Women In Science event on September 22. These, and all research-related events, are posted in the calendar of upcoming events as well as on our web site (cuny.edu/research).



I am also delighted to announce that we recently received a grant from the Alfred P. Sloan Foundation to support the research of our junior scientists at the University (see page 12 for more details). An important goal of our office is to support our junior faculty in launching and maintaining their research careers. Part of the funding from the Sloan award is to support a

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V. P. Nair: “A Life in Theoretical Physics”

Dr. V. Parameswaran Nair, Professor of Physics at City College, was recently named Distinguished Professor in recognition of his accomplishments over the course of his thirty-year career as a theoretical physicist.

Dr. Nair knew from a young age that he wanted to be a physicist. “I was 12 or 13 when I realized I wanted to do physics and the idea of looking at other pursuits never came to me.” Growing up in a fairly small town in India, he completed his B.Sc.



and M.Sc. at the University of Kerala. A visiting professor from Syracuse University, Prof. Balachandran, took an interest in Nair and offered to bring him to the US. As a result of this mentorship, Nair completed his Ph.D. at Syracuse University in 1983. “My Ph.D. thesis at Syracuse was based on a somewhat esoteric idea that you could think of protons and neutrons in a nucleus as solitary waves,” an idea which had been proposed many years earlier by Tony Skyrme, but had not been fully appreciated or proven. The work by the Syracuse group helped to advance this further. The full proof and understanding came with the work of Edward Witten (one of the world’s leading theoretical physicists) shortly afterwards. Professor Nair carried out postdoctoral research at the Institute for Advanced Study at Princeton and at the Kavli Institute for Theoretical Physics (KITP) of the University of California, Santa Barbara. He joined the faculty at Columbia University in 1987 and then moved to City College in 1993.

Throughout his career Dr. Nair has focused on some of the most prominent problems in the field. One of the major questions he has tackled is the attempt to understand the interactions between fundamental particles, primarily how quarks combine to form neutrons and protons. This problem is closely related to the so-called Yang–Mills Existence and Mass Gap problem, which has been identified as a Millennium Prize Problem—one of the seven great unsolved mathematical puzzles. While this still remains a major intellectual challenge, Profes-

or Nair has made some significant headway in a different version of this problem: “I took a slightly simpler version, in one lower dimension, but which still captures the essence of the original problem, and my collaborators and I managed to make progress in the late nineties and 2000s by using some new mathematical techniques borrowed from String Theory.” Their calculation of a key parameter, the so-called string tension, has been found to be in agreement with large scale numerical computations using supercomputers.

Professor Nair’s other main area of interest has been in the flipside of quarks, i.e. what happens to quarks when they collide and scatter (in a particle collider) as opposed to binding. In 1988, Nair wrote a paper that included a formula describing a limited class of these collision processes. “This formula came out of a very esoteric mathematical construction called Twistors,” he says, which originally had been proposed and developed in a completely different context by Roger Penrose at Oxford University. Professor Nair goes on, “for about fifteen years it just lay there in the literature and not much happened.” But in 2003, Edward Witten, from the Institute for Advanced Study at Princeton, conceived of a Twistor String Theory, which incorporated Nair’s work. Building on Witten’s work, Twistor String theory “has developed into a big area of activity; we think we can understand a lot about the quark collision processes using this technique.” This is another of Nair’s contributions that has given him name recognition in the field.

More generally, Professor Nair talks passionately about theoretical physics as a logical framework that can explain all physical phenomena—from things smaller than the size of an atomic nucleus to physics on the scale of the whole universe. Now that theoretical physicists have developed a robust theory, which goes by the name of the Standard Model, he says the current challenge is somewhat different. “The issue is to understand this theory in detail. Most of my focus has been on understanding the mathematical structure of these theories. Bringing new mathematics, if needed, to understanding the theory’s predictions in contexts and regimes and parameters that we were not able to address before.”

Professor Nair is currently serving as a principal investigator on a recent awarded NSF grant, *Collaborative Research: Topics in Gauge Theory, Gravity and String*

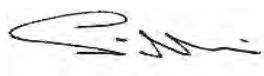
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new CUNY Junior Faculty Research Award in Science and Engineering, which will provide \$50,000 awards to some of our promising junior faculty in STEM disciplines to help get their research programs established at their respective colleges. Please look out for more details on this shortly.

Over the past year, we have initiated a number of additional programs to support junior faculty in their research endeavors. For the last two application deadlines, we have offered matching funds for junior faculty who apply for and receive NSF CAREER awards. For those faculty, who applied and were not successful last year, we organized discipline-specific mentoring workshops that offered guidance on revising the unfunded proposals for resubmission the following year. Many faculty took advantage of these workshops and we look forward to running more such workshops in the upcoming year. In keeping with our efforts to support junior scientists, the Women in Science workshop mentioned above will discuss various strategies and negotiating skills to help launch a successful research career in the academic environment. This event is especially targeted towards postdoctoral researchers and junior faculty.

Let me end by wishing you a successful year, I look forward to seeing many of you at one of the many events announced throughout this newsletter.



P.S. You may have noticed that we have re-launched our Newsletter with a new look and a more forward-looking approach. We hope you enjoy the new format.

CUNY Advanced Science Seminars (CASS)

CASS concentrates on the five key emerging science disciplines at CUNY: nanoscience, photonics, environmental science, structural biology, and neuroscience. These disciplines are the focus of the CUNY Advanced Science Research Center (ASRC), currently under construction. The speakers spend a day at CUNY meeting with faculty and students before giving their talks.

All seminars take place in **The Segal Center at the CUNY Graduate Center** and are followed by a small reception that gives audience members the opportunity to interact with the speaker.

Thursday, October 27, 2011

Steve Almo

Professor of Biochemistry, Physiology & Biophysics
Albert Einstein School of Medicine

Thursday, December 15, 2011

Alexander Gaeta

Professor of Applied & Engineering Physics
Cornell University
and

Michal Lipson

Associate Professor of Electrical & Computer Engineering
Cornell University



CUNY
ADVANCED
SCIENCE
RESEARCH
CENTER

The Energy Institute Announces 11 Winners of Electricity Storage Research Seed Grants

Twenty CUNY researchers representing seven colleges and a variety of scientific disciplines were recently awarded seed grants from the CUNY Energy Institute to advance electricity storage research. In January 2011, the Energy Institute issued a University-wide solicitation for proposals for innovative electricity storage research that could grow into ongoing projects funded by extramural organizations. The U.S. Department of Energy (DOE) and Consolidated Edison Company of New York (ConEd) provided the funding for this initiative.

Teresa J. Badosz (CCNY) & **Dan Steingart** (CCNY)
Graphene /MnO₂ Composites: Investigation of energy storage capability

Alexander Couzis (CCNY) & **Olivia Niitsoo** (CCNY)
Using Colloidal Assembly to Engineer Manganese Oxide and Ni Nanoparticles in Cathodes for Alkaline Based Rechargeable Batteries

Todd Holden (QCC), **Nidhi Gadura** (QCC),
Dehipawalage Sunil (QCC) & **Tak Cheung** (QCC)
Reversible Microbial Fuel Cell with Electrode-Biofilm Optimization

Iлона Kretzschmar (CCNY)
Large Surface-Area Electrodes for Battery Applications

Sharon Lall-Ramnarine (QCC), **Robert Engel** (Queens), **Dan Steingart** (CCNY), & **James Wishart** (Brookhaven National Laboratory)
Novel phosphonium ionic liquids for battery, electrolysis and separations applications

Alan Lyons (CSI), **Dan Steingart** (CCNY), & **Stephen O'Brien** (CCNY)
3-Dimensional Electrodes for Energy Storage Applications Fabricated by Advanced Printing Technologies

Hiroshi Matsui (Hunter) & **Steve Greenbaum** (Hunter)
Novel Material Synthesis of LiFePO₄ Nanocrystals at Low Temperature using Evolution and Their Assembly into 3D Wired-Cathode of Lithium Ion Battery in Macro-Collagen Grids

Michael V. Mirkin (Queens College) & **Dan Steingart** (CCNY)
Study of nucleation/growth of metals by combination of nanoelectrochemistry and TEM

Sophia Suarez (Brooklyn)
High Pressure studies of gas hydrates

Raymond Tu (CCNY) & **Dan Steingart** (CCNY)
Dynamics of nanoscale structure and selective transport in organic electrolytes

Nan-Loh Yang (CSI) & **Michal Kruk** (CSI)
High energy density ultracapacitors based on nanoparticle of giant dielectric constant embedded in conductive matrix with high surface area

Town Hall Meeting on Human Research Protection Programs (HRPP) and Institutional Review Boards (IRBs) at CUNY

When: September 9, 2011, 3:00 PM - 5:00 PM

Where: Faculty Dining Room, Hunter College

The Office of the Vice Chancellor for Research is hosting a town hall meeting to discuss upcoming changes to the human research protection programs and the restructuring of institutional review boards at CUNY. Interested faculty, students and administrators are encouraged to attend.

For further information and to RSVP please contact Luz Jimenez at 212-794-5649 or luz.jimenez@mail.cuny.edu



From Astronomy to Ecology

C-SURP students tackle a variety of research projects across CUNY

What regulates the shape of bone cells? How do you make a better battery? What makes brown dwarf stars glow? These are among the many questions asked by the 2011 CUNY Summer Undergraduate Research Program (C-SURP) students, who studied in laboratories across the University. The 10-week program, which culminated in a poster presentation on August 11, enrolled 14 students, who each received a \$3,500 stipend for their efforts. C-SURP matches students' research goals with research active mentors who share their interests. Currently in its second year, it is unique among summer undergraduate research experiences in that students set the curriculum rather than following a predetermined program. Although the students are primarily from CUNY senior and community colleges, the 2011 group contained two students from Bard College.



Antonia Florio, Macaulay (CCNY) graduate, discusses her research as C-SURP students Annakarina Marinos and Chathuranga De Silva look on.

Despite being spread across the University, the students kept in touch via a Facebook group, where they posted photos of their labs and the field work. This was particularly useful for Lainga Tong from Kingsborough Community College, who studied an endangered bird



C-SURP Class of 2011

species on Buzzard Island, MA for the first month of the program, under the mentorship of Professor Dick Veit from the College of Staten Island. Lainga posted YouTube videos of her work, which was a great way for the rest of the group to learn about her research and methods.

The program supplemented the lab experience with a weekly seminar series held at the Macaulay Honors College. The seminars included presentations by prominent faculty from a wide range of scientific disciplines—from photonics to ecology—as well as sessions on responsible conduct in research and professional development. The highlight for many students was the behind the scenes tour of the American Museum of Natural History. In the bone room, the students were able to have an exclusive look at where many rare dinosaur fossils are stored. In the reptile room, the docent was Antonia Florio a CUNY Macaulay Honors College (CCNY) graduate, who is currently enrolled as a PhD student at the museum. Next year, support from the Alfred P. Sloan Foundation will enable the Office of the Vice Chancellor for Research to expand and enhance this very successful program. More information about C-SURP can be found at www.cuny.edu/research/sr/csulp.html

Meet some of the C-SURP researchers on pages 10-11

Searching for Mongolia's Landlocked, Mouse-Eating Salmon

Dr. John Waldman (Queens) spent part of his summer on a research expedition to Mongolia in search of a rare and primitive fish, the taimen. During the trip, Dr. Waldman kept a blog documenting his experiences.

In swift Mongolian rivers lurks a fish with crocodilian tendencies. Taimen, a primitive member of the trout and salmon family reach upwards of one-hundred pounds in drainage basins that are not ecologically productive. How is this possible? By eating anything that moves, including not only the expected smaller fish, but rodents that try to cross the rivers they inhabit, plus young ducklings, and even bats that swoop too low for insects. All may disappear in a savage surface attack. This proclivity is also just one of the factors that



Waldman with a large Taimen specimen

make them among the most desirable gamefish in the world, with international anglers paying thousands of dollars to fish for them with guides from camps on remote rivers.

Being predators at the top of the riverine food chain, taimen are not abundant, in the same way that eagles and tigers are never numerous. This renders them especially susceptible to overfishing and environmental degradation. To this end, not enough is known about their current status and basic biology, the fundamental information required for enlightened management.

Taimen are just one of the reasons I'm in Mongolia. I'm part of a NSF-funded expedition of three professors, four undergraduate and graduate students, and several Mongolian partners, all led by Dr. Olaf Jensen of Rutgers University. Our expedition will launch a number of studies. The word expedition evokes romantic notions of a search for the dramatic find. Today's reality though, is less dramatic. Typically an expedition provides essential samples and raw data that are fully analyzed back in the university laboratory. Major focuses of this trip will

include, placing radio transmitters on taimen to track their movements, examining the feeding habits of two other trout-like species—lenok (a primitive trout with an unusual bottom-oriented mouth) and grayling (a gorgeous trout relative with a sweeping dorsal fin)—and modeling the food chain of Lake Hovsgol. However, the value of the experience gained in major field forays should not be undersold. They provide scientists with an essential familiarity with the organisms and their place in the environment, which enriches later laboratory work.

Queens College Biology Department undergraduate, **Ivana Roman**, spent part of her summer in Mongolia working with Dr. John Waldman. Ivana has developed a study that will attempt to determine when Lake Hovsgol was recolonized by comparing DNA sequence variation between populations of fish from the lake itself, and from possible source populations that somehow survived glaciation. To collect the tissue samples, Ivana and the team employed an arsenal of fish catching practices including fly-fishing, spinnfishing, electroshocking, seining, dipnetting, trapping, and trotlining. The DNA collected will be analyzed during the fall 2011 semester with the help of Dr. Mike Hickerson (Queens College), who has developed algorithms for investigating geographical histories of populations.



Ivana Roman & John Waldman seining for taimen

Ivana, who is a transfer student from Belgrade University in Serbia, has a strong interest in ecology and marine biology. At her previous University, Ivana was active in laboratories studying pollution levels of benthic fauna in the Gradac River. After graduation, anticipated to be spring 2012, Ivana plans to pursue graduate studies in Marine and Environmental Sciences.

Day 3

Eleven of us rode crammed with gear in our laps in a Russian Furgon—picture a vintage Volkswagen van on steroids. I coped with my own discomfort by gazing at the grand vistas of the Mongolian steppe as it slowly transformed to taiga forest. Our Mongolian driver coped by endlessly blasting the same music tape by the still-popular-in-Mongolia 80's dance band, Modern Talking. We rolled into Taimen Camp at midnight, after a brutal 15-hour road trip. This last leg featured more than 70 miles of ligament-loosening dirt road, and included a rescue mission of a van that had fallen partly through the deck of a single-lane wooden bridge.

The next morning, we are on the hunt for taimen. Not long before we need to return to camp, I hook a lovely, crimson-colored two-footer. Working it up includes sedating it, measuring its length, taking a tissue sample for DNA analysis, injecting a plastic tag under its dorsal fin, photographing its head spots for study of their use as a “natural” fish tag, and then surgically placing a radio-transmitter in its body cavity. Olaf turns to me and says “Since you caught it, you get to name it.” My answer: “Modern Talking.” We watch as Modern Talking revives and slowly swims off, offering not a dance beat but instead steady radio signals that should provide information on the habits of taimen for years to come.

Day 10

Yesterday I rafted several miles of the Uur with Dr. Mendee Bud of the Mongolian Academy of Sciences to listen for the radiotagged taimen, Modern Talking. We found it holding in the pool below where we tagged it. Hopefully it will survive the fierce winter and be intercepted again next year.

Day 11

I feel deeply refreshed at having been removed from the endless superficial stimuli of western life. I've yet to fully comprehend what this expedition will mean to me, in keeping with Martin Buber's proposition that “all journeys have secret destinations of which the traveler is unaware.”

But I also am concerned at what I've seen. Mongolia is hurtling towards some environmental tipping points. In Ulaan Bator construction is everywhere. New roads are opening up remote locations. Industrial mining by foreign companies is frenzied and wildcat mining for gold is polluting waterways. Few regions of the world have felt climate warming as acutely as Mongolia, with significant shrinkage and loss of fresh waters. Taimen are sensitive, apex predators. We lose eagles before we lose pigeons and starlings. The survival of taimen, one of



The Russian Furgon - ‘a Volkswagen Van on steroids’

the world's iconic fishes, will be a true test of Mongolia's environmental stewardship.

To read the full blog visit www1.cuny.edu/mu/decade-of-science/category/mongolia-expedition-2011

V.P. Nair

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Cosmology. He is collaborating on this grant with colleagues at City and Lehman colleges (including his wife, Dr. Dimitra Karabali, Chair of the Physics Department at Lehman). Together, the grant recipients have already published a number of papers on their work.

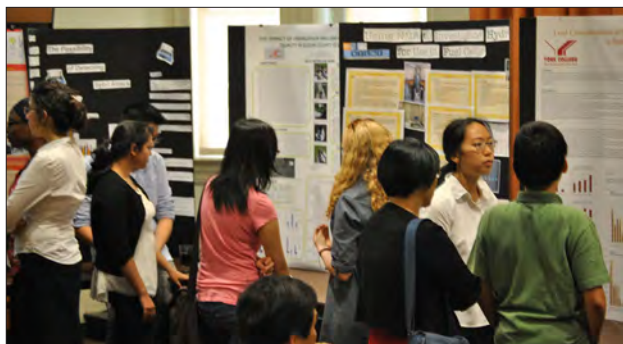
Collaboration has been a key feature of Professor Nair's career, with many collaborators both within CUNY and elsewhere, including long-term collaborators Roman Jackiw (MIT) and Seifallah Randjbar-Daemi (Abdus Salam International Center for Theoretical Physics [ASICTP]). In addition to lectures and presentations at international conferences, he has been a visiting scholar and speaker at ASICTP in Trieste, Rockefeller University, and MIT.

Professor Nair is also very proud of his collaborations with students, postdocs, and faculty at CUNY over the past two decades. He is an articulate advocate for the University. He believes CUNY's role, as a public institution, is very important because it necessitates a focus on both teaching and research. For Professor Nair these two aspects of scholarship are complementary: researchers benefit from the interaction that is inherent in their teaching and mentoring experience, and teachers benefit from research advances in their field. “We can and should do both.”

NYCSEF Summer Research Internship Program

In its fourth year as part of the New York City Science and Engineering Fair (NYCSEF), the **NYCSEF & CUNY College Now Summer Research Internship Program** brought high school juniors and seniors from across the city, who are interested in pursuing college degrees in science and engineering, into CUNY laboratories for an intensive six-week summer research experience. This year, the program placed 12 student interns, from 10 different NYC high schools, into 10 labs on five CUNY campuses. The interns participated in a range of research projects, from the acoustic properties of graphene to the impact of urbanization and land use on water quality in Queens County. On Thursday, August 11, the student interns presented their research experiences at the Macaulay Honors College.

College Now hopes to continue expanding the program to additional CUNY colleges in summer 2012. For more details about serving as a faculty mentor in next summer's program, contact **Jeannie Song** at **College Now**: jeannie.song@mail.cuny.edu or go to www.collegenow.cuny.edu/sciencefair



NYCSEF SIRP 2011 Poster Session



NYCSEF Class of 2011

The 2011 CUNY NSF CAREER Award Incentive

For the second year, the Office of the Vice Chancellor for Research has offered a University-wide incentive to encourage junior faculty to apply for the National Science Foundation CAREER Award. Any successfully funded proposal, submitted for the July 2011 deadlines, will be provided with a 10% supplement up to a maximum of \$50,000.



This year, an impressive 28 proposals were submitted from ten CUNY colleges, and notably, 12 of these proposals were resubmissions.

In response to this initiative last year, a record number of faculty rose to the challenge and submitted CAREER proposals. This past spring we were pleased to announce that two CUNY faculty members received this prestigious NSF award, and would also receive the University supplement: **Mandë Holford** (Chemistry, York College) and **Sihong Wang** (Biomedical Engineering, City College).

To encourage those unsuccessful, yet still eligible, applicants from 2010 to resubmit, the Research Office organized and conducted discipline-based grant revising and mentoring workshops.

The National Science Foundation's Faculty Early Career Development (CAREER) Program is the most important NSF award offered to STEM faculty newly embarking on independent research and teaching careers. The program is specifically designed to provide junior faculty with secure financial support at a sufficient level and duration to enable them to excel as researchers and educators who effectively integrate teaching, investigation, and innovation.

Structural Biologists Bond at Science Retreat

Faculty, postdoctoral fellows, and graduate students recently enjoyed a day of networking and presentations at the **2011 CUNY Structural Biology Workshop**. The June 6 workshop featured two guest speakers from the National Institutes of Health, Dr. Carole Bewley and Dr. Ward Smith. Dr. Bewley (NIDDK) discussed structural biology's contribution to HIV research and Dr. Smith (NIGMS) discussed funding opportunities in the field.

In addition to guest speakers, ten faculty members, representing six of CUNY's senior colleges, gave presentations on their current work. Research topics included DNA and RNA, viruses, peptides, and spectroscopy. At the poster session, 28 research projects generated much interest and discussion.

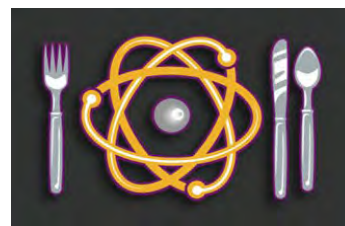
This workshop was organized by the Office of the Vice Chancellor for Research as a part of the University's ongoing effort to build community within the flagship disciplines of environmental science, nanoscience, neuroscience, photonics, and structural biology. Faculty working in these areas will have the opportunity to conduct research in the new CUNY Advanced Science Research Center. The next disciplinary retreat will feature nanoscience faculty and research topics and will take place during the Spring 2012 semester. For more information about the nanoscience retreat, please contact Avrom Caplan, Program Director at avrom.caplan@mail.cuny.edu or at (212) 794-5444.



Carole Bewley addresses CUNY's Structural Biologists

CUNY to Serve Up Science This Fall

Serving Science, The CUNY Science Café is gearing up for its fourth year of connecting the New York City community with important and topical scientific research. The



science café movement aims to promote scientific literacy beyond the walls of academia by establishing settings for informal researcher-led discussions with a generalist after-work crowd. The CUNY science café program invites top CUNY scholars to present their research in an interactive and easy-to-understand format.

This year's series kicks off with new Hunter College faculty member, Dr. Jayne Raper. Dr. Raper is working on developing a transgenic cow—one that is resistant to the parasite that causes Sleeping Sickness. The parasite is transmitted through the bites of infected tsetse flies, mainly found in Sub-Saharan Africa. Many scientists are seeking ways to provide immunity for humans, without much success. Dr. Raper, on the other hand, is seeking ways to provide immunity for one of the tsetse flies' largest host bases, the cow. By making cattle immune, Raper hopes that a significant proportion of the parasite will be eliminated, thereby resulting in fewer human infections.

Visit the *Serving Science* website for more details about the upcoming fall series: <http://www.cuny.edu/research/news-events/science-cafe.html>

Fall 2011 Serving Science Schedule

All events are at Kouzan Restaurant on the Upper West Side from 6-7pm. Cover is \$10 and includes 1 drink.

Monday, October 3

Jayne Raper (Hunter College)

Saying 'Good Night' to Sleeping Sickness

Monday, November 7

Thomas McGovern (Hunter College)

Sustainability and Collapse: Lessons from the Vikings

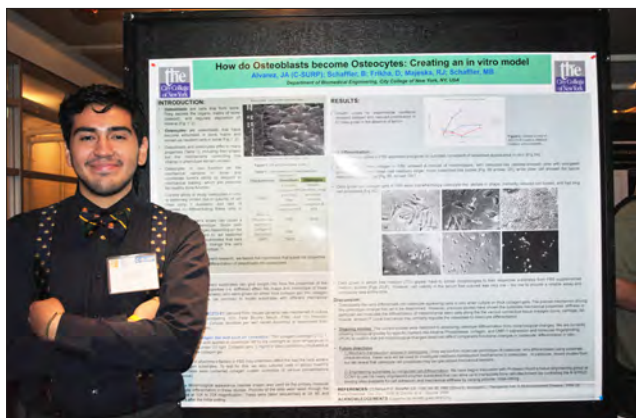
Monday, December 5

Michelle Fine and Michael Fabricant (CUNY Graduate Center and Hunter College)

Charter Schools: The Promise vs. The Evidence

2011 C-SURP Researchers

Julio Alvarez is a biophysics major entering his senior year at Hunter College. During the 10-week C-SURP he worked in Professor Mitchell B. Schaffler's biomedical engineering lab at CCNY. His project examined the development of bone cells. Osteoblasts are the cells that



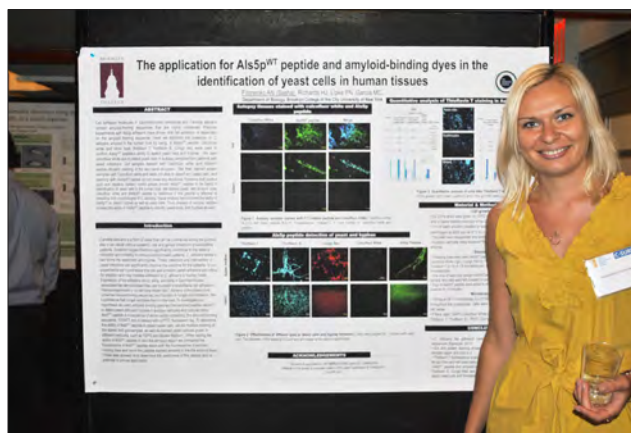
How do Osteoblasts become Osteocytes: Creating an in vitro model

form bone; they secrete the organic matrix of bone and regulate mineralization. Osteocytes are osteoblasts that have become embedded in the bone matrix. Osteoblasts and osteocytes are shaped differently, however, the mechanisms controlling this difference in shape and appearance are unknown. Julio's project tested the hypothesis that the physical properties of different substrates (the media on which the cells were grown) could impact the growth and differentiation of bone cells.

Julio found his experience in Dr. Schaffler's lab to be challenging, rewarding, and fun; he also "learned a ridiculous amount of bone cell biology, physiology, and mechanics." He expressed a sense of pride and satisfaction when he said the experience was like "jumping on a moving bus." Julio credits his mentors with giving him the opportunity to think like a scientist: "they wanted me to use the tools I had and think critically and logically, instead of just being handed the answer and told how to do things." Dr. Schaffler reported back that Julio had been a great addition to his lab and that he has offered him the opportunity to stay on with the project during the upcoming academic year. Julio is still uncertain where he wants his education and training to lead after graduation, but he is considering pursuing the Mount Sinai Post-Baccalaureate Research Education Program.

Appropriately, as a rising senior in the nursing department at Kingsborough Community College, **Alexandra (Sasha) Filonenko** has a passion for scientific research that has a practical application and can improve human lives. In Dr. Peter Lipke's lab in the biology department at Brooklyn College she was able to work on a project with real world implications, particularly for people with diseases that affect the immune system.

Candida albicans is a form of yeast that can cause oral and genital infections. These systemic fungal infections significantly contribute to the rates of morbidity and mortality in immunocompromised patients. The timely detection and treatment of yeast infections can significantly improve the outcome for these patients. In her experiments Sasha tested whether she could detect *C. albicans* in human hosts using a peptide from a cell wall protein called an adhesin. The adhesin forms amyloids; amyloids are ordered aggregates of proteins found in many different pathological states, including Alzheimer's disease. In *C. albicans*, the amyloids act to ensure that the yeast stick together to form biofilms.

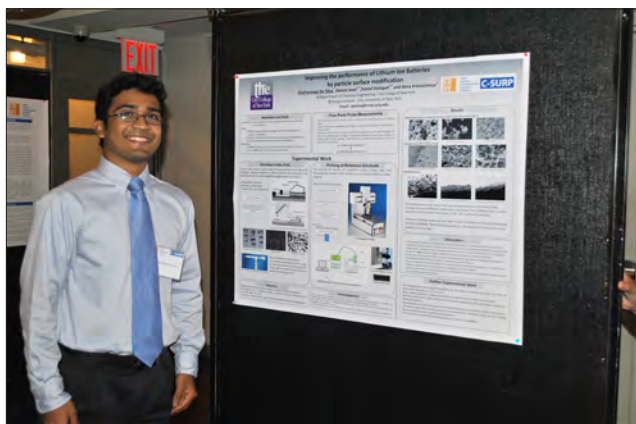


The application for Als5p^{WT} peptide and amyloid-binding dyes in the identification of yeast cells in human tissues

As a nursing student Sasha has had hands-on experience with yeast and fungal infections. It was exciting for her to study the science behind these conditions. She found that her nursing experiences provided her with insight into the research questions being asked, and that the research added a new level of depth and understanding to her nursing education.

2011 C-SURP Researchers

Chathuranga De Silva, a CCNY junior, has been a researcher in training for years. After graduating from a research-intensive high school in Sri Lanka, Chathuranga began CCNY's Chemical Engineering program in the Fall of 2009. Eager to get back in a lab, he began to work with CCNY Professor of Chemistry Glen



Improving the performance of Lithium Ion Batteries by particle surface modification

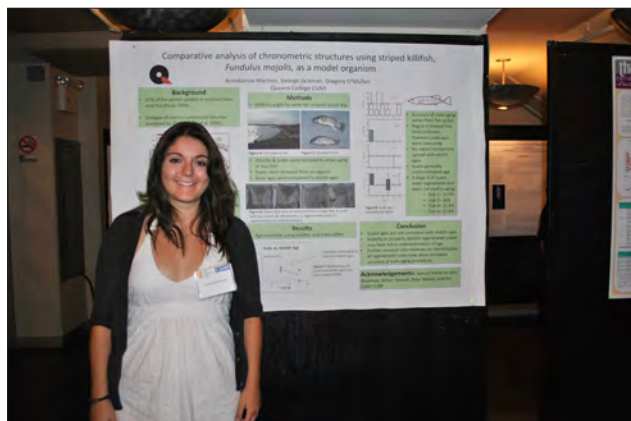
Kowach. For the last two years Chathuranga has been in his lab working on synthetic crystals.

C-SURP placed Chathuranga with CCNY Chemical Engineering Professor Ilona Kretzschmar. He was assigned to a project between Dr. Kretzschmar and CCNY Chemical Engineering Professor, and CUNY Energy Institute member, Dan Steingart.

For 10 weeks over the summer, Chathuranga has been testing Lithium Cobalt Oxide (LiCoO₂) printed batteries and working on methods to modify the surface of the LiCoO₂ particles. Some methods of printing provide less resistance to electrical current than others, and it has been his task to test for the best printing and layering methods in order to improve the overall performance of the printed electrodes. This work is just the beginning of a much longer search for the best technique, and Chathuranga may be able to stick around to see it through. After the C-SURP program ended in the beginning of August, he was offered a position in Dr. Kretzschmar's lab. Chathuranga knows that he wants to continue with chemical engineering, but he's uncertain which area he wants to pursue in the future. "Right now," he says, "my closest bet is to study energy and surface modification."

Since she saw her first nature show on TV when she was five years old, **Annakarina Marinós**'s passion and interest in the natural world has grown with each passing day. The Environmental Science department at Queens College, in which she is a rising junior, has cultivated and channeled this passion. Annakarina's experience as a voluntary research aide in a marine geochemistry laboratory sparked a particular interest in coastal and estuarine ecology. Her C-SURP research experience with Professor Gregory O'Mullan at Queens College has solidified her commitment to a career as a researcher in the field of conservation ecology.

In Dr. O'Mullans lab, Annakarina was given the freedom to conduct her own research project. Determining the age of fish is a critical facet of sustainable fisheries management. In her study, Annakarina removed otoliths (a structural feature of the inner ear) and scales



Comparative analysis of chronometric structures using striped killifish, *Fundulus majalis*, as a model organism

of striped killifish (*Fundulus majalis*) caught in the Great South Bay. She compared these two chronometric structures to determine the age of the fish. Scale regeneration is suggested as a reason why scale measures underestimated age in 60% of the fish. She concluded that further research is needed into methods for identifying regenerated scales. Annakarina claims that the C-SURP experience has been a turning point in her life, and that she fully intends to pursue a doctorate and a career in research.

Alfred P. Sloan Foundation Grants \$1 Million to CUNY

The City University of New York has received a three-year, \$1,075,968 grant from the Alfred P. Sloan Foundation to encourage and support promising early-career scientists.

Promoting Scientific Success at CUNY will fund two initiatives: the CUNY Summer Undergraduate Research Program (C-SURP) and the CUNY Junior Faculty Research Award in Science and Engineering.



Chancellor Matthew Goldstein said the grant, awarded during CUNY's ongoing Decade of Science, reflects the University's priority on research in science, technology, engineering, and mathematics (STEM).

"We're pleased that the Sloan Foundation has recognized CUNY's role in promoting scientific research," he said. "This is an exciting opportunity because the grants will enhance the stature of the University by giving our students and faculty a competitive advantage in these vital fields."

Vice Chancellor for Research Gillian Small, who is the Principal Investigator on the grant application, said, "We're delighted to partner with the Sloan Foundation to spearhead a cohort of new scientists. This will provide CUNY's researchers with a means to excel and will accelerate their road to success."

Alfred P. Sloan program director Paula Olsiewski said, "CUNY's innovative program is taking a leadership role in advancing science at the highest levels by encouraging young people, particularly women and minorities, to study in these disciplines."

The junior faculty fellowship program for young science and engineering scholars will provide each awardee with a \$50,000 research fellowship.

Dr. Small said the goals of these programs are clear. "We hope to train a new generation of researcher-entrepreneurs to create a pipeline of students interested in emerging science disciplines, and provide early-career STEM scholars with the means to create new knowledge and succeed at a level that might otherwise have been unobtainable."

On the Forefront of New Anti-Viral Treatments

Professor of Chemistry **Dr. Mahesh Lakshman** (CCNY) is the recent recipient of a National Institutes of Health exploratory grant for his work with novel anti-viral agents.

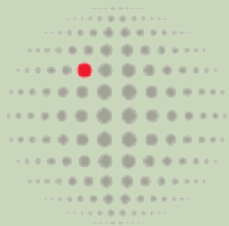
The grant will fund Lakshman's research aimed at developing a new methodology to synthesize benzotriazole and related nucleoside mimics. Azoles and related compounds have shown activity ranging from anti-microbial to anti-viral. Lakshman's hope his research will result in new treatment options for viral diseases like HIV, human papillomavirus (HPV), and herpes. Lakshman explains, "Existing viral diseases, as well as newly emerging viral diseases, demand the development of novel agents to combat them."



Aiding in Lakshman's project is the Rega Institute for Medical Research based in Belgium. Dr. Jan Balzarini of the Rega Institute has agreed to test the effectiveness of these new compounds against an array of viruses. Barring any major setbacks, Lakshman expects the first set of compounds to be available for testing by the beginning of 2012.

The National Institute of Allergy and Infectious Diseases grant, which began August 1, 2011, awards Lakshman \$405,380 over the next two years.

BioAccelerate NYC Prize



New York City Investment Fund

CUNY's **Technology Commercialization Office** is encouraging biotech researchers to apply for the New York City Investment Fund (NYCIF) BioAccelerate NYC Prize. This competition will provide up to \$250,000 in the form of a grant for biomedical translational research related to therapeutics, devices, and diagnostics that can direct clinical care. Proposals should be for research that is more advanced than what an academic institution or the NIH would fund, but too preliminary to generate interest from venture capital or commercial sectors.


The TCO's submission in 2010 resulted in a \$250,000 prize awarded to **Dr. Zaghoul Ahmed**, Assistant Professor of Physical Therapy at the College of Staten Island, for his new and very promising electrostimulation treatment that has successfully reversed paralysis and returned mobility to disabled patients.



For further information on this year's prize please contact Technology and Commercialization Office Director **Jake Maslow** at jake.maslow@mail.cuny.edu or 646-758-7910.

CUNY CREST Institute Receives \$15 Million Research and Education Grant From NOAA

The National Oceanic and Atmospheric Administration Cooperative Remote Sensing Science and Technology center (NOAA-CREST) has recently been awarded a five-year (2011-2016) \$15 million research and education grant from NOAA's Office of Education.



NOAA-CREST was founded in 2001—one of five cooperative science centers established nationwide among minority-serving institutions. The institute is headquartered at The City College under the directorship of Dr. Reza Khanbilvardi. The CUNY CREST is now one of the country's top comprehensive university remote sensing facilities, with advanced capabilities in all four remote sensing monitoring priority areas: coastal water, land, air and climate.

Over the past 10 years, CREST has demonstrated that it can effectively recruit, educate, train and graduate an increasing number of underrepresented minority students through rigorous academic programs that are complemented by hands-on participation in state-of-the-art research in line with NOAA's mission. More than forty CUNY faculty members are now affiliated with the CREST including several internationally prominent researchers who have joined the CUNY faculty in recent years.

With NOAA's support, in five years the CUNY CREST aims to become the premier global remote sensing institute in the Northeastern US, capable of providing government, state, and local agencies, as well as the academic and scientific community, with large sets of temporal and spatial environmental data for research and training. In addition, NOAA-CREST scientists will develop operational models that can be utilized for air quality and flood related disaster management, coastal water management, severe storm tracking, and other problems associated with climate change. CUNY CREST will also continue to strengthen its recruitment, education, and outreach goals to grow the STEM workforce of tomorrow for NOAA and the nation.

Postdoc Spotlight: Dr. Eno Essien Ebong

Although, **Dr. Eno Essien Ebong** is currently a postdoctoral researcher working with faculty members both at City College and Albert Einstein College of Medicine, her passion for scientific research started early, when she was a summer undergraduate trainee. In 1995, when Ebong began her studies in Mechanical Engineering at the Massachusetts Institute of Technology, she worked as an NIH-sponsored summer apprentice with Dr. Lorraine Flaherty at the New York State Department of Health Wadsworth Center. Under Dr. Flaherty's guidance she employed the polymerase chain reaction (PCR) technique to analyze the genetic effects on mice of the chemotherapy drug Chlorambucil. Ebong later worked with Dr. Ernest Cravalho, Professor of Mechanical Engineering at MIT, to investigate approaches for measuring in vivo tissue stiffness, with a view towards designing a "glove" device for prostate cancer detection. Throughout her undergraduate studies, Dr. Ebong was also involved in industry research with Hewlett-Packard's (HP) Chemical Analysis and Health Solutions Groups (now part of Agilent and Philips, respectively). At HP she used sophisticated statistical and engineering methods to design, execute, and analyze experiments related to chromatograph and ultrasound transducer development.



From 2000 to 2006, Ebong pursued graduate studies (M.Eng. and Ph.D.) in Biomedical Engineering at Rensselaer Polytechnic Institute (RPI). She worked with Dr. Natacha DePaola, integrating biofluid mechanics and blood vessel cell biology to demonstrate that fluid shear stress augments cell-to-cell communication in the human endothelial cells (EC) that line blood vessel walls (Ebong et al., *American Journal of Physiology Heart and Circulatory Physiology*, 2006). For her achievements, Dr. Ebong was awarded the 2006 Karen and Lester Gerhardt Prize by RPI, and the 2006 Zelda and David G. Gisser Prize in Biomedical Engineering by the Rensselaer Department of Biomedical Engineering.

Dr. Ebong works with both Dr. John M. Tarbell in the

Biomedical Engineering Department at City College and Dr. David C. Spray at Albert Einstein College of Medicine. Using rapid cryopreservation and transmission electron microscopy techniques, she has begun to define the structure and blood-flow-pattern-induced reorganization of the endothelial cell sugar coat—or glycocalyx—that is shed in vascular disease (Ebong et al., *Arteriosclerosis Thrombosis and Vascular Biology*, 2011). Dr. Ebong also studies the mechanisms that determine how glycocalyx participates in the process of blood fluid forces affecting the endothelial cell function and dysfunction associated with vascular health and disease. Her long-term career goals are to identify mechanically-regulated cellular and molecular targets and to develop novel tools to prevent, diagnose, and treat disease.

Dr. Ebong has been an active and engaged member of the CUNY Postdoctoral Development Program. In a recent presentation to the CUNY Summer Undergraduate Research Program (C-SURP) she detailed a number of reasons why a postdoctorate position is necessary for laying the groundwork for a career in scientific research both inside and outside of academia. A postdoctorate extends the career decision-making and transition time period, which enables a researcher to: learn new techniques and/or a new discipline, expand a professional network of leaders and peers in the field, increase her number of publications, gain experience in writing grant and fellowship applications, and enhance her teaching skills. Dr. Ebong also strongly encourages all postdoctoral researchers to map out and adhere to a structured postdoctoral development plan, and to have regular progress reviews with their advisors.

Did You Know?

September 19-23, 2011 is National Postdoc Appreciation Week.



Sponsored by the National Postdoctoral Association, the week celebrates the contributions that postdocs make to scientific research throughout the US.

This year CUNY will honor its postdocs as part of our Women in Science event on September 22 (page 16).

Find out more about the National Postdoc Association at www.nationalpostdoc.org

Announcing the 2012 Community College Collaborative Incentive Research Grant Competition

(Round 9)

C³IRG

What: How to Write a Pedagogical Research Grant
A One-Day Workshop

When: Thursday, January 5, 2012
9:00 – 5:00

Where: Borough of Manhattan Community College

This year the workshop will offer more focused small group sessions addressing human subjects research and the IRB process, project evaluation and assessment, and grant writing basics for pedagogical research grants.

Community College Collaborative Research Grant Winners

This was the first year that the C³IRG focused on pedagogical research. The response to this initiative was very promising. Three of the four awardees listed below are conducting pedagogical projects.

Francesco Crocco (BMCC), **Carlos Hernandez** (BMCC), **Kathleen Offenholley** (BMCC)

Game-based Learning: Evaluating a 21st-century Pedagogy for CUNY Community Colleges

Kate Garretson (KCC) and **Gisela Jia** (Lehman)

Improving the Teaching and Learning of English Language Learners: Testing the Aural and Oral Model

Rachel Torres (BMCC) and **Jacqueline Nichols**

(BMCC) *Health Literacy Knowledge and Experiences of Community College Nursing Students: A Pedagogical Study*

Monica Trujillo (QCC) **Akira Kawamura** (Hunter), and **Andrew Nguyen** (QCC)

Biological characterization of a Streptomyces strain isolated from NY soil

CCNY Professor Finalist for Prestigious Blavatnik Award

Dr. Robert Anderson (CCNY) has been named a finalist for the prestigious Blavatnik Award for Young Scientists. Dr. Anderson, a biogeographer and ecologist, is being honored for his work on the development of a new modeling program. This program incorporates a mathematical principle called maximum entropy to analyze available ecological data and determine the species that may be viable in a given area.



With wide uses in ecology and environmental sciences, the program, named Maxent, has the potential to aid in species discovery, wildlife protection and conservation efforts, invasive-species monitoring, and in predicting the effects of climate change on plant and animal species. “Maxent is now pervasive in the field,” says Dr. Anderson about the paper’s more than 1,000 citations. Maxent was developed in collaboration with computer scientists Dr. Steven Phillips at AT&T-Research and Dr. Robert Schapire at Princeton University.

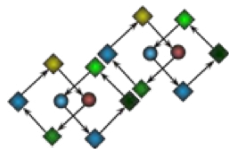
The New York Academy of Sciences Blavatnik Award recognizes outstanding interdisciplinary accomplishments from tri-state faculty in the fields of life sciences, physical sciences, mathematics, and engineering. Dr. Anderson was selected as one of only seven faculty finalists, and he is the first CUNY faculty member to be selected as a finalist. Winners of the Blavatnik Award will be announced at the Academy’s 8th annual Science and the City Gala on November 14, 2011.

2011 Blavatnik Award Faculty Finalists:

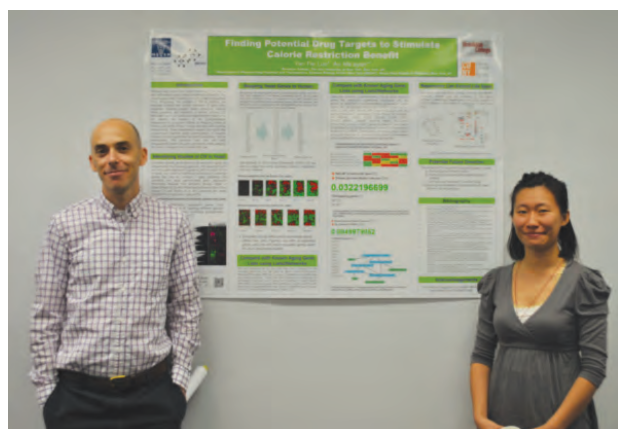
- Robert Anderson, Ecology, CCNY
- Johannes Gehrke, Computer Science, Cornell
- Charalampos Kalodimos, Chemistry, Rutgers
- Jun Korenaga, Earth Science, Yale
- Szabolcs Marka, Astronomy, Astrophysics & Cosmology, Columbia
- Olga Troyanskaya, Computational Biology, Princeton
- Gerard Wysocki, Electrical Engineering, Princeton

CUNY Undergrads Participate in Summer Research Program at Mount Sinai

In its fourth year, Systems Biology Center New York (SBCNY) Summer Undergraduate Research program at Mount Sinai awarded fellowships to two CUNY students for a 10-week research-intensive systems biology training program conducted in the Center's laboratories.



The Systems Biology Center New York (SBCNY) is one of the National Centers for Systems Biology funded by the NIH National Institute of General Medical Sciences (NIGMS). The SBCNY consortium consists of researchers and educators from CUNY, Mount Sinai



Professor Avi Ma'ayan & Yan Fei Luo

School of Medicine, New York University, SUNY Stony Brook, The National Centre for Biological Sciences (India), and the IBM Watson Research Center.

The SBCNY offers summer research fellowships to undergraduates who are planning to pursue PhD or MD/PhD degrees and are interested in incorporating systems biology approaches into their research. Students majoring in physical, mathematical and engineering sciences are given the opportunity to learn how concepts in their fields can be applied to cell biological problems both at experimental and computational levels. Students majoring in biological sciences learn a range of computational techniques and how to quantitatively model biological processes.

All SBCNY Summer Fellows conduct an individual research project under the mentorship of a SBCNY investigator.

- **Yan Fei Luo** (Physics, Brooklyn College) worked with Dr. Avi Ma'ayan (Mount Sinai). Her project was entitled, *Finding Potential Drug Targets to Stimulate Calorie Restriction Benefit*.
- **Roy Song** (Biology, CCNY) worked with Dr. Susana Neves (Mount Sinai). His project was entitled, *Regulation cAMP-specific Phosphodiesterase PDE4D3 by Brain-derived Neurotrophic Factor and Dopamine*.

WOMEN IN SCIENCE

Negotiating a Successful Academic Career

"For every dollar earned by a man in STEM (Science, Technology, Engineering and Mathematics) a woman earns 14% less." (US Dept. of Commerce). Research suggests that women are less likely to initiate negotiation than men and this may account for some of the differential in salaries and other areas (e.g. start-up packages). These issues along with potential corrective strategies will be discussed at the upcoming Women in Science event.

The Office of the Vice Chancellor for Research is pleased to present **Women in Science: Negotiating a Successful Academic Career**, a workshop aimed at senior doctoral students, postdoctoral researchers, and junior faculty (everybody welcome irrespective of gender!)

Thursday, September 22, 2011, 3-6 pm
Segal Theatre, CUNY Graduate Center

To register for this event visit: <http://cuny.edu/research/news-events/womeninscience.html>