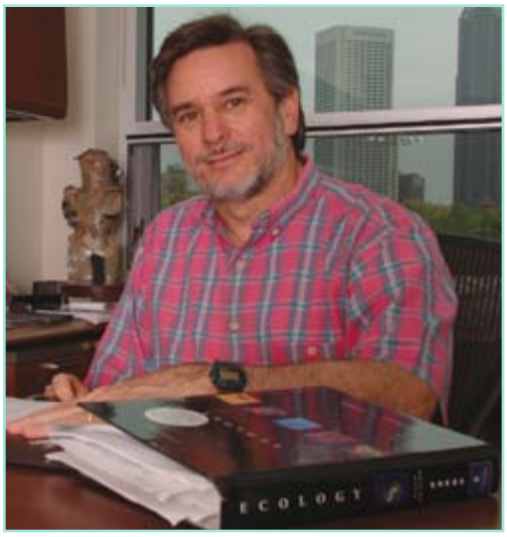
School of

Georgia Tech

BIOLOGY

FALL 2011



It is our pleasure to present the Fall 2011 edition of the School of Biology newsletter. Inside you will find highlights of some of the important events in the lives of our students and faculty. One article discusses the opening of the Clough Undergraduate Learning Commons (CULC) building, where all freshman science labs are taught. The building is getting rave reviews from students and faculty alike. Another article describes how Biology alums can help our current undergrads by serving as a mentor through the Mentor Jackets program. Check out the fun events that the School of Biology is sponsoring during home football games, including tailgate parties and the renting of boxes in the stadium. An opportunity is described for alums to help the School of Biology by serving on the Advisory Board. The exciting research of two of our newest faculty is highlighted, Dr. Fred Vannberg and Dr. Joel Kostka. Lastly, we describe our partnership with The Coca-Cola Company in teaching a micro-biology certification course using our classrooms and labs.

Education and research are the two primary activities of the School. Our professors are engaged in mentoring research scientists, post-docs, graduate and undergraduate students and are training the next generation of biologists to solve important problems with serious societal impacts. These teaching and research activities cost millions of dollars, most of which are generously provided by the state of Georgia and federal research grants. However, there are certain activities that are not supported by these funds. These include: seminar series that bring top scientists to Georgia Tech for a few days to present their research and talk to students, student travel to scientific meetings, student awards for outstanding teaching and research, and scientific retreats where graduate students and post-docs present their research and receive critiques from faculty. We could use your help in funding these activities that are so important to the professional development of students and faculty. If you would like to help the School of Biology continue to attract and retain the best quality students and faculty, please consider making a donation at http://www.biology.gatech.edu/. Use the left sidebar and click on Giving to the School of Biology. If you would like to discuss specific ways to help the School, please contact me and we can have a more detailed conversation about how you might contribute. Even though you have left Georgia Tech, we hope that you will continue to participate in the excitement of the discoveries happening everyday in the School of Biology.

Best wishes,

Terry W. Snell

Professor and Chair
School of Biology

NEW Clough Undergraduate Learning Commons

The Clough Undergraduate Learning Commons (CULC) is a new state-of-the-art teaching facility that opened adjacent to the Georgia Tech Library in August. The 220,000 square-foot building is home to teaching labs for introductory biology, chemistry, physics and earth and atmospheric sciences. It also houses: two lecture halls, a number of smaller classrooms including rooms designed for group work, a Starbucks, the offices for Undergraduate Studies, the Center for the Enhancement of Teaching and Learning, the Center for Academic Success (tutoring programs), the new Comm Lab writing center and a resource center for the Office of Information Technology.

The building is seeking LEED Platinum certification and features a 1.4 million gallon underground cistern to capture runoff and condensate water. This water is used for flushing toilets in the building and landscape irrigation. The building also has a rooftop garden, 347 solar panels and a daylight harvesting system that reduces electricity usage.

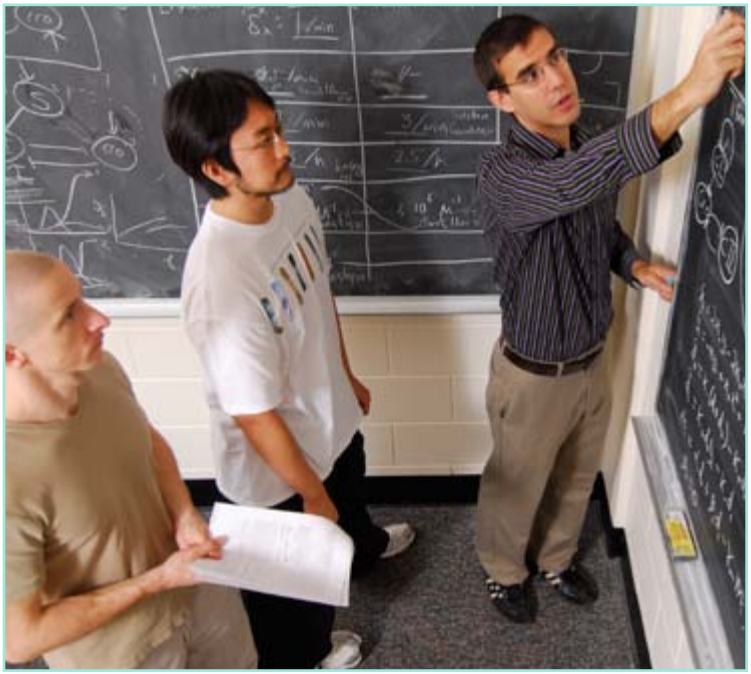
Students can reserve study and rehearsal rooms throughout the building, which also features many open study areas. Biology has five beautiful new labs for our freshman Biological Principles and Organismal Biology courses. The labs have an innovative design that encourages group collaboration and allows easy access to Internet resources through integrated benchtop computers.

Next semester we plan to open a biology career resource area adjacent to the biology labs, where students can come for academic advising and access to career information in biology.

GT Biology alumni undergraduate mentoring program

We are initiating a new program to connect GT Biology alumni with our current undergraduates through the Mentor Jackets program sponsored by the GT alumni association. This program helps our students to prepare for careers after Georgia Tech by acquainting them with the range of careers developed by our alumni. Connecting students to experienced professionals working in the field is the best way to get answers to their questions about careers in biology-related fields. There are several ways for alumni to become involved in the Mentor Jackets program: one-on-one mentoring with a student who is interested in your field through email, phone and/or personal contact, interaction with a small group of current students by delivery of a career seminar at GT, video-conferencing an event from your home or office where students can ask you questions about your career trajectory and what they should do to prepare themselves for a similar career. A good place for alumni and Biology undergraduates to meet and mingle would be the Bio-Bash at homecoming weekend on October 28th.

See other parts of this newsletter for more details on the Bio-Bash. If you are interested in becoming a mentor for a Biology undergraduate, please sign up at the website: http://www.gtmentorjackets.com/. Here they explain all of the activities available from email to video conferences to campus visits. Registration is painless and it will get you started as a mentor for Biology students, who I am sure will benefit from your experience and expertise.



Biology alum Curt Bazemore '74 and daughter Jen

Biology alum Michon Mitchell '89 and husband George

School of Biology at the Opening Football game

The School of Biology rented a box in the Wardlaw Center for the Tech opening football game with Western Carolina. We hosted six Biology alums and their guests to watch Tech convincingly defeat WC 63 to 21. It was a great opportunity for alums to enjoy the game and to chat informally with some professors. We hope to repeat this whenever we can get access to a box again. Biology alums should be on the look out for an invitation and respond quickly, as the boxes fill rapidly.

Biology hosts tailgates for home football games

The School of Biology is sponsoring tailgate parties for Biology alums and their guests at all remaining Tech home football games. We usually start about two hours before kick-off, weather permitting. Look for a Tech tent with a Biology banner under the big oak tree on the west side of the baseball field. Biology professor Dr. Tom DiChristina will host on the grounds of the Environmental Science and Technology building. It is a convenient and pleasant spot with access to bathrooms in the building. We will supply some finger foods, but bring your own drinks. Please stop by and say hello.

School of Biology Advisory Board

The School of Biology has formed an external advisory board of alumni to provide advice on various aspects of developing the School and relations with alumni. Eight people have agreed to serve three year terms, including Wade Barnes '71, Georgette Sarmaritan '70, Cynthia Mangiameli '74, Tim Helton '74, Larry Lawrence '74, Joel Pittard '68, Fred Levin '72, and Phil Williams '88. The first meeting is October 26 and will be followed by annual meetings on campus each Fall. For example, at the meeting this Fall we will be discussing the alumni undergraduate mentoring program, the homecoming Bio-Bash, and ways to better engage the alumni. If you would like to be involved, we will likely have some new openings in Fall 2012. Please send me an email at terry.snell@biology.gatech.edu if you would like to be placed on the list of candidates.

Welcome to our new Biology faculty, Professor Fred Vannberg and Professor Joel Kostka!

We asked Drs. Vannberg and Kostka about the path that brought each of them to Georgia Tech, and this is what they said:

From Dr. Vannberg:

What made you choose the kind of research that you have used to build your career?

My research allows me to interact with truly great scientists across the disciplines of genetics and immunology. In addition, my work is global, with projects based in West Africa and India so it also allows for some exceptional experiences both research and non-research related.

What courses will you be teaching at Georgia Tech and how do you imagine interacting with our undergraduates?

I am currently teaching Cell and Molecular Biology along with Prof. Al Merrill. I have also brought three undergraduate students to my laboratory to explore the concept of differential RNA regulation in nanovesicular exosomes post exposure to innate immune stimuli. I am finding it very exciting to teach undergraduates about completely novel work which is not even present in the textbooks.

What research to you plan to embark on in your new lab at Georgia Tech?

My studies have the common theme of using modern genomics to study the host-pathogen relationship. My main studies include understanding which human genetic variants impact on immunity to mycobacterial infections, including tuberculosis, leprosy and Buruli ulcer. We have also started a concerted effort to understand the role of nanovesicular exosomes in health and disease.

What do you hope to achieve with your work in the next decade?

By understanding the host-pathogen relationship, especially as relates to bacterial virulence mechanisms, we can specifically start to target these molecular pathways with small molecules, or in the case of vaccines, come up with novel adjuvants which will steer the immune response in the right direction to protect against the infection.

What's the next big challenge in your field of research, and how will your group participate?

The work on the genomics of mycobacterial diseases is moving forward and we are making new discoveries. A bigger grand challenge will be to understand the role of nanovesicular exosomes during infection. Previous studies have shown that these mammalian vesicles circulate in the blood and can specifically deliver a payload of nucleic acids and proteins to cells anywhere in the body, and even pass the blood-brain barrier. These exosomes can either activate or shut down the immune system and so we are now studying the Janus nature of these particles.

What kind of hobbies and activities do you engage in when you're not teaching or doing research?

I enjoy playing tennis, horseback riding, fishing, and mentoring kids in math and science subjects.

Do you travel for your research, and if so, where do you go and what is it like there?

I travel to West Africa quite frequently and very much enjoy the vibrant culture and the food (especially fried Tilapia). The warmth of the people there is unprecedented and on my most recent trip to Ghana I spent an entire day with my collaborator's family and felt completely part of their extended family.

From Dr. Kostka:

My background is in marine science and I was professor in an oceanography department at Florida State University before coming to Tech. My research and teaching programs have trended toward microbial ecology and environmental microbiology. I came to Tech to be a part of a Biology department and a university that is on an upward trajectory.

What research to you plan to embark on in your new lab at Georgia Tech?

I have two new research projects that were funded to my lab group at Tech. As part of the Deep-C consortium and funded by the Gulf of Mexico Research Initiative, we will investigate the biodegradation of oil and ecological impacts associated with the Deepwater Horizon oil spill in the Gulf of Mexico. We will focus on a huge valley on the sea floor in the northeastern part of the Gulf called DeSoto Canyon. The region is considered a hot spot of biological diversity and has the highest biological productivity in the Gulf, so it has tremendous economic value. DeSoto Canyon is believed to be a conduit, or escalator, for transporting oil to sensitive shallow water ecosystems where most of the economic and ecological damage from oil spills is done. Very little is known about the physics and biology in this part of the Gulf. In order to evaluate and predict the impacts of an oil spill, we need to first understand how the Gulf of Mexico works. Thus, we will generate quantitative field data on the physical, chemical and biological systems of the northeastern Gulf. We will investigate the biological diversity and trophic interactions among marine organisms from the base of the food chain to apex predators.

In a project funded by the U.S. Department of Energy (DOE), we will study the microbially-mediated carbon cycle in boreal or northern peatlands. Peatlands sequester one-third of all soil carbon and currently act as major sinks of atmospheric CO2. The ability to predict, or to simulate, the fate of stored carbon in response to climatic disruption remains hampered by our limited understanding of the controls of C turnover and the composition and functioning of peatland microbial communities. My group will investigate the microbial carbon cycle in peats as part of a large climate manipulation experiment at the Marcell Experimental Forest in northern Minnesota, where Oak Ridge National Laboratory and the USDA Forest Service are developing a climate manipulation field site known as Spruce and Peatland Response Under Climatic and Environmental Change.

What are the long-term implications of the research you engage in?

While the immediate and acute effects of the Deepwater Horizon oil spill have been intensively studied, chronic or long-term effects to Gulf ecosystems remain largely unknown. Only a fraction of the released oil and gas has been accounted for. Our research will be critical for finding out where the oil went and what long term effects it will have on sensitive Gulf ecosystems.

In addition, the risk of accidental oil discharge to the marine environment will remain high for the foreseeable future as increased economic pressure to access new oil reserves in deep marine waters will require less tested technologies. It is not a question of *whether* another major spill will happen but rather *when* it will occur. Thus, our research will provide vital data and modeling in support improved response efforts for future spills.

Microbes largely control the release of greenhouse gases to the atmosphere, and yet microbial processes are rarely included in Earth system models that seek to forecast global climate change. Our goal is to incorporate microbial processes into global climate models to better predict the response of wetland ecosystems to climate change.

What courses will you be teaching at Georgia Tech and how do you imagine interacting with our undergraduates?

I am teaching BIOL 3380, Introductory Microbiology, right now. I am impressed with the students at Tech, so far. I look forward to engaging and mentoring undergraduate students to perform research. My research is heavily field oriented and I find field work, especially involving the oceans and coastal ecosystems, goes a long way in getting students excited about research.

What kind of hobbies and activities do you engage in when you're not teaching or doing research?

I am pretty much addicted to running. I have participated in a half marathon every year for the past five years. I hope to train for the full marathon, but have not been able to find the time.

Coca-Cola and SoBIOLOGY

The Coca-Cola Company held a microbiology certification course July 25-29 in the School of Biology, using our lecture room and lab. About 20 Coke employees heard lectures and discussed microbiological issues concerning the manufacture and storage of their beverages. Various lab techniques were described and practiced in the School of Biology lab using our microscopes, pipettors, and growth chambers. We were happy to provide these facilities and contribute to the in-service training of Coke microbiologists. If your company needs labs for short in-service training courses, please contact the School of Biology and we will discuss how we might be able to accommodate your needs.

2011 bio bash Amazonia

The Georgia Tech School of Biology homecoming tradition continues this year with Bio-Bash 2011 "Amazonia." The event will be held from 7:00-10:00 p.m. on Friday, October 28th in the Marcus Nanotechnology Building with an additional research seminar on nutrient flow from the Amazon by Dr. Joseph Montoya from 6:30-7:00 p.m.

The event will celebrate the cultural and scientific treasures of the Amazon region including: a delicious Brazilian menu, Capoeira demonstration by Brazilian martial arts/dance group Capoeira Maculele Decatur, live traditional Brazilian jazz from Atlanta ensemble Os Ossos, a visit from an amazonian Boa constrictor courtesy of Zoo Atlanta and more. We will also have a silent auction with **LOTS** of fabulous items available.

Proceeds from Bio-Bash 2011 ticket sales will benefit the Biology Student and Faculty Programs fund. Some of the programs supported by this fund are: scholarships for biology majors to attend field trips and scientific conferences, support for undergraduate research programs, a scientific retreat of graduate students, researchers, and faculty to build scientific interactions and grow new research directions and environmental outreach programs for inner-city youth.

For more information and to buy tickets visit:
http://www.biology.gatech.edu/biobash