CHAIR’S MESSAGE

A happy new year to all of you! After a relaxed semester break we are in the midst of another busy semester. I want to take this opportunity to share some of the recent Department news with you. I am pleased to inform that two of our young faculty members, Landon Cox and Romit Roy Choudhury, received prestigious NSF CAREER awards. Landon received the award for the project “Tolerating Access Control Misconfiguration” and Romit for the project “Exploiting Antenna Capabilities in Wireless Mesh Networks: Theory, Protocols, and Practice.” Duke received a $14.5M grant from the National Institute for General Medical Sciences to establish a center for systems biology. Six of the co-PIs on the grant are affiliated with the Department, including Alex Hartemink who is the Associate Director of the Center. The Center brings together scientists from many different disciplines to study intricate biological networks that govern living cells. Julian Lombardi, an Adjunct Professor in the Department, recently accepted a $100,000 prize from the Andrew W. Mellon Foundation to Duke University for Duke’s leadership and development work to advance Croquet. It is a powerful open-source 3D virtual world environment and software infrastructure for creating and deploying deeply collaborative online applications on and across multiple platforms.

The Department hosted a dinner in honor of Dee Ramm and Bob Wagner, who retired last year, to celebrate their long careers at Duke and to thank them for numerous contributions to the Department. As always, the Department was one of the eight sites of the ACM Mid-Atlantic Programming Contest in which 138 teams participated. The Duke team Robowat, consisting of Matthew Rognlie, Jason Bosko, and Andrew Waterman, came first and will be heading to the World Finals at Banff Springs, Alberta, in April 2008. Congratulations to the team members and their coach Owen Astrachan, aka "Coach A." Since 1994 a Duke team has gone to the finals all but one year.

We were busy organizing a number of other events as well. In the annual meeting followed by picnic, new members of the Department were introduced and the graduate student achievement awards were presented. TechConnect 2007 brought students and employers together. The event was hosted by the Career Center, the Department of Computer Science, and the Pratt School of Engineering.

Be sure to check out our Web site to learn the latest news about the Department and to be part of our community. If you are in the RTP area, we hope you will stop by for a visit. We look forward to hearing from you.

Best wishes,
Pankaj K. Agarwal
PROFESSORS Dietolf “Dee” Ramm and Robert Wagner, who retired from the Department in summer 2007, were honored in September with a dinner party at Parizade. Among the attendees were current Computer Science faculty, professors emeriti, current and past staff members, and the honorees’ families, including Ramm’s children, Lenore and Karl, both of whom are CS alumni.

Ramm, a founding member of the Department, came to Duke as a graduate student in 1964 and became a faculty member in 1970. He was the Associate Chair and Director of Undergraduate Studies for many years. As a Professor of the Practice, he taught early courses in programming and computer science and inspired young minds to pursue further studies in computer science. Because of his efforts and dedication, our research faculty could focus on teaching advanced courses in their own interest area, making the Department better in both its teaching and its research endeavors. Speakers at the party recalled the pivotal role Ramm played in making the Department a friendly community.

Wagner joined the Department in 1978 as an Associate Professor, and he was the Director of Graduate Studies from 1994 to 2002. At the party Wagner was remembered for teaching a first course in programming for graduate students in which he emphasized very hard combinatorial problems. This course was notorious for being challenging beyond anything students had ever experienced. Years later, some of the Department’s best students returned to campus and remarked that this was the finest course they had taken at Duke because it prepared them well for their jobs in the real world.

JEFF FORBES RECEIVES ARTSI ALLIANCE GRANT

PROFESSOR JEFF FORBES has received a grant to participate in the NSF-funded ARTSI (Advancing Robotics Technology for Societal Impact) Alliance research project centered around robots for healthcare, the arts, and entrepreneurship. ARTSI’s goals include increasing the number of African Americans who study computer science and robotics in college and increasing the number of HBCU faculty who educate students in robotics.

As part of the project, Forbes will host REU students and faculty from HBCUs in the alliance at Duke during summer 2008. They, and other Department faculty, will collaborate on developing low-cost robot architectures for use in research and education.

Forbes says, “I’m looking forward to working with an excellent group of faculty and students from the ARTSI Alliance institutions. Involving undergraduate researchers in existing robotics and artificial intelligence research in our Department may help broaden the participation of underrepresented students both at Duke and nationally.”
DUKE’S CONTRIBUTION TO CROQUET PROJECT
RECOGNIZED BY MELLON FOUNDATION

CITING DUKE UNIVERSITY’S “leadership for the development work on the Croquet open-source 3D virtual-worlds environments,” the Andrew W. Mellon Foundation granted Duke the Mellon Award for Technology Collaboration (MATC).

The award, one of ten MATCs granted annually to nonprofit institutions, was presented at an event in Washington. Web inventor Sir Timothy Berners-Lee, director of the World Wide Web Consortium, was master of ceremonies. Duke’s MATC was one of three that received the top prize of $100,000.

“We’re grateful and delighted to be recognized for Duke’s efforts to support the advancement of open source Croquet technologies in support of learning and research,” said Julian Lombardi, adjunct faculty member with Duke’s Department of Computer Science. “We are eager to take the next steps in advancing practical applications for this versatile, freely available and collaborative learning and research platform.”

Lombardi, who also serves as Associate Vice President for Academic Services and Technology Support in Duke’s Office of Information Technology (OIT), co-leads, with OIT Systems Architect Mark McCahill, Duke’s collaboration with the Croquet Consortium, a nonprofit organization whose members are made up mainly of universities and technology companies. Lombardi and McCahill belong to the consortium’s team of technology architects, who have built software that links multiple operating systems and devices to enable users to communicate, congregate and collaborate virtually in real time. Unlike the technologies behind most of today’s commercial virtual worlds, the Croquet technology is highly scalable, open source, and greatly reduces the need to rely on servers as a means of supporting large scale collaborative virtual worlds. In this way, the Croquet architecture allows for virtual world systems to grow in ways that are less constrained by hardware limitations, time or space. Avatars are optional.

Croquet Consortium: www.opencroquet.org

OWNEN ASTRACHAN NAMED NSF CISE FELLOW

OWNEN ASTRACHAN, who co-directs undergraduate studies in the Department, is one of two recipients of a new National Science Foundation (NSF) award intended to help transform undergraduate computing education in the United States.

As one of the first NSF Computer and Information Science and Engineering (CISE) Distinguished Education Fellows, Astrachan will receive $250,000 over two years to develop his solution to what the federal science agency sees as a national shortcoming.

The fellowships are a component of a broader NSF initiative called the CISE Pathways to Revitalized Undergraduate Computing Education (CPATH) Program. CPATH is working to ensure that undergraduate computing education in the US attracts and prepares young people for futures in the computer science sector.

“Unfortunately, despite the deep and pervasive impact of computing and the creative efforts of individuals in a small number of institutions, undergraduate computing education today often looks much as it did several decades ago,” the NSF said in awarding the grants. Astrachan plans to use the funding to promote “problem based learning” as a way to revitalize how computer science is taught.

“Instead of teaching students a lot of facts and then giving them a problem to solve, this method starts out by giving them a problem,” he said. “Then they have to go figure out what facts they need to learn to solve it.”

He plans to initially introduce problem-based learning into Duke courses and then to “get students and faculty at other schools to try it out,” he said.

Astrachan has won two teaching awards while at Duke as well as a third during a year he spent on leave at the University of British Columbia. In addition to directing undergraduate studies, he has also coached Duke students participating in national and international computer modeling and problem solving contests.

CISE 2007 Distinguished Education Fellows Owen Astrachan and Peter Denning
ENZYME REDESIGN provides a good test of our understanding of proteins. The Donald Laboratory develops new algorithms to plan structure-based site-directed mutations to a protein in order to modify its function. They develop general planning software that can reprogram the specificity of many proteins, including "NRPS domains," whose products include natural antibiotics, antifungals, antivirals, immunosuppressants, and antineoplastics. These engineered enzymes should enable combinatorial biosynthesis of novel pharmacologically-active compounds, yielding new leads for drug design.

Redesign of NRPS enzymes offers the opportunity to reengineer biosynthetic pathways, greatly increasing the number and types of NRPS products, specifically, to develop new libraries of antibiotics. Bruce Donald, William and Sue Gross Professor of Computer Science and Professor of Biochemistry, leads a laboratory of students and postdocs in reprogramming NRPS enzymes using $K^*$ ("K-star"), an ensemble-based protein redesign algorithm. Structure-based protein redesign algorithms, such as $K^*$, exploit the high-resolution protein structures as well as biophysical modeling. When Donald’s lab applies $K^*$ to an NRPS, or, more generally, to other proteins, they modify the active sites to switch the specificity of the amino acid-accepting domains from their natural substrates to different amino acids. The modifications are planned and analyzed in silico, using novel geometric algorithms. The Donald Lab’s "enzyme reprogramming" could allow the modified NRPS to synthesize different modified peptides. Exploration of the combinatorial space of new NRPS "programs" will generate a large number of new compounds, which could then be screened for pharmaceutical activity.

How does $K^*$ work?

Realization of novel molecular function requires the ability to alter molecular complex formation. Enzymatic function can be altered by changing enzyme-substrate interactions via modification of an enzyme’s active site. $K^*$ searches over possible active site mutations and combines a statistical mechanics-derived ensemble-based approach to computing the binding constant with the speed and completeness of a branch-and-bound pruning algorithm. Two graduate students in Donald’s lab, Ivelin Georgiev and Ryan Lilien (now an Assistant Professor of Computer Science and Medicine at the University of Toronto), developed an efficient deterministic approximation algorithm, which approximates the binding constant to arbitrary precision. To test their predictions, Georgiev worked with two other graduate students in Donald’s laboratory, Cheng-Yu Chen (Department of Biochemistry) and John MacMaster (CS), to redesign the phenylalanine-specific adenylation domain of the NRPS Gramicidin Synthetase A (GrsA-PheA). Using predictions made by Georgiev and Lilien, Chen and MacMaster create the mutant constructs by cloning, expressing, and purifying the mutant proteins from the PheA gene. Having obtained the purified proteins, they then subject them to biochemical activity assays and high-field solution-state nuclear magnetic resonance (NMR).

A major challenge has been the development of accurate ensemble-based redesign algorithms that efficiently prune mutations and conformations. $K^*$ flexibly models both protein and ligand using rotamer-based partition functions for application in enzyme redesign, the prediction of protein–ligand binding, and computer-aided drug design. The $K^*$ $e$-approximation algorithms can prune the vast majority of conformations from more computationally expensive consideration, thereby reducing execution time and making a mutation search that considers both ligand and protein flexibility computationally feasible.

While the correctness of $K^*$ is clear from statistical mechanics over the ensemble of protein and ligand conformations, before this algorithm it has been difficult and expensive to compute partition functions accurately for large systems. One key contribution of Donald’s lab is a proof that a large number of conformations and mutations may be pruned while still approximating the partition function to within a multiplicative factor of $(1-e)$, where the error bound $e$ may be chosen by the user of the software. $K^*$ is biologically accurate too. Ensemble scoring, using a rotameric approximation to the partition functions of the bound and unbound states for GrsA-PheA, was used to predict binding of the wild-type protein to switch the enzyme specificity toward two novel substrates using several novel active site sequences computationally predicted by searching through the space of possible active site mutations. The top-scoring in silico mutants were created in vitro and binding constants and catalytic activity were experimentally determined. Most of the tested mutations exhibited the desired change in binding specificity or catalytic specificity.

Donald and his students are developing a general planner that can reprogram the specificity of NRPS domains, whose products include natural antibiotics, antifungals, antivirals, immunosuppressants, and antineoplastics. Fundamental to this algorithm is a novel extension of Dead-end elimination (DEE) (called "MinDEE") to include provable bounds on pruning correctness when the final rotameric conformations are energy-minimized.

For more information, see www.cs.duke.edu/donaldlab/
ANONYMOUS VOTING OVER THE INTERNET

PROFESSOR VINCENT CONITZER has been working on the problem of how to run an anonymous online election. As an example of how not to do this, at the end of the twentieth century, Time Magazine organized a poll on their website to help them determine the Person of the Century. Anyone could vote (it was easy to vote multiple times), and write-in candidates were allowed. In the official final tally, Elvis Presley placed first, but Time Magazine declared that Albert Einstein the Person of the Century instead, after a statistical analysis of its data. In reality, however, many other high-scoring candidates had already been removed from the ranking, including Jesus Christ, Ric Flair (a prominent WWE wrestler), and Cartman (from the animated series South Park).

One might think that such an episode would discourage the practice of online polls. However, similar polls continue to this day. In 2007, a national election for the New Seven Wonders of the World was held. Only an e-mail address was required to cast a vote on the website. Still, this heavily mediated event seems to have obtained some measure of legitimacy in the public’s eye, in spite of repeated protestations from UNESCO (who maintain the World Heritage List).

It seems that such online elections, in which the voters are basically anonymous, are unlikely to disappear in spite of their drawbacks. Perhaps even more pervasive are online product rating systems, where it is easy to severely affect the result by submitting multiple ratings. In a theoretical sense, such rating systems are a special case of elections, in which the possible ratings are the candidates. The “preference aggregation problem” is phrased most generally as follows: there is a set of alternatives that we need to decide among, based on the reported preferences of multiple parties.

Conitzer is investigating several approaches to make preference aggregation meaningful in anonymous settings where it is easy to vote multiple times. With his student Liad Wagman, he has shown how such elections can succeed if casting an additional vote comes at a slight cost (but not if there is no cost). Another possibility is to sacrifice some anonymity, and verify the real-world identities of some of the voters after the fact. Conitzer has shown how to minimize the amount of after-the-fact verification that is necessary to discourage voters from voting more than once.

An ideal solution to these (and other) problems would be a system under which it is very easy to (anonymously) obtain one account, but very difficult to obtain multiple accounts. Conitzer has recently tried to design a memory test that is easy to pass once, but difficult to pass a second time, because the subject becomes confused with the first time she took the test. However, the results on this are not yet consistent enough to use in the real world.

NEW DUKE CENTER FOR SYSTEMS BIOLOGY

THE NATIONAL INSTITUTE for General Medical Sciences has awarded Duke University a $14.5 million, five-year grant to establish a national center for Systems Biology (CSB) within Duke’s Institute for Genome Sciences & Policy (IGSP). Six of the grant PIs are affiliated with the Department of Computer Science: Pankaj Agarwal (chair), Herbert Edelsbrunner, and Alexander Hartemink hold primary appointments, while John Harer (Mathematics), Sayan Mukherjee (Statistics), and Uwe Ohler (Bioinformatics and Biostatistics) hold secondary appointments.

CSB brings together experimental and quantitative scientists from biology, computer science, engineering, mathematics, physics, and statistics to explore how the intricate biological networks that govern living cells operate dynamically at three different time scales: minutes, days, and millions of years. The goal is to characterize and understand the dynamics of these networks, including both the dynamics of network states—changes in molecular concentrations as different portions of a network are utilized—and the dynamics of network structures—changes in the components or interactions of a network—as genetic mutations accrue through evolution. Their findings promise to be useful in understanding basic biology and human disease.

“We have all these pieces in place: the human genome, the parts list of thousands of cellular components, and some preliminary network diagrams on how all these parts work together,” said CSB Director Philip Benfey, the Paul Kramer Professor of Biology. “Now we need to pull it all together and perform quantitative studies on how these networks actually operate in varying conditions, in different organisms, across different time scales.”

That’s where computer science will play a significant role, explains CSB Associate Director Alexander Hartemink. “Computer science is critical to the success of systems biology at almost all levels, from the capture, storage, management, and communication of millions of gigabytes of data; to the implementation and execution of detailed mathematical and statistical models of complex biological networks that are capable of making experimentally testable predictions.”

The relatively new field of systems biology is often described as the opposite of the “reductionist” biology of the last century, in which scientists went to great lengths to isolate and identify a single component of a living cell. Enabled by the availability of powerful computers, systems biologists now want to take all those hard-won isolated findings and find out how they operate together in the dynamic systems of the cell and the organism.

CSB is creating a scholarly scientific community that fosters inquiry, intellectual exchange, and effective interdisciplinary education and communication. In addition to active Duke faculty, the center brings in visiting scientists through sabbatical and fellowship programs, and involves undergraduate students through a new Howard Hughes Medical Institute research initiative at Duke focused on systems biology. Faculty affiliated with CSB are adding systems biology themes to graduate education programs, teaching new undergraduate systems biology courses, and helping administer a certificate program designed for biology, mathematics, and computer science majors. The center is also developing workshops to facilitate the exchange of ideas among scientists in the area, and hosts the annual Duke Symposium on Systems Biology which targets a much wider audience.

For more information, see www.genome.duke.edu/centers/csb/ and news.duke.edu/2007/07/sysbio.html
Professor Susan Rodger has been working on the software JFLAP for what seems to her like forever, for seventeen years with thirty-three students. Their hard work was recognized at the Frontiers in Education 2007 conference when Rodger and the seven students who worked on the most recent version of JFLAP were recognized as a finalist in the Needs Premier Courseware Ceremony.

JFLAP is an educational software tool for experimenting with theoretical computer science that is now used in courses around the world. JFLAP provides students hands-on experience with immediate feedback on topics that are traditionally taught with pencil and paper. In addition to experimenting with theoretical machines such as Turing machines and finite state machines, JFLAP allows one to experiment with proofs and applications. Examples of applications include L-systems, grammars to represent the growth of plants or fractals, and compilers, or rather algorithms for the theory of parsing such as CYK and LL(1) parsing.

The Duke undergraduate students who worked on the most recent version of JFLAP 6.1 or its web tutorial include Thomas Finley, Ryan Cavalcante, Stephen Reading, Bart Bressler, Jinghui Lim, Chris Morgan and Kyung Min (Jason) Lee. Most of these students have graduated from Duke and are currently in industry or graduate school.

The NEEDS Premier Award competition is hosted by NEEDS/Engineering Pathway digital libraries and examines “high-quality, non-commercial courseware designed to enhance engineering education.”

Several classes, including interdisciplinary seminars in Computational Biology and Computational Economics, meet in the new space, which is far more inviting than the small-classroom space in North we previously used. Several groups have helped ensure that the space meets a variety of needs. We continue to work with Rachael Brady and Duke’s visualization faculty in using this new space and our existing LSRC space. For example, an extremely well-attended Visualization Forum takes place over lunch every Friday in our LSRC space, and the new North space is home for some of the visualization and computational efforts that we continue to develop. We’re working to ensure that the new space is used effectively as we develop exciting new programs and projects for a new, more interdisciplinary undergraduate student body.
GRAD STUDENT PROFILE: JEFF PHILLIPS

JEFF PHILLIPS got started on research early. While an undergrad at Rice University, he worked in Lydia Kavraki’s lab, publishing papers on physical simulation and robotic motion planning, which appeared in IEEE Conference on Robotics and Automation, the main conference in robotics. After graduating with a BS in Computer Science and a BA in Mathematics, he joined the PhD program at Duke in Fall 2005, with the goal of working on something more mathematical but still geometric. Phillips’s undergraduate research experience helped him win a James B. Duke graduate fellowship and a National Science Foundation graduate research fellowship.

Soon after arriving at Duke, Phillips started working with Pankaj Agarwal. Motivated by problems in protein interaction as part of the Biogeometry project, Phillips became interested in shape-analysis problems. He has contributed on both theoretical and practical levels. His work has provided some of the first algorithms with formal theoretical guarantees for matching point sets allowing transformations while using the ubiquitous root mean squared distance. He also developed a practical method for the popular ICP point matching algorithm to handle outliers. In collaboration with Johannes Rudolph, a biochemist, Phillips spearheaded a project to detect geometric motifs on the interface between two bound proteins. These motifs have potential to identify residues critical to the binding process. This piece of work has been integrated into the Biogeometry’s Protein-Protein Interface Surface MAPS software.

As the Biogeometry project wound down, Phillips’s focus shifted more toward the interface between computational geometry problems and statistics. Stepping from a summer as a visitor at AT&T Shannon Labs, Phillips became interested in a statistical anomaly detection technique for spatial data. The algorithm he and his collaborators developed and implemented was the first for this class of problems to have a guaranteed bound on its approximation, and it also performs comparable or better to known heuristic techniques in practice. More recently, Phillips has been extending these techniques and looking at geometry problems that lie at the foundation of many spatial statistical questions. He is also applying his technique to develop better uncertainty models for geometric problems. Bringing mathematical rigor to geometric problems that arise in many applied fields and developing simple, efficient algorithms for them has been a recurring theme of Phillips’s research. What sets Phillips apart from many of his peers is his ability to work independently, to collaborate with a broad spectrum of researchers, and to juggle between many problems at the same time. Over his brief research career, Phillips has published in fields ranging from robotics to bioinformatics, from algorithms to modeling, and from geometry to databases and data mining.

Besides being an outstanding researcher, Phillips has also been a devoted citizen of the Department. The Department has benefited tremendously from his leadership and mentoring skills. New students flock to him for advice, and he is always very generous with his time. Phillips thrice chaired the graduate student recruitment, organized the design of department t-shirts, curated two seminars, and served as the graduate student liaison to the faculty. He won the Outstanding Department Service Award in 2006.

UNDERGRAD PROFILES: JASON BOSKO, ANDREW WATERMAN, AND MATTHEW ROGNLIE

WHAT CHARACTERISTICS do students on successful ACM programming contest teams share? What practice regimens help ensure success in the contest? Since Duke teams have done very well in the ACM contests, advancing to the world finals every year but one since 1994, perhaps we could market Duke’s brand in this arena and be as successful as Coach K is in developing and marketing Duke basketball. The students advancing to the finals in 2008—Jason Bosko, Andrew Waterman, and Matthew Rognlie—all share some characteristics of those on previous teams. Like all our students, each is uniquely different. Jason Bosko is a senior and a North Carolinian, sharing this characteristic with several previous world-finalists. Like many, he’s a double major in both Computer Science and Electrical and Computer Engineering. Jason came late to programming, learning Pascal as a first-year high school student. Jason has worked with Professor Alex Hertemink on a software package named SMLR for machine learning using probabilistic and Bayesian methods applied to genomic and biological data. Perhaps most notably, Jason has some of his best work, joint with previous ACM world-finalist Matt Edwards, ACM team-member Mike Bauer, and Coach Owen Astrachan, visible on YouTube where together the four run a sub four-minute 4x400 meter relay: www.youtube.com/watch?v=anEHuUU9jX4.

Andrew Waterman is also a senior, also a double major in Computer Science and Electrical and Computer Engineering, but hails from New Orleans, a first for one of Duke’s ACM world-finalists. Andrew plans on building on his success with Duke’s autonomous, underwater robot team as he continues to graduate school next year. Instead of running 4x400’s, Andrew honed his competitive instincts in the Cyberathlete Professional League. Although Andrew’s GPA places him in the stratosphere of Pratt students, he is better known for the intense satisfaction he derives from driving carefully. Matt Rognlie is a sophomore and a Trinity student. However, Matt shares his teammate’s work habits in doing research for Duke faculty: in Matt’s case he is working with Prof. Vince Cantizan on problems in the area of computational economics. Matt excels at excelling, which has helped the team as it develops strategies and tactics for the 2008 world finals to be held in Banff, Canada. Matt has done extremely well in the COMAP Mathematical Modeling Contest working with previous world-finalist Peng Shi in last year’s contest to be one of four teams earning a rating of Outstanding. Matt’s competitive instincts carry him neither to the track nor to the gaming-keyboard: this year he developed expertise in all tests standardized as he started on a marathon drive to ace the LSAT, GMAT, and GRE before his junior year begins.
THOM LABEAN LEADS INTERNATIONAL RESEARCH EXPERIENCE IN NANOSTRUCTURES

A VERTICALLY integrated team led by Professor Thom LaBean, with members from all education levels from high school to post-doctoral, participated in a month-long international research experience funded by the National Science Foundation. The team pursued projects involving bionanoscience and molecular engineering. Working in the newly-founded Centre for DNA Nanotechnology at Aarhus University in Denmark, the students developed synthetic DNA molecules capable of self-assembling into designed structures on the nanometer length-scale. These nanostructures may prove useful for future applications in biosensors, electronics, photonics, computation, and medicine.

NSF funding provided by the IRES grant will sponsor additional trips from Duke to Aarhus in August of 2008 and 2009. A call for student applications from US citizens and permanent residents will be posted at the beginning of the spring 2008 semester.

Additional information can be found at www.cs.duke.edu/~thl/pages/Denmarksite/IRES.html
GRADUATE AWARDS
FOR THE 2006-2007 ACADEMIC YEAR

OUTSTANDING PH. D. DISSERTATION AWARD
Dazhi Wang
Service Reliability: Models, Algorithms and Applications
Advisor: Kishor Trivedi

OUTSTANDING MASTER’S THESIS AWARD
Anita Lungu
Verification-Aware Processor Design
Advisor: Daniel Sorin

OUTSTANDING DOCTORAL CANDIDACY (PRELIMINARY EXAM) AWARDS
Piyush Shivam
Active Learning of Application Models for Utility Resource Planning
Advisor: Jeffrey Chase

Aydan Yumerefendi
System Support for Strong Accountability
Advisor: Jeffrey Chase

OUTSTANDING RESEARCH INITIATION PROJECT AWARD
Raluca Gordan
Incorporating Multiple Informative Priors into a Gibbs Sampling Algorithm for de novo Motif Discovery
Advisor: Alex Hartemink

OUTSTANDING TEACHING ASSISTANT AWARD
Bei Wang
COMPSCI 102: Discrete Mathematics, Spring 2007
Instructor: Herbert Edelsbrunner

OUTSTANDING GRADUATE TEACHING AWARD
Laura Grit
COMPSCI 225: Intellectual Property Rights, Spring 2007

OUTSTANDING DEPARTMENTAL SERVICE AWARD
Tingting Jiang
For her dedicated service to the Department and the graduate program

If you received a degree from the Department of Computer Science, please fill out our online alumni registration form (www.cs.duke.edu/people/alumni).

PAPER IS TOP PICK
ALBERT MEIXNER, Mike Bauer and Dan Sorin’s paper, Argus: Low-Cost, Comprehensive Error Detection in Simple Cores, was recently selected by IEEE Micro as one of ten top picks among all computer architecture publications in 2007. The paper was presented in December at the IEEE/ACM Symposium on Microarchitecture.

KEEP IN TOUCH!
CONGRATULATIONS to the following alumni who have recently received awards or taken new jobs.

Bart Bressler (BS, ’07)
Icarus Studios; Durham, NC

Tiffany Chen (BS-CmpSci/Biology, ’07)
Graduate student at Stanford University, Stanford, CA

Marcin Dobasz (BS, ’07)
Microsoft; Seattle, Washington

Laura Grit (PhD, ’07)
Amazon; Seattle, WA

Pradeep Gunda (MS, ’07)
Live Search @ Microsoft; Mountain View, CA

David Irwin (PhD, ’07)
Research Fellow at University of Massachusetts, Amherst; Amherst, MA

Jeannie Albrecht Irwin (MS, ’03)
Assistant Professor at Williams College; Williamstown, MA

Tingting Jiang (PhD, ’07)
Postdoctoral Researcher, INRIA – Grenoble-Rhône-Alpes (The French National Institute for Research in Computer Science); France

Michael Lin (BS, ’07)
Microsoft; Redmond, WA

Mason Matthews (MS, ’06)
SciMed Solutions; Durham, NC

Patrick Paczkowski (BS, ’07)
Computer Science PhD Student at Yale University; New Haven, CT

Symon Perriman (BS, ’07)
Microsoft; Redmond, WA

Rachel Pottinger (BS, ’07)
Recipient of 2007 Denice Denton Emerging Leader Award

Sudheer Sahu (PhD, ’07)
Live Search @ Microsoft; Redmond, Washington

Rebecca Braynard Silberstein (PhD, ’06)
Palo Alto Research Center; Palo Alto, CA

2nd Lieutenant Ben Spain (AB, ’07)
The 55th Fighter Squadron, Shaw AFB – USAF, Sumter, SC

Daniel Summerhays (BS, ’07)
Microsoft; Bellevue, WA

(Jatherine) Beth Trushkowsky (BS, ’07)
Graduate student at UC Berkeley, Berkeley, CA

Ben Wolf (BS, ’07)
Bloomberg; New York

Junyi Xie (PhD, ’07)
Oracle; Redwood Shores, CA

Tingting Jiang receives Outstanding Departmental Service Award from Prof. Jeff Chase
STUDENT PUBLICATIONS/PRESENTATIONS

Allister Bernard
Machine Learning Summer School 2007, Tubingen, Germany, Deconvolution Yields a Global High-resolution View of Cell Cycle Gene Expression

Fred Bower
ACM Transactions on Architecture and Code Optimization (TACO) 2007, 4(2), Online Diagnosis of Hard Faults in Microprocessors

Emilie Buneci
Super Computing 2007 (SC07), Reno, NV, Qualitative Performance Analysis for Large-Scale Scientific Workflows

Badrish Chandramouli and Jeff Phillips
33rd International Conference on Very Large Data Bases (VLDB'07), Vienna, Austria, Value-Based Notification Conditions in Large-Scale Publish/Subscribe Systems

Eduardo Cuervo and Peter Gilbert

Sangyun Duan
33rd International Conference on Very Large Data Bases (VLDB'07), Vienna, Austria, Processing Forecasting Queries

Ivelin Georgiev
15th Annual International Conference on Intelligent Systems for Molecular Biology (ISMB 2007), Vienna, Austria, Dead-End Elimination with Backbone Flexibility and published in Bioinformatics 2007; 23(13): i185-i194

Reuca Jordan
Machine Learning Summer School 2007, Tubingen, Germany, Gibbs Sampling for DNA Motif Discovery

Laure Grit

Mingyu Guo
18th International Conference on Game Theory, Stony Brook, NY, Improved VCG Redistribution Mechanisms

DIMACS Workshop on Boundary between Economic Theory and Computer Science, New Jersey, Worst-Case Optimal Redistribution of VCG Payments in Multi-Unit Auctions

Tingting Jiang
1st ACM/IEEE International Conference on Distributed Smart Cameras (ICDSC'07), Vienna, Austria, How to Dispatch Observers to Track an Evolving Boundary

Workshop on Non-rigid Registration and Tracking through Learning (NRTL 2007), Rio de Janeiro, Brazil, Finite-Element Level-Set Curve Particles

Zheng Li
Society for Neuroscience 2007 Annual Meeting, San Diego, CA, n-th Order Kalman Filter Improves the Performance of a Brain Machine Interface for Reaching

Kuan-ming Lin
ACM Symposium on Applied Computing (SAC'07), Seoul, Korea, Exploiting Inter-gene Information for Microarray Data Integration

Anita Lungu
16th International Conference on Parallel Architectures and Compilation Techniques (PACT), Brasov, Romania, Verification-Aware Microprocessor Design

Albert Meixner
16th International Conference on Parallel Architectures and Compilation Techniques (PACT), Brasov, Romania, Error Detection Using Dynamic Dataflow Verification


Dmitriy Morozov
48th Annual IEEE Symposium on Foundations of Computer Science (FOCS 2007), Providence, RI, Inferring Local Homology from Sampled Stratified Spaces

Christopher Painter-Wakefield

Jeff Phillips
6th International Conference on 3-D Digital Imaging and Modeling (3 DIM), Montreal, Canada, Outlier Robust ICP for Minimizing Fractional RMSD

Sam Siewe
Robotics: Science and Systems Conference (RSS 2007), Atlanta, GA, Optimal Kinodynamic Motion Planning for 2D Reconfiguration of Self-Reconfigurable Robots

Lirong Xie
Dagstuhl Seminar on Computational Issues of Social Choice, Dagstuhl, Germany, Voting with Partial Orders
E V E N T S

ON SEPTEMBER 18, more than 350 students got the chance to network with members of industry at the annual inDuke TechConnect event. The two-hour event started with a panel discussion and question and answer period, followed by a networking social, and attracted forty engineering companies spanning the technology spectrum from structural engineering to biomedical devices to computer software designers.

Held annually on the day before Duke’s Career Fair, TechConnect is a popular and very successful way to bring students and technical career employers together, to the mutual benefit of both. The low-key atmosphere and opportunity to exchange information and perspectives outside the inherently stressful environment of a formal interview help students develop their professional social skills.

DUKE WINS BATTLE OF THE BRAINS!

ON SATURDAY, October 27, Duke overcame 137 teams to win the ACM Mid-Atlantic Regional Programming contest. The contest, sponsored by IBM, was held at eight sites and included sixty-one schools and 412 competitors. The Duke site had twenty-seven teams spread over all three floors of the LSRC D-wing. At noon the teams raced to their offices with the packet of eight programming problems. Each team of three students tackled over the problems, submitting one occasionally and responding with shouts of joy when a positive response was returned. Five hours later, the contest was over. The problems were difficult; at most four problems were solved by any team.

The Duke team Robowat with members Matthew Rognlie, Jason Basko, and Andrew Waterman took first place and will head to Banff Springs, Alberta, in April 2008 to compete in the International Competition. Two other Duke teams placed well in the contest. The Duke team Bajoko, composed of Michael Bauer, Matthew Johnson, and Nadeem Kolia, took seventeenth place. The Duke Team Tagusu, composed of Kevin Tao, Gareth Guvanasen, and Thomas Hsu, took twenty-fourth place. The coach of all three Duke teams was Coach A, Professor Owen Astrachan.

The ACM International Collegiate Programming Contest is in its thirty-second year. Thousands of teams compete in regional contests from September to December with ninety teams advancing to the world finals. Duke has sent a team to the world finals every year since 1997.

STAFF AWARD GIVEN TO PAMELA SPENCER

THE OUTSTANDING Staff Award for 2006–2007 was given to Pamela Spencer, Program Assistant, at the annual departmental meeting with great appreciation for her excellent service to the Department. As Administrative Manager Jewel Wheeler says, “Pam’s consistently helpful, flexible, effective, generous, warm, delightful, caring, happy, energetic, resourceful, cooperative, creative, engaging teamwork makes CS a wonderful place.”
FALL 2007 DEPARTMENTAL MEETING

THE ANNUAL departmental meeting, hosted by the Chair and the Director of Graduate Studies, introduced new faculty, staff, and students; announced what would be happening in the Department during the academic year; and presented the graduate student and staff achievement awards for 2006-2007. A picnic catered by Three Seasons followed the meeting. Family and friends joined in, making the picnic a great place to meet and greet.