Computer scientists Ben Hescott, Lenore Cowen, and Mark Crovella were part of a team that developed a model to better predict the function of proteins by studying their interactions. The discovery could provide biologists with better targets for advancing research in cellular biology.

“We know which proteins are interacting and collaborating to do a job,” says Professor Lenore Cowen. “We know what some of these proteins do, and others we don’t.” Much like groups of adolescents, for proteins “who you hang out with might tell me a lot about who you are and what you do,” she says.

Imagine you’re on Facebook, says Assistant Professor Ben Hescott. It’s reasonable to assume that your friends’ interests will be a tip-off to your interests.

But what if one of your Facebook friends is Beyoncé? The odds that a random friend of Beyoncé’s would actually reveal much information about you are pretty remote—after all, she’s got

“We’re modifying the way to look at the data. By looking at the data as computer scientists at a very high level, we can predict what a protein or a gene does.”

Continued on page 3
Dear members of the Computer Science community,

This fall I had the honor of becoming the third chair of Tufts Computer Science, following in the footsteps of two great department leaders, Diane Souvaine and then Carla Brodley. I’d particularly like to thank Carla for her leadership and dedication. During her tenure, Carla was responsible for hiring several faculty. Research expenditures rose significantly. Carla oversaw the department’s expansion of its research space with the addition of the Interdisciplinary Lab for Computation at 196 Boston Avenue, and the renovation of Halligan Hall. Carla is now enjoying a well-deserved sabbatical but also keeping busy as a new member of DARPA’s Information Science and Technology (ISAT) study group.

As for me, I’m thrilled at the opportunity to lead CS into the future at a very exciting time. The university just completed a 10-year strategic plan that highlights the need for computational approaches in emerging areas. Efforts within the School of Engineering are currently underway to pursue strategic interdisciplinary initiatives directly dependent upon advances in Computer Science. There are certainly many opportunities on the horizon to position Tufts CS to better serve our students and university, and to build on our current research strengths in Machine Learning, Computational/Systems Biology, and Human-Machine Interaction.

Halligan Hall is finally renovated! The renovation included 10,000 square feet of space reclaimed from the Department of Athletics after relocation to the recently completed Steve Tisch Sports and Fitness Center, and an additional 10,000 square feet on the first floor. We hosted a “Halligan Renovation Celebration” for our current students, faculty, academic and financial supporters in late October. Read more about our new space on page 5.

Let me iterate how proud I am to be chair of Tufts CS. I joined a combined Department of Electrical Engineering and Computer Science in 1998. It has been a rewarding and thrilling experience to work with amazing faculty, staff and students to bring Tufts CS to what it is today. I look forward to working with you, students, alums, and colleagues, in the next three years to further build and strengthen Computer Science at Tufts.

— Soha Hassoun

Notables...

Our department completed an external review led by a panel of four experts: Ed Felten, Princeton University; Rajesh Gupta, University of California, San Diego; Julia Hirshberg, Columbia University; and Jim Kurose, University of Massachusetts, Amherst. Through interviews with students and faculty, the reviewers recognized the extraordinary experience we provide for both our undergraduate majors and non-majors. The reviewers also outlined the need to build on our solid research portfolio by hiring additional research-active tenure-track faculty. These findings will serve to inform the administration of our departmental aspirational goals, and to guide us in charting the future for our department.

Doctoral student Nathan Ricci received the Best Student Presentation award at The International Symposium on Memory Management (ISMM) this June in Seattle. His paper “Elephant Tracks: Portable Production of Complete and Precise GC Traces” represents almost two years of work on a new tool for recording and analyzing the dynamic memory behavior of programs.

Doctoral students Noah Daniels and Andrew Gallant along with Professor Norman Ramsey were recognized for their paper “Experience Report: Haskell in Computational Biology.” The paper was received as one of the best papers in the 2012 International Conference on Functional Programming (ICFP), and the authors have been invited to submit their work to a special issue of the Journal of Functional Programming.

Lecturer Ming Chow returned to Las Vegas August 1–4 for DEFCON, “one of the oldest continuous running hacker conventions around, and also one of the largest.” Chow spoke on abusing NoSQL databases.

Chair and Associate Professor Soha Hassoun was named one of 33 luminaries of the Electronic Design Automation Consortium. Professor Hassoun also moderated a session at the Design Automation Conference in June 2013 and was featured in Computer World and Network World articles.
Proteins and Facebook  Continued from page 1

millions of Facebook friends. To really understand your interests, it makes sense to tamp down the influence of your mutual friends with Beyoncé, and amplify the interests of friends who are more likely to be your real friends, Hescott says.

The researchers looked at the physical interactions of proteins using an organism whose genome has been well mapped and fairly well annotated—the common baker’s yeast S. cerevisiae. In the case of yeast, some proteins within the organism are like Beyoncé: They have connections with a lot more proteins than most. Inside S. cerevisiae, there are about 4,900 proteins and 74,310 “edges” or connections between proteins that physically interact. “It’s like a hairball of interconnectedness,” says Cowen.

Teasing out the connections among the proteins helps pinpoint their exact functions. Existing algorithms try to do that, but they simply assume that the closer the distance in the interaction network, the more closely related their functions.

The researchers’ new computer model, called “diffusion state distance,” takes into account additional complexities of the interactions—for instance, that sometimes proteins interact but are not crucial to each other for functioning—and suggests what tasks each protein likely is responsible for, says collaborator Mark Crovella, a professor of computer science at Boston University.

Like any model, though, “the only way we’ll know if we’re right is if the biologists go to the wet lab and test this,” says Cowen.

Their research, conducted together with Tufts CS graduate students Mengfei Cao, Hao Zhang, Jisoo Park and Noah Daniels, was published in October in the open-access, peer-reviewed journal PLOS One.

Read the full story by Taylor McNeil on TuftsNow:
http://now.tufts.edu/articles/proteins-and-facebook-friends

RESEARCH HIGHLIGHTS

Associate Professor Donna Slonim and Professor Diana Bianchi, M.D. of the Tufts Medical Center received funding from the National Institutes for Health (NIH) for their work entitled, “A Molecular Assessment of the Consequences of Preterm Birth.” This project will lead to better management of prematurity complications, as well as a better understanding of the long-term consequences resulting from preterm birth. The research could also lead to new therapeutic approaches to prevent lifelong disabilities.

Chairs and Associate Professors Soha Hassoun and Kyongbum Lee in the Department of Chemical and Biological Engineering received a grant from the National Science Foundation to identify bioactive metabolites generated by the gut microbiota that impact the inflammation of adipose tissue. The discovery of naturally resident bacterial metabolites with anti-inflammatory properties could lead to new, safe treatment modalities for obesity as an inflammatory disease.

Tufts Innovates!

Associate Professor Norman Ramsey received a grant to promote student learning of essential programming principles through the development of a new computer language, Jumbo ML, being taught in Comp 15.

Tufts Collaborates!

Assistant Professor Remco Chang received a grant for work leading to better health decisions using interactive Bayes reasoning visualizations. The grant is a collaboration among Professor Holly Tayor of the psychology department, Assistant Professor Paul Han of Tufts School of Medicine, and postdoctoral computer science scholar, Lane Harrison.

Professor Lorene Cowen, doctoral student Andrew Gallant, and Stephen Fuch, an assistant professor of biology, received a grant for their project to explore the mechanisms that underlie repetitive protein diversity to improve understanding of organismal adaptation and drive development of novel protein function.

Assistant Professor Ben Shapiro, Assistant Professor Harprit Singh Bedi, and Radiology Clinical Associates Joo Y. Cho and Salar Hakham at Tufts School of Medicine and Tufts Medical Center, received a grant to create radiology learning modules and host problem-based learning conferences to improve medical student radiology education.

QUICK HITS

Professor Diane Souvaine was named the university’s new Vice Provost for Research in January 2013.

Research Assistant Professor Ethan Danahy was featured in an article in The Jordan Times about the first Arab Robotics Conference held last fall. Danahy said that his goal is to find innovative ways of engaging students in the process of learning about STEM topics.

Professor Kathleen Fisher received ACM SIGPLAN’s 2013 Distinguished Service Award. Fisher served on the SIGPLAN Executive committee for 12 years, from 2001 to 2012, taking on in succession the roles of member-at-large, vice-chair, chair, and past chair. During that time, she worked to promote programming languages among researchers and students.
The Defense Advanced Research Projects Agency (DARPA) has named Professor Carla Brodley to the Information Science and Technology (ISAT) study group for a three-year term beginning this fall. The group brings 30 of the brightest scientists and engineers together to identify new areas of development in computer and communication technologies and to recommend future research directions. This fall, Carla stepped down from her role as department chair for the past three years. We thank Carla for her service to the department and to the field of computer science.

Professor of the Practice Noah Mendelsohn joins the department after years in academia and industry working with standards groups such as the World Wide Web Consortium (W3C). He is known for his contributions to widely used systems technologies including Java, XML and SOAP, for his early work in the 1970s on virtual machine operating systems, and for his research on pioneering distributed systems such as LOCUS. He retired from IBM in 2010 as an IBM Distinguished Engineer Emeritus. For nine years, Noah was a member and subsequently chair of the W3C’s Technical Architecture Group, the senior technical body responsible for the World Wide Web. He has done research in computer science at Stanford University and MIT, and he has taught introductory computer programming at Stanford.

Visiting Assistant Professor Greg Aloupis will be covering courses for Diane Souvaine, who was appointed Vice Provost for Research in January. Greg holds a Ph.D. from McGill University where he researched computational geometry. His academic employment includes postdoctoral positions at the Academia Sinica, Taiwan; Université Libre de Bruxelles, and Carleton University, Canada, where he holds an adjunct position. He is currently on leave from his position at the Chargé de Recherches du FNRS, in Belgium, a research fellowship hosted by the Algorithms Group at ULB, Brussels, Belgium. He is teaching Computational Geometry (COMP 163) and Algorithms (COMP 160) this fall.

Professor Matthias Scheutz and co-PI Linda Tickle-Degnen, Chair of the Department of Occupational Therapy, received funding from the National Science Foundation’s Division of Information and Intelligent Systems. In collaboration with Professor Ronald Arkin at Georgia Tech College of Computing, the work will produce an architecture for a co-robot mediator for people with “facial masking” due to Parkinson’s Disease (PD). PD reduces patients’ ability to signal emotion and intentions to their caregivers and health care providers who often misinterpret the lack of expressions as disinterest and an inability to adhere to treatment regimen, resulting in stigmatization. The project also includes novel educational efforts such as a course in occupational therapy robotics, as well as significant K-12 outreach through the Tufts Center for STEM Diversity and the Center for Engineering Education and Outreach (CEEO).
Halligan Hall, the home of the Department of Computer Science since 1993, has recently reopened following a $4.5 million building renovation.

Originally built as a radio factory in 1925, Tufts acquired the building in 1930. On June 5, 1940, the building was dedicated as the Hooper Laboratories for Electrical Engineering in honor of William J. Hooper, A1877, G1878, H1898, a former Tufts professor instrumental in the founding of the Department of Electrical Engineering. Thanks to generous donations from William J. Halligan, E1923, H1937, and his wife Katherine Halligan, the building was rededicated in 1983. Improvements to the hall were made throughout the mid-1980s, but none as extensive as the recent remodel.

The concept design process began in July 2011 as the athletics department began to relocate to space in the newly redesigned Steve Tisch Sports and Fitness Center. The focus of the renovation was to provide quality collaboration spaces for the students and faculty, though many improvements were also made to energy efficiency and accessibility.

The design incorporates new windows and utilities including a modular HVAC system that can be expanded and adapted for future renovations. The building is now handicapped accessible, with upgraded bathrooms and an elevator. The building also received an external facelift. The parapet on the façade was replaced with a horizontal patina copper molding to match the neighboring fitness center, completed in fall 2012.

Many efforts to bring in more natural light were incorporated into the design. Although the original roof featured skylights, the roof was replaced and solar tubes were used to bring daylight into open areas. Additionally, transoms were placed in as many openings as possible to allow daylight into the interior spaces.

Students also say they are happy with the aesthetically pleasing yet practical improvements. Marcella Hastings, E15, says, “Providing more collaborative space, areas for people to sit together and write on whiteboards, is essential for building a community within the department. The new space is bright, open, inviting—the physical appearance of the building finally matches the atmosphere created by the students and professors that are a part of it.”

The grand re-opening of Halligan Hall took place on October 30, 2013. The event was well-attended by various members of the university.
Nightly dance parties, executives from Facebook and Google, and coveted gift bags? Must be the Grace Hopper Celebration of Women in Computing. This year, Associate Professor and Chair Soha Hassoun and seven students from the Department of Computer Science represented Tufts at the three-day convention in Minneapolis, Minnesota, October 2–5, 2013.

The convention is more than just a celebration; research panels, roundtable discussions on the status of women in computing, and career workshops make up a majority of the daily schedule. The event is also an excellent opportunity to network with top professionals in the field. Tufts students hosted a booth at the conference to promote computer science degree programs while networking with other attendees. Graduate student Priscilla Briggs said, “I think it is really important to attract as many women as possible into computer science, and the Grace Hopper conference is a great way to keep women in the major; it also had a lot of good ideas about how to get more into the major.”

Inspirational messages were the highlight of the conference, said many of the student attendees. The plenary session included Sheryl Sandberg, COO of Facebook and founder of Leanin.org, which focuses on encouraging women to pursue their ambitions. For Briggs, the most memorable panel of the conference featured Brenda Chapman, director and writer at Disney/Pixar. “She had a lot of interesting stuff to say about what it was like to work as a woman in the animated movie business. And I loved her prerogative of slipping strong moments into princess movies,” said Briggs.

Marcella Hastings, E15, said she enjoyed the research presentations at the conference. She said, “It’s amazing to watch people get excited about the work that they’ve dedicated years of their lives to. One of my favorite talks was by Sheila Nirenberg, entitled Talking to the Brain in Its Own Language, about how she’s developed a set of equations that produce the same output as photoreceptors in the eyes. It’s effectively a new set of eyes for people with degenerative eye diseases. Amazing!”

Attendees expressed that it was refreshing to be reminded how many women are really involved in computer science. Now that they are back at Tufts, they will be hard at work promoting the status of women in computing. When asked how she hopes to inspire other women, Hastings said, “I try to promote women in computing with more of an osmosis effect: If I do the things I want to do and I perform well, then I’m on my way towards changing the stereotypes and biases in the field without having to directly champion the cause. That being said, it’s really cool to be at a conference populated almost entirely by women, to pick up conversations about type classes or grad school research with women, to do all the things that I do on a daily basis in the rest of the tech world, but to do it with women.”
In the 2012 academic year, the Department of Computer Science was pleased to graduate an exceptional class of seniors. Our graduates accepted jobs at Amazon.com, Google, Microsoft, and Crashlytics/Twitter, among others.

Tufts Hackathon 2013
The third Tufts Hackathon was held on October 25, 2013 at 1:00 p.m. The 24-hour event gives students a chance to develop their skills, win prizes, and gain exposure to industry sponsors including Pega Systems, Tufts ESTS, DataXu, Google, and more. See pictures from the event:

Alumni News
Ph.D. alumna Orit Shaer, Clare Boothe Luce Assistant Professor of Computer Science, has won the Pinanski Teaching Prize, awarded annually to members of Wellesley College faculty to honor fine teaching.

Sarah Cannon, Math, A12, received a 2013 Graduate Research Fellowship Program award from the National Science Foundation. She also received a National Defense Science and Engineering Graduate Fellowship for 2013. Sarah pursued a master’s degree in Mathematics and the Foundations of Computer Science from the University of Oxford during the 2012–2013 academic year.

Byron Wallace, EG12, was selected as the Runner Up for the 2013 ACM SIGKDD Doctoral Dissertation Award. The selection committee called Byron’s work “outstanding.” Byron, EG12, an assistant professor in Brown University’s Center for Evidence-Based Medicine, was presented with a plaque during the opening ceremonies at the conference on Knowledge Discovery and Data Mining (KDD) in Chicago. He presented a summary of his dissertation “Machine Learning in Health Informatics: Making Better use of Domain Experts” during a special session of the conference.

CS Young Alumni Group
In the fall, During the summer of 2013, alumni Josh Pearl A13, Zach Abramson A11, Amanda

Hay A13, Alden Sampson A13, Ari Kobren E10, Matt Russell A13, Noa Palmon A13, and Sarah Nolet A11 started a young alumni group. They hosted two successful events this fall: More than 50 students attended a panel on finding internships and employment; and more than 35 alums attended an intimate dinner in Cambridge. The group has several exciting events planned for the spring. Contact Josh for more information about the group at: TuftsCSYoungAlumni@gmail.com

Alumni Spotlight
Marshall Moutenot, A13, and Alden Keefe Sampson, A13
Following their graduation in May 2013, Marshall embarked on a 10,000 mile motorcycle trip around America, and Alden traveled throughout India. They said of their journeys, “It was a trip of a lifetime.” At Tufts, they started the Tufts Hackathon. Now in its third year, the hackathon is an event that brings technically minded students together to work on a project for 24 hours. They now work together at Crashlytics, a company that provides tools like crash reporting for mobile developers. Crashlytics was acquired by Twitter at the beginning of the year.

In addition to their jobs at Crashlytics, Marshall and Alden continue their introduction to programming course at Breakthrough Cambridge, a program that offers academically intensive out-of-school time services to highly motivated, traditionally underserved middle- and high-school students in greater Boston. Learn more at: http://www.breakthroughcambridge.org

Right: Marshall Moutenot makes a pit-stop on his transcontinental motorcycle trip.
The grand re-opening of Halligan Hall took place on October 30, 2013 following a $4.5 million building renovation. The focus of the renovation was to provide quality interaction spaces for the students and faculty. Many improvements were also made to energy efficiency and accessibility, including solar tube lighting, an upgraded HVAC system, and the addition of an elevator. (Kelvin Ma/Tufts University)