

BIOLOGY

FALL 2012



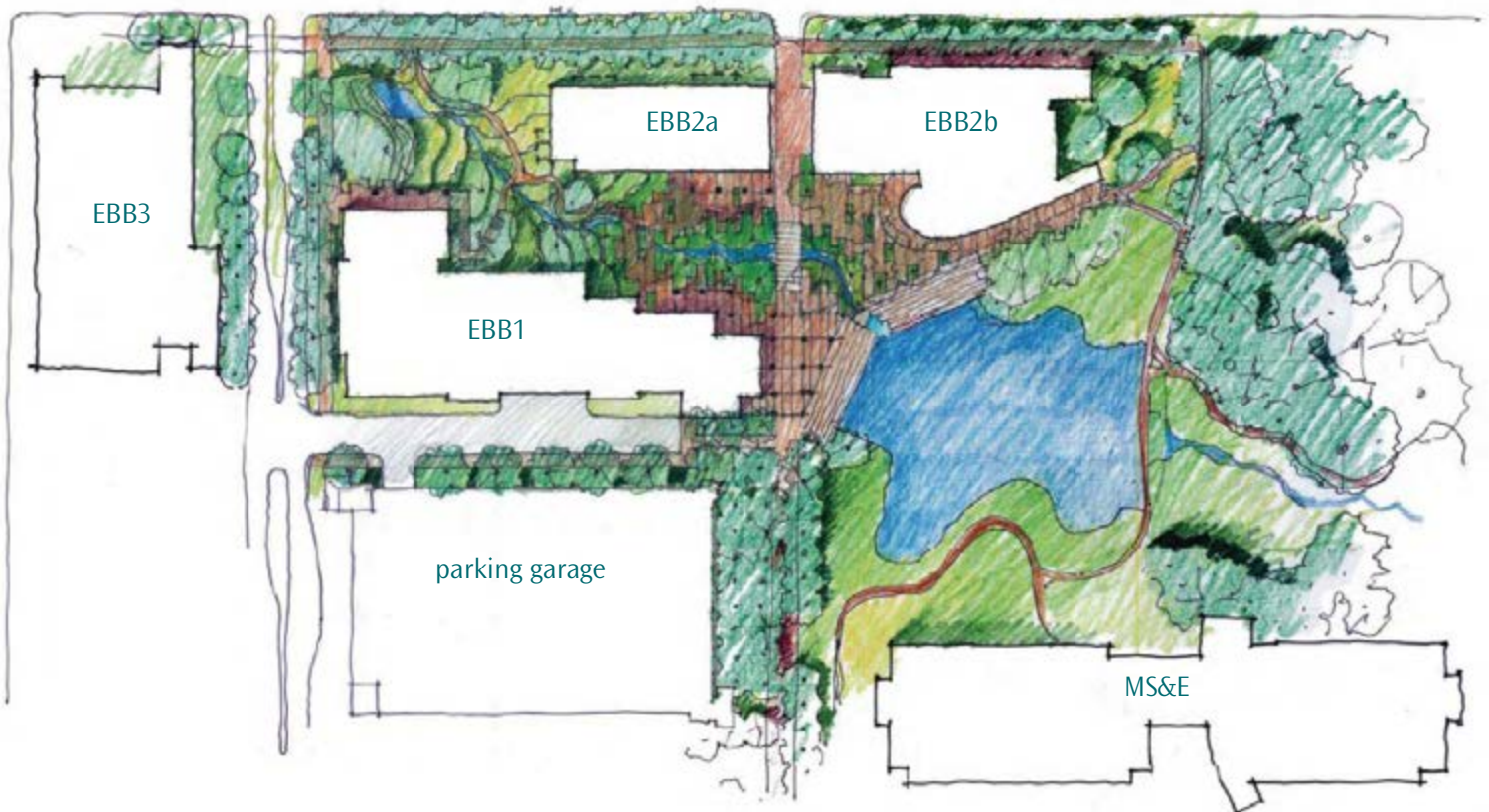
The big news this Fall is that we are about to break ground on a new \$110 million life sciences research building. It will be home for many biology and bioengineer researchers and the administrative offices of the School of Biology. Take a look at the important scientific symposium on coral reef ecology that attracted some of the most eminent scientists in the field to Georgia Tech. The School of Biology scientific retreat was a wonderful opportunity to showcase the homegrown

scientific talent of our Ph.D. students and postdocs. Please note the homecoming activities that we are sponsoring October 26-27, including a student-alum cook-out, guided lab tours, and a pre-game tailgate. We hope to see you on campus for the festivities!

Best wishes,



Professor and Chair
School of Biology





Teasley Workshop on seaweed-coral interactions

On April 5, 2012, some of the world's leading marine biologists and coral reef ecologists presented their research and discussed resource management solutions at Georgia Tech. The workshop was organized by our own world-renowned coral reef expert Dr. Mark Hay with funding provided by the Harry and Linda Teasley endowment. The School of Biology hosts a variety of workshops like this one, organized by our faculty around a hot topic of societal interest. Identifying threats to coral reefs and ways to maintain their structure and function remains an urgent topic of research for many coastal communities. It was a great opportunity for our undergraduate and graduate students to hear, meet and debate these topics with some of most eminent scientists in the world.

The following is a list of presentations:

Nancy Knowlton, Sant Chair for Marine Science, National Museum of Natural History, Smithsonian Institution "Coral-seaweed interactions: the largely unknown consequences for reef diversity"

Peter Mumby, ARC Laureate Professorial Fellow, University of Queensland, Brisbane, Australia "The role of coral-algal interactions for ecosystem resilience"

Forest Rohwer, Professor of Biology at San Diego State University "Microbes or Fish? Something will eat the algae"

Jennifer Smith, Assistant Professor, Scripps Institution of Oceanography, UC San Diego "Benthic coral reef community dynamics and lessons learned from the Central Pacific"

Valerie Poul, Head Scientist, Smithsonian Marine Station, Fort Pierce, FL "Chemical ecology of seaweed-coral-herbivore interactions on Caribbean reefs"

Doug Rasher, Ph.D. student, Biology, Georgia Tech, Atlanta, GA "Chemically-mediated competition, herbivory, and the structure of coral reefs"

Mark Hay, Teasley Professor of Environmental Biology, Georgia Tech, Atlanta, GA "Dynamics, variance, and molecular mechanisms of seaweed-coral interactions"

Peter Steinberg, Professor of Biological Earth and Environmental Sciences, University of New South Wales, Sydney, Australia (also Director and CEO, Sydney Institute of Marine Sciences; Director Centre for Marine Bio-Innovation; Co-Director, Advanced Environmental Biotechnology Center, NTU, Singapore) "Seaweed-bacterial interactions: ocean warming, disease and bacterial communities"

Robert (Bob) Steneck, Professor, School of Marine Sciences, University of Maine, Darling Marine Center, Walpole, Maine "Benthic algae and the coral recruitment potential of Caribbean reefs"



Photos by Elena Antonova





Alumni Spotlight—Vice Admiral Matthew L. Nathan

Vice Admiral Matthew L. Nathan, B.S., Biology, Georgia Tech ('77), M.D., Medical College of Georgia ('82), IM Training, University of S. Florida ('84), Master's Degree, Joint Industrial College of the Armed Forces ('99) is the Surgeon General of the Navy and Chief of the Navy's Bureau of Medicine and Surgery. He has also served as commander of Walter Reed National Military Medical Center.

Early in his career, Nathan headed various Naval Hospitals' internal medicine departments before reporting to Naval Clinics Command, England. Afterwards, he was assigned to the Bureau of Naval Personnel as a special assignment officer providing guidance to over 1,500 United States Navy Medical Corps officers.

In 1998, Nathan accepted a seat at the Joint Industrial College of the Armed Forces, Washington, D.C. After that, he served as the United States 7th fleet surgeon commander; transferred as deputy commander, Navy Medical Center Portsmouth, VA (2001); assumed command of Naval Hospital Pensacola with additional oversight of 12 clinics in four states where he oversaw Navy medical relief efforts following hurricanes Ivan, Dennis, and Katrina (2004); and, transferred as the fleet surgeon to the Commander, United States Fleet Forces Command (2006). He then was assigned as commander, Naval Medical Center Portsmouth and Navy Medicine Region East commanding over 18,000 personnel with an operating budget exceeding \$1.2 billion.

A Fellow in the American College of Physicians and the American College of Healthcare Executives, Nathan holds an appointment as Clinical Professor of Medicine at the Uniformed Services University of the Health Sciences. He is the recipient of numerous awards including medals for Distinguished Service Medal; Legion of Merit; Meritorious Service; Navy and Marine Corps Commendation, and Navy and Marine Corps Achievement.

We asked Vice Admiral Nathan to reminisce about his experience in the School of Biology at Tech:

Q: *Who was your favorite Biology professor?*

A: Dr. Edward Fincher was my absolute favorite. I appreciated his scholarly and very civil approach to problems, research, and most of all animated college students. I credit him for igniting a passion in me to learn more about microbiology; especially when I was more interested in applied studies than memorizing facts. It served me very well in med school. I think Dr. Fincher was a nice counter balance to some of the more "excitable" profs in the School of Biology; e.g., Biostatistics with Professor Kethely, (AKA known as "weed out for Nobel Prize Winners"). By the way, I got a "C."

Q: *What were your most memorable experiences in the School?*

A: I always thought the spring social picnics were great. Everyone let their hair down; faculty and students. I also remember a test on molecular genetics and recombinant DNA. I failed it and thought, well how important can this stuff be? (1976)

Q: *What do you consider the most important lessons you learned at Tech; especially, ones that best served you in your career?*

A: Georgia Tech has great faculty and passionate teachers and classes that taught you how to think and figure out what the problem actually is. That's harder than it sounds, whether supporting disaster relief, curing disease, or harnessing energy. The real education was learning to find answers or figure them out using your instincts, tools, and skills. I think that is why Tech produces so many people who basically find solutions and solve problems.

Q: *Any career advice for Tech Biology graduates?*

A: Tech students should become world citizens as much as scientists. Take advantage of the amazing diverse student body and learn about as many divergent views and backgrounds as you can; be it New Jersey or China. The chance to interact and network with a population like that will rarely come again. Tech can make you a world class scientist, but only you can you make you a world class person.



DESIGNING THE FUTURE

Georgia Tech meeting grand challenges in life sciences

The Georgia Tech community spent two years drafting a strategic plan for growth over the next decade. The life sciences are one of the focal areas identified for investment. This is recognition of the remarkable opportunities for discovery in this field and the need of Georgia Tech to bring life sciences to the same level of distinction as the engineering programs. Three grand challenges were identified and are described below:

Environment and Health The Earth's environment is heterogeneous and changing rapidly. This affects the distribution, interaction and health of organisms from microbes to mammals. The grand challenge is to (1) quantify and understand the complexity of interactions among species in a changing environment, as well as the impact of living organisms on the environment, and then to (2) manipulate these systems to achieve favorable, sustainable outcomes. This includes such disparate research areas as the health (and diseases) of humans, other organisms and of the environment itself; sustainability and global climate change; environmental engineering and bio-energy; aspects of both natural and built environments; access to clean air, water, soil and healthy food; and the role of social networks in facilitating or inhibiting health-enhancing choices.



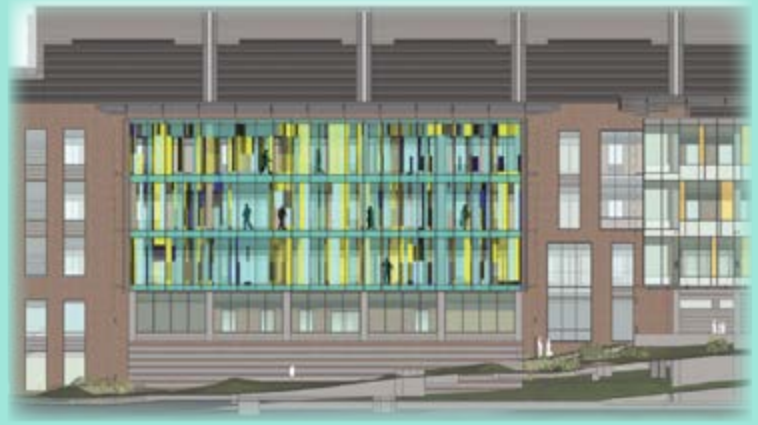
Biomedical Therapies Human disease, degeneration and injury have colossal societal and economic impacts world-wide, and the development of effective biomedical therapies to address these conditions will continue to be one of humanity's greatest challenges. Strategic themes that will guide solutions to these challenges include (1) integrating fundamental cellular and molecular developmental and structural biology with emergent technologies to develop novel approaches to pediatric healthcare, healthy aging, and prevention as well as treatment of cancer, cardiovascular

and infectious diseases; (2) understanding and harnessing endogenous repair and adaptive mechanisms to achieve tissue regeneration and restoration of function; and (3) developing novel therapeutic agents, manufacturing methods, delivery strategies and instrumentation to help bring biomedical therapies to patients.

Complex Biological Systems Understanding biological systems requires a multi-scale, interdisciplinary approach, from the analysis of molecules and cells to the analysis of tissues, organs, behavior and population dynamics. Now, more formidable challenges lie ahead, namely (1) to understand how molecular, cellular and circuit models can be integrated, (2) to understand how these component parts interact in larger networks and systems, (3) to explain the relationship of these interactions to the dynamic behavior of biological systems as a whole, and (4) to exploit this knowledge and understanding to manipulate and synthesize new biological and hybrid systems that demonstrate and test our understanding of the fundamental nature of such systems, with the ultimate goal to improve the human condition.



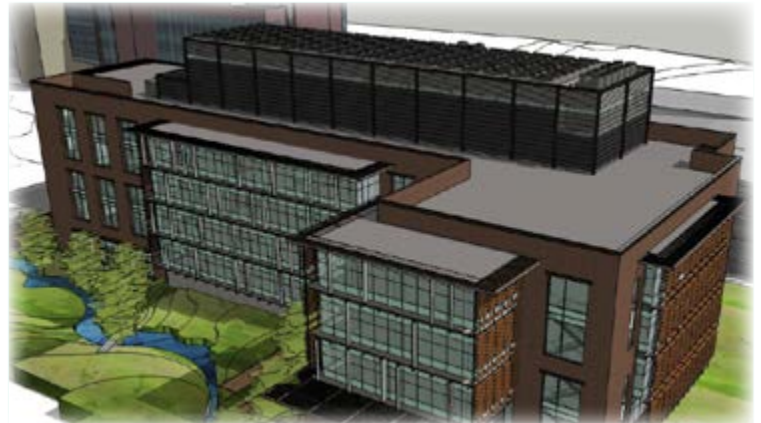
An integrative, interdisciplinary effort will be required to solve these problems and Georgia Tech is well positioned to play a leading role. Excellence in the life sciences will enable Georgia Tech to become a global center for developing programs that will enhance human and environmental health and promote economic growth. This research is inherently trans-disciplinary, requiring deep expertise that spans science, engineering, mathematics, and computing, all strong disciplines at Georgia Tech. World class intellectual resources from engineering, science, social science and humanities are available at Georgia Tech to bring to bear on these problems to improve living conditions for all people.



New home for the School of Biology: Engineered Biosystems Building

Georgia Tech will soon break ground on a new Engineered Biosystems Building that will house 34 research groups, about one half engineers and one half scientists. They will be interspersed in the building to facilitate collaborations and organized into research neighborhoods of stem cell and developmental biology, systems biology and chemical biology. The building will provide first-class research space, core

facilities for shared equipment, seminar rooms for presentations and meetings, and administrative offices for the School of Biology. As you can see from the architectural renderings, this will be a building that will make all Georgia Tech Biology alums proud and enable our biological scientists to continue to make high-impact discoveries.

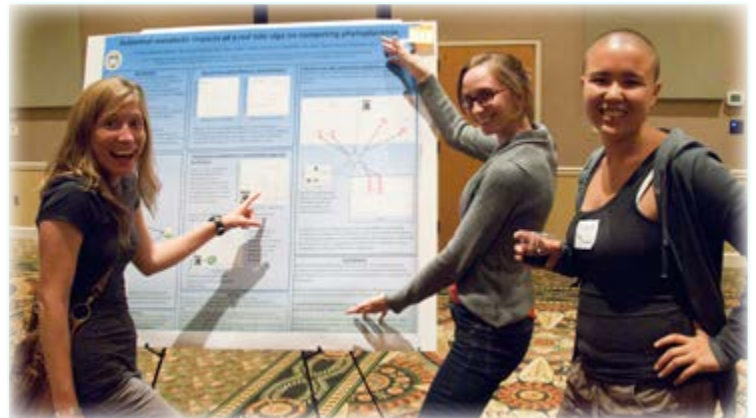




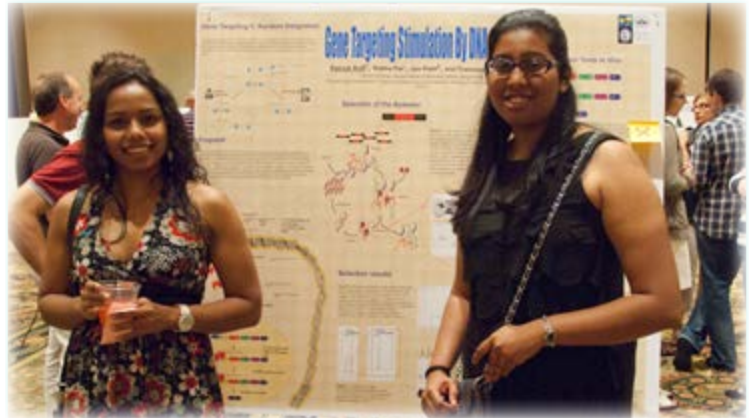
School of Biology Scientific Retreat

Over the weekend of August 25-26, the School of Biology held its biennial scientific retreat at Unicoi State Park in the north Georgia mountains. The purpose of this retreat is to give graduate students and postdocs a forum to present their work and get feedback from the faculty and colleagues. Learning to communicate science effectively is a critical part of all Ph.D. programs. The meeting also gives young faculty an opportunity to advertise their labs to new graduate students in hopes of attracting new recruits

to their programs. Like all scientific meetings, much of the discussion happens during the social hours, including the traditional faculty-student soccer match. The plenary talk was given by Dr. Joel Kostka on the biological impact and recovery of the Gulf of Mexico from the massive oil spill in 2010. You can watch the video of his talk and those of many other scientists who visit Georgia Tech on the School of Biology website (www.biology.gatech.edu).



Photos this page by Kevin Roman



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2012 Homecoming Events for Biology Alumni

Friday, October 26

**Homecoming Picnic with
Tours of ES&T Biology Labs**

4:00—7:00 p.m.

Bio-Tech Quad Courtyard

Located behind the Whitaker Building

(across the street from Cherry-Emerson)

In Case of Rain: ES&T Atrium

Hosted by Georgia Tech School of Biology

R.S.V.P. appreciated by October 15

RSVP@biology.gatech.edu

Main Office: 404.894.3700

Saturday, October 27

**School of Biology Tailgate
2 hours before Kick-off**

Game Time: TBA

Westside of Baseball Stadium,
under the oak tree Rain or Shine

Hosted by Georgia Tech School of Biology

No R.S.V.P. needed

Join Us!

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<http://www.facebook.com/GTBiology>

