CHAIR’S MESSAGE

A happy new year to all of you! We are pleased to announce the addition of many new members to the department. Timothy Lenoir, Sayan Mukherjee, and Nikos Pitsianis have joined the department as secondary faculty members. Rachael Brady, who was an adjunct faculty member, has now joined the department as a research scientist. Cheryl Wallace is our new Human Resources and Business Office Manager. Three students, Pradeep Kumar Gunda, Stephen Odaibo, and Thileepan Subramaniam, have joined the department this semester. As we welcome the new students, we also congratulate our latest graduates and wish them all the best. We enjoyed having them in our program, their presence enriched the department, and we are confident they will achieve great success.

I am proud to share the achievements of our faculty members. Herbert Edelsbrunner was inducted into the American Academy of Arts and Sciences’ 225th Class of Fellows and Foreign Honorary Members along with many other celebrities. Alexander Hartemink received a $2M grant, jointly with Erich Jarvis, from the National Institute of Deafness and Communication Disorders (NIDCD) for “Neural Flow Networks in Songbirds”. John Reif co-chaired the NSF Workshop: Emerging Opportunities of Nanoscience to Energy Conversion and Storage in Arlington, VA.

We are pleased to announce the new Computer Science Undergraduate Research Fellows Program (C-SURF). This program is designed to provide undergraduates with an intensive research experience in either a core computer science project or an interdisciplinary project leveraging core concepts in collaborative ways. C-SURF Fellows will receive course credit for their research work, a paid summer research experience, and will graduate with distinction upon successful completion of the program. Congratulations to our first fellows: Kamaria Campbell, Matthew Edwards, Patrick Paczkowski, Katherine Beth Trushkowsky, and Yanjia Mariya Yao. The department continues to strive to offer interdisciplinary programs to undergraduates and diversify the program.

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
ALEXANDER HARTEMINK RECEIVES GRANT FOR “NEURAL FLOW NETWORKS IN SONGBIRDS”

DUKE UNIVERSITY assistant professor of computer science Alexander Hartemink is the recipient of a grant from the National Institute of Deafness and Communication Disorders (NIDCD) through the Collaborative Research in Computational Neuroscience (CRCNS) program jointly sponsored by the National Science Foundation (NSF) and National Institutes of Health (NIH). Hartemink is the PI, and is collaborating with co-PI Erich Jarvis, associate professor of neurobiology. The grant, entitled “Neural Flow Networks in Songbirds”, will provide the collaboration with over $2 million during the next five years.

“I am thrilled about the science Erich and I are undertaking to better understand how the brain processes information to perceive, learn about, and interact with the world. It is gratifying that the NSF and NIH review panels found our approach compelling, and I am very thankful for the support of the NIDCD as we embark on this project,” says Hartemink.

Hartemink is involved in a number of research efforts built upon a single foundation, namely, the development and application of principled computational and statistical methods to elucidate the architecture and function of complex biological systems. His work is providing insight on a broad range of difficult problems, including understanding how networks in the brain are activated when processing information or learning new tasks (with a special focus on vocal learning in songbirds), how eukaryotic cells regulate the transcription of their genes (with a special focus on transcriptional regulation during the cell cycle in yeast), and how disease can be diagnosed more accurately and the usefulness of different therapies can be predicted before they are administered (with a special focus on using gene and protein expression patterns in cancers).

Department Chair Pankaj Agarwal states, “We are thrilled Professor Hartemink is leading such an important interdisciplinary research project, building upon his expertise in computational biology. We are extremely proud to have such an outstanding researcher, teacher, and mentor on our faculty. We look forward to the contributions this project will make to the field of neuroscience.”

JOHN REIF CO-CHAIRS NSF WORKSHOP

JOHN REIF co-chaired the NSF Workshop: Emerging Opportunities of Nanoscience to Energy Conversion and Storage in Arlington, VA on November 21-22.

The goal of this multi-disciplinary workshop was to facilitate the advance of scientific research and commercial development and provide the scientific basis for new funding programs in Energy Applications of Nanoscience. The workshop brought together, for the first time, leading scientists with expertise in the relevant sub areas (e.g., self-assembly, quantum dots, nano-optics, DNA-metallic hybrids, etc.) to consider this topic. Experts ranged over multiple disciplines including computer science, electrical engineering, chemistry, and physics. The workshop also invited leading relevant energy technology experts in photovoltaics, thermocouples, fuel cell and battery technology, who provided expertise on current energy technologies and limitations.

HERBERT EDELSBRUNNER ELECTED TO THE ACADEMY’S 225TH CLASS OF FELLOWS AND FOREIGN HONORARY MEMBERS

THE AMERICAN ACADEMY of Arts and Sciences welcomed this year’s new Fellows and Foreign Honorary Members at its annual induction ceremony on October 8, at the Academy’s headquarters in Cambridge, Massachusetts.

The Academy elected 196 new Fellows and 17 new Foreign Honorary Members. The 213 men and women are leaders in scholarship, business, the arts, and public affairs.

Fellows and Foreign Honorary Members are nominated and elected to the Academy by current members. A broad-based membership, comprised of scholars and practitioners from mathematics, physics, biological sciences, social sciences, humanities and the arts, public affairs and business, gives the Academy a unique capacity to conduct a wide range of interdisciplinary studies and public policy research.
WELCOME
NEW SECONDARY FACULTY

Rachael Brady
Research Scientist,
Visualization Analysis Lab

Rachael Brady is interested in how visualization technology can aid data exploration and analysis. Brady’s current research focuses on integrating EEG and sEMG sensors with virtual reality devices for motor control and sustained attention studies.

Timothy Lenoir
Professor, Arts & Sciences

Tim Lenoir’s recent work has focused on the introduction of computers into biomedical research from the early 1960s to the present, particularly the development of computer graphics, medical visualization technology, and the development of virtual reality and its applications in surgery and other fields.

Sayan Mukherjee
Assistant Professor,
Institute for Genome Sciences and Policy

Sayan Mukherjee’s research focuses on computational biology and machine learning/statistical learning theory. In computational biology his primary interest is in the analysis for gene expression data for prediction of clinical outcomes and to build statistical models incorporating pathway information. In machine learning his focus is on the interface of statistical learning theory and Bayesian statistics, specifically exploiting geometric properties of data to improve the performance of statistical methods.

NEW GRANTS AWARDED

Pankaj Agarwal
Algorithms
Collaborative Proposal: Motion-Models, Algorithms, and Complexity (Supplement)
National Science Foundation (NSF)

Pankaj Agarwal, Jun Yang, Kamesh Munagala, Carlo Ellis, Jim Clark (NSOE) Algorithms

Collaborative Research: SEI (BIO) – Automated Methods for Generating High-Resolution GIS Databases from Remotely Sensed Data for Biodiversity Predictions
National Science Foundation (NSF)

Jeff Chase
Systems & Architecture
CSR: AES: Virtual Playgrounds: Making Virtual Distributed Computing Real
National Science Foundation (NSF)

Herbert Edelsbrunner
Algorithms
Microstates to Macrodynamics: A New Mathematices of Biology
Princeton University/DARPA

Alexander Hartemink
Artificial Intelligence
CRCNS: Neural Flow Networks in Songbirds
National Institutes of Health (NIH)

Thom LaBean
Algorithms
Qubic: Novel DNA Nanostructures for Targeted Molecular Scale to Micron Scale Interconnects (Supplement)
National Science Foundation (NSF)

Artificial Intelligence
Alfred P. Sloan Research Fellowship
Alfred P. Sloan Foundation

Thom LaBean, Gleb Finkelstein (Physics)
Algorithms
Electronic Properties of Nanostructures Templated on Self-Assembled DNA Scaffolds
Army Research Office (ARO)

John Reif
Algorithms
EMT: Error-Resilient DNA Tiling Assemblies (Supplement)
National Science Foundation (NSF)

Algorithms
NANO: EMT: A DNA-Based Autonomous Programmable Molecular Transport Network
National Science Foundation (NSF)

Xinobai Sun
Scientific Computing
FANTOM: Algorithm-Architecture Codesign for High Performance Signal and Image Processing
Science Applications International Corporation (SAIC)

Carlo Tomasi
Artificial Intelligence
CRI: A Core Experimental Facility for Computer Vision and Artificial Intelligence
National Science Foundation (NSF)

Artificial Intelligence
Visual Learning in Context
National Science Foundation (NSF)

Jun Yang, Tom Kepler (Biostatistics & Bioinformatics)
Systems & Architecture
Multiscale Integrative Immunology for Adjuvant Development
National Institutes of Health (NIH)

Thom LaBean
Algorithms
NER: Addressable DNA NanoArrays for Force Spectroscopy of Molecules Relevant to Protein Aggregation
National Science Foundation (NSF)
IN AN ERA where scientific disciplines are becoming increasingly specialized, it’s unusual to see two fields grow together, but this is exactly what’s happening with artificial intelligence and computer vision, both at Duke and beyond.

To understand how these fields are growing together, we should first understand how they grew apart. For the past few decades, vision researchers addressed the challenging problems of image understanding using the tools of geometry and continuous mathematics, while AI researchers focused their efforts on decision making and symbolic reasoning. However, a growing interest in machine learning techniques in both computer vision and core artificial intelligence has pushed the two fields closer together. Researchers in both areas are increasingly applying statistical techniques and optimization methods to the problems they study.

This transformation started at Duke in the 2000–2001 academic year, when Ron Parr arrived as an Assistant Professor, and Carlo Tomasi was recruited from Stanford. Parr is an expert on decision making under uncertainty, and Tomasi is an expert on computer vision. The concurrent donation of a robot (named Markov) from industrial partner SAIC motivated Tomasi and Parr to ask some basic questions: How can the robot learn from and interact with its environment while using what is arguably the most important human sensor – vision? The two discovered that focusing on an embedded vision system raised issues that did not necessarily arise in studying vision or robotic planning independently. Parr comments, “Any real vision system produces noisy and ambiguous outputs. What’s interesting from the robotics perspective is how the noise and ambiguity can be managed in the context of the robot’s mission.” Tomasi adds, “Computer vision often treats the camera as a passive and stationary observer of a scene. When the camera is placed on a robot that can change its perspective on the environment, and even alter the environment with its actions, both the problem and the measure of success change dramatically.”

To address this and related questions of mutual interest, Tomasi and Parr formed a new research group named DRIV (Duke Robotics Intelligence and Vision). Weekly DRIV meetings include faculty and students from a variety of backgrounds. The DRIV robot family has now grown to 5, and with the support of an NSF infrastructure grant, Tomasi and Parr are establishing a new lab with state of the art motion tracking, vision, and laser depth-sensing technology.

`COMPUTER-CHEMISTRY’ YIELDS NEW INSIGHT INTO A PUZZLE OF CELL DIVISION

DUKE UNIVERSITY BIOCHEMISTS aided by Duke computer scientists and computational chemists have identified the likely way two key enzymes dock in an intricate three-dimensional puzzle-fit to regulate cell division. Solving the docking puzzle could lead to anticancer drugs to block the runaway cell division behind some cancers, said the researchers.

Significantly, their insights arose not just from meticulous biochemical studies, but also from using sophisticated simulation techniques to perform “chemistry in the computer.”

In a paper published Nov. 24, 2005 online in the journal Biochemistry, members of the interdisciplinary collaboration described how they discovered the probable orientation required for a Cdc25B phosphatase enzyme to “dock” with and activate a cyclin-dependent kinase protein complex that also functions as an enzyme, known as Cdk2–pTyr–CycA. The work was funded by the National Institutes of Health.

“To me this is the culmination of my six years here at Duke,” said Johannes Rudolph, the Duke assistant professor of chemistry and biochemistry who led the research. “It’s very exciting. I think it’s a really hard problem.”

Rudolph, his graduate students Jungsan Sohn, Kolbrun Kristjansdottir and Alexias Safi and his post-doctoral investigator Gregory Burhman began collaborating with a team led by computer science and mathematics professor Herbert Edelsbrunner.

Edelsbrunner, who has developed techniques and computational programs for modeling and analyzing complex molecular shapes, used a large cluster of computers and custom software to analyze about one thousand trillion different conceivable shape match-ups between the molecules. Edelsbrunner’s group, which included programmer Paul Brown, then began narrowing that search further. They did so by using a different software program that could identify the highest and lowest places on the molecules’ surfaces, and where “highest” on one might fit into the “deepest” on the other. “That’s not easy, because there is no point of reference on those complicated shapes,” Rudolph said.

He credited the study’s success to the power of interdisciplinary scientific collaborations, noting that he and Edelsbrunner initially met “by coincidence” in Duke’s Levine Science Research Center building, where they both have separate labs in separate wings.

A NEW VISION FOR ARTIFICIAL INTELLIGENCE AT DUKE

‘A NEW VISION FOR ARTIFICIAL INTELLIGENCE AT DUKE’

IN AN ERA where scientific disciplines are becoming increasingly specialized, it’s unusual to see two fields grow together, but this is exactly what’s happening with artificial intelligence and computer vision, both at Duke and beyond.

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**SENSOR NETWORKS IN DUKE FOREST**

FACULTY MEMBERS from Computer Science—Pankaj Agarwal, Carla Ellis, Kamesh Munagala, and Jun Yang—in collaboration with Jim Clark from Biology and Alan Gelfand from Statistics, have received a five-year, $1.4 million grant from the National Science Foundation (NSF) to develop an advanced wireless sensor network for forest monitoring. The sensor network will help researchers better understand how the growth, survival and reproduction of forest trees are influenced by changes in climate, atmospheric carbon dioxide, disturbances, and other environmental factors that can fluctuate rapidly. This study is especially relevant today in understanding and assessing the potential effects of global warming.

Wireless sensor networks have been increasingly recognized as a revolutionary technology that enables data collection on an unprecedented scale and from previously unobservable environments. Effective use of such networks, however, still poses challenging research problems in coping with the scarce computing resources and limited battery power of sensor nodes. This new project will develop a general framework for dynamic, data-driven control of wireless sensor networks that combines environmental modeling and real-time feedbacks to provide energy-efficient sensing support for environmental research. The framework supports a new paradigm of joint control over sensing and communication using models both in and out of the network. Out of the sensor network, powerful computing servers run full-fledged environmental models that fully assimilate all information. Inside the network, lightweight sensors employ simplified environmental models supporting adaptive sampling and data compression. The in-network models communicate compressed sensor and diagnostic data to the out-of-network models, which assimilate the data and in turn provide the in-network models with more accurate control based on modeling requirements and global feedback.

To build this advanced sensor network, the team of computer scientists, statisticians, and environmental scientists at Duke will be collaborating with Paul Flikkema, Professor of Electrical Engineering at Northern Arizona University. The results of this interdisciplinary collaboration will lead to a better understanding of ecosystem properties and maintenance of biodiversity, with global implications for the environment.

**DUKE PHONES INSTALLED WITH VOICE RECOGNITION**

IF YOU HAVE ever lost or didn’t know a phone number, Duke computer scientists may be able to help you out.

Researchers have developed a voice-recognition system that allows a caller to be forwarded to the person they are trying to reach—even if they don’t have the person’s phone number. By dialing 668-3070 and just saying a name, people can access any phone number. By dialing 668-3070 and just saying a name, people can access any phone number. By dialing 668-3070 and just saying a name, people can access any phone number. By dialing 668-3070 and just saying a name, people can access any phone number. By dialing 668-3070 and just saying a name, people can access any phone number. By dialing 668-3070 and just saying a name, people can access any phone number.

The system uses error-correction technology developed by Professor of Computer Science Alan Biermann, research associate Ashley McKenzie and computer science graduate student Bryce Inouye.

Typical voice recognition systems work accurately two-thirds of the time. But when the software is combined with error-correction technology, the number of misplaced calls and unrecognized names drops to less than 10 percent.

“The vision is that you won’t have to use phone numbers—automated call connection is in the near future,” Inouye said. “Say I want to talk to my friend, Joe Boggs. I say the name and two seconds later, the phone is ringing. You don’t have to know the phone numbers. Just know the name.”

To use the system, callers are asked to say the name of the person who they wish to contact. If the name is not recognized by the system, the caller is asked to spell the name.

“We use a Nuance speech recognizer. It’s an excellent speech recognizer within the industry,” Biermann said. “If it works, then our system does little. If the speech recognizer fails, then our system uses a complex statistical method to compute the most probable name. It is essentially error correction.”

The new service draws from Duke’s online directory, which contains 35,000 names and phone numbers.

Although the service does not include the phone numbers of undergraduate students, it does provide call forwarding to all faculty and staff within the Duke community.

In experimental tests, the average caller took 76.6 seconds to reach a person using the Duke telephone operator.

When using the automated voice recognition system, however, the average caller was able get connected within 48.8 seconds.

If successful, the system could be extended to public use. The researchers noted that the technology may soon be marketed as a commercial product.

“We are currently talking with companies. Now, it depends on whether the economy and society will support it,” Biermann said. “If the system can support the names and numbers of 35,000 people, then it can be developed to support the identities of people within 35,000 cities.”
2005 RICHARD TAPIA CELEBRATION OF DIVERSITY IN COMPUTING CONFERENCE


Jeffrey Forbes was chair of a technical presentation session titled “Collaborative Environments” and was also a presenter of a talk titled “Moving Toward Future Objectives” at the Student and Scholarship Recipient Orientation. Forbes spent time recruiting for Duke Computer Science and the Graduate School.

We are pleased to announce the new Computer Science Undergraduate Research Fellows Program (C-SURF). This program is designed to provide undergraduates with an intensive research experience in a core computer science research-intensive project or an interdisciplinary project leveraging core concepts in collaborative ways. C-SURF Fellows will receive course credit for their research work, a paid summer research experience, and will graduate with distinction upon successful completion of the program. This competitive program not only capitalizes on the educational benefits of Duke’s capabilities as a premier research university, but will also increase the connection of computer science students to the process of inquiry, and discovery.

Dean of Trinity College and Vice Provost for Undergraduate Education Bob Thompson states, “The C-SURF program is a terrific example of exactly what the College was seeking to develop with the Duke Endowment funds that we were awarded last year to enhance undergraduate education through establishing an Undergraduate ‘Culture of Research’. The primary purpose was to realize the educational benefits of a research university by increasing the connections of undergraduate education to the processes of inquiry, and discovery.”

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Missed class? Try a podcast

By Jodi S. Cohen, Tribune higher education reporter

Digital recordings of lectures allow college students with MP3 players to catch lessons or just catch up wherever and whenever they want.

It’s a step that a small but growing number of professors are trying. By turning class lectures into podcasts—free audio recordings that students can download to their iPods or other portable players—students can skip the lecture hall but still hear the lecture. Supporters say podcasts help students who miss a class or want to review the material, while professors get points for being flexible and using the latest, hippest gadget.

More traditional academics fear that by listening to lectures on the run, students will miss out on learning that can happen only when students and instructors come together. Professors have posted lecture notes, PowerPoint slides and other written class material online for years, but instructors only recently began testing the best uses of the popular audio technology.

Duke University professor Richard Lucic, who has 27 students in an introductory computer science course, podcasts lectures and also requires students to listen to independent podcasts related to class topics. The easy availability of his lectures hasn’t affected attendance, he said, probably because class participation counts for 15 percent of a student’s grade.

Meredith Tenison, a Duke senior in Lucic’s class, has missed only one class but still downloads and listens to the lectures before writing weekly papers and putting together presentations required for the course.

“If there is a gap in my notes, I go back to get the context,” said Tenison, who also listens to podcasts about wine, South Africa and Duke basketball. “You can be doing your laundry or doing your homework. It’s amazing how efficient you can be with your time.”
STUDENT PROFILE: KEVIN YI

AFTER A HIGHLY SUCCESSFUL undergraduate experience at China's premier Tsinghua University, Ke “Kevin” Yi sought out the opportunity to realize his research aspirations in a program that would provide him with an exceptional faculty and computing environment. In the fall of 2001 it was the good fortune of Duke CS to welcome this promising student into our scholarly community.

It did not take the faculty long to recognize the outstanding potential Kevin possessed for working out solutions to complex mathematical problems, but then one should not have been surprised given the many honors and prizes he had achieved as an undergraduate. Among some of these were his earning a Silver Medal in the 9th International Olympiad in Informatics, which earned him exempted exam entrance into Tsinghua University, a Meritorious Winner in the 2000 Mathematical Contest in Modeling, and the Tsinghua Top-Grade Scholarship which was awarded to only 5 out of 12,000+ undergraduate students that year.

As early as his first year at Duke, Kevin was conducting research work with Professor Jeffrey Vitter, which led to a paper that appeared at (the distributed systems conference) PODC’02. Starting from his second year, he began to work with Professors Pankaj Agarwal and Lars Arge on I/O-efficient algorithms, namely algorithms that can handle data sets much larger than physical memory. Traditional algorithms often become horrendously slow when they run out of memory, if not bail out completely. During the past three and half years, Kevin has developed I/O-efficient algorithms for a number of important problems, many of which arise from databases and terrain analysis: range searching, XML labeling, terrain modeling, flow computation, etc. Recently, he has been working on an algorithm that automatically extracts important topological features from a terrain, and his new I/O-efficient algorithm turns out to be more than 100 times faster than the existing method!

Kevin has always maintained a strong interest in databases, and has been actively conducting database research in collaboration with Professor Jun Yang and his group. The research projects span a number of different topics: query processing, XML, view maintenance, data streams, etc. Although not included in his thesis, Kevin has greatly broadened his horizon from these projects, and is delighted to see how algorithm design could change the way data is managed in real systems. Apart from academic research, Kevin also spent two summers at IBM Watson Research Center and AT&T Labs – Research, respectively, where he worked with industrial researchers and got a chance to apply his expertise in algorithms to real-world problems.

Kevin, now in his fifth year and preparing his way toward his dissertation defense and degree completion, has a list of impressive accomplishments and award recognitions that attest to the exceptional gift this student has for conducting research and making an outstanding contribution to his discipline.

STUDENT AWARDS

Outstanding Ph.D. Dissertation Award
Peng Yin
DNA Based Self-Assembly and Nano-Device: Theory and Practice
Committee: John Reif, Thom LaBee, Hao Yan, Alex Hartemink, Pankaj Agarwal, Andrew Turnerfield (Physics, Oxford)

Outstanding Master’s Thesis Award
Pallavi Pratapa
A Comprehensive Analysis of MALDI-TOF Mass Spectral Data with Application to Cancer Diagnosis
Committee: Alex Hartemink, Xiaobai Sun, Edward Patz (Radiology, DUMC)

Outstanding Ph.D. Proposal Award
Austin Elizarov
Distributed Particle Simultaneous Localization and Mapping (DP-SLAM)
Committee: Ronald Parr, Carlo Tomasi, Pankaj Agarwal, Lawrence Carin (ECE)

Outstanding Research Project Award
Albert Meixner
Dynamic Verification of Memory Consistency
Committee: Daniel Sorin, Alvin Lebeck, Carla Ellis

Outstanding Teaching Assistantship Award
Mason Matthews
CPS 100 – Program Design & Analysis I
Fall 2004 – Owen Astoranchan
Spring 2005 – Jeffrey Forbes
CPS 130 – Design and Analysis of Algorithms
Summer I, 2005 - Instructor

Outstanding Teaching Assistantship Award
Erik Halvorson
CPS 130 – Design and Analysis of Algorithms
Spring 2005 – John Reif

Outstanding Departmental Service Award
Dmitry Morozov
For dedication, leadership and service
GPSC representative for CS graduate students, graduate recruitment co-chair, active faculty search participant, communications committee, and teaching assistant.

WELCOME NEW STUDENTS

Pradeep Kumar Gunda
Pradeep completed a B.S. in Computer Science from IIT – Hyderabad, India in May 2004 and later worked as a software engineer at NCR Teradata R&D division. He was involved in analysis, design, and implementation of an analytical framework called Supply Chain Intelligence (SCI).

Stephen Odaibo
Stephen Odaibo, originally from Nigeria, completed his M.S. in Mathematics from the University of Alabama. He enrolled in Duke’s School of Medicine as part of the MSTP (M.D./Ph.D. program) where he served summers as a TA for the Robert Wood Johnson Summer Biomedical Science Program for gifted undergraduates.

Thileepan Subramaniam
Thileepan completed a B.S. in Computer Science & Engineering from IIT-Madras in July 1997. He joined HP in Singapore as R&D Engineer where he developed various components of HP’s Windows printer driver. Thileepan currently is a Senior Software Engineer at EFI, Inc., a world leader in network printing and digital print management solutions.
ATTORNEYS FOR a voting machine manufacturer have asked a state court to narrow a key provision in the rules governing those bidding on the chance to sell equipment to local elections boards. The state’s voting equipment has been under scrutiny since 2004.

A series of glitches occurred across the state and nation, but the most significant was in Carteret County in eastern North Carolina. There, computerized machines lost more than 4,000 votes, an error that plunged the close agriculture commissioner race into uncertainty for months.

Responding to that mishap and changes in federal law, the General Assembly this summer tightened rules for voting machine manufacturers. Under those new rules, the state is seeking firms that produce machines meeting certain requirements—such as that computer scientists may examine them to make sure they work as expected.

The state will choose one or more companies from whom local elections boards can buy equipment. Under state rules, companies holding that contract must place “all software that is relevant to functionality, setup, configuration and operation of the voting system” in safekeeping so it may be examined should something go wrong. The voting machine company Diebold, argues that the requirement is too broad.

Voting machine watchdogs are concerned that if Diebold is exempt from submitting the Windows code, it will set a dangerous precedent.

“That Diebold cannot live up to that very reasonable requirement of state law is their own fault,” said Justin Moore, a computer science graduate student at Duke University who has testified before legislative hearings on voting machine security.

Moore said other voting machine manufacturers bidding on the state contract used open-source software—which is freely available—or developed their own operating systems, either of which they are free to turn over to the state.

Moore said he also is worried about a more sinister scenario. If the state exempts third-party software from disclosure, voting machine vendors might be able to broker license agreements with other companies that allow them to exempt certain pieces of software from the safekeeping requirements, potentially hiding flaws from elections officials.

COMPANY SEEKS CLARITY ON VOTING MACHINE RULES: JUSTIN MOORE VOICES CONCERN

By Mark Binker, News & Record (Greensboro, N.C.)

DUKE HOSTS REGIONAL “BATTLE OF THE BRAINS” PROGRAMMING COMPETITION

DUKE CS TAKES 3RD PLACE AND HEADS OFF TO WORLD FINALS

A “BATTLE OF THE BRAINS” took place on November 12, as Duke University hosted teams from 15 universities in a regional competition that was part of the 30th Association for Computing Machinery International Collegiate Programming Contest (ICPC), sponsored by IBM. Student teams were challenged to use their programming skills and mental endurance to solve complex, real world problems under deadline. The 28 teams competed for the chance to move on to the contest’s world finals April 9-13, 2006, in San Antonio Texas.

The Duke team Bhamami, consisting of Ben Mickle, Kshipra Bhawalker, and Matt Edwards placed 3rd. The Duke team Wibabo, consisting of Aaron Wise, Jason Bosko, and Michael Bauer placed 17th. Team Bhamami will be heading to the World Finals in San Antonio, Texas. Since 1994 a Duke team has gone to the finals all but one year. From thousands of teams competing in regional contests held from September to December 2005 world-wide, seventy-five teams are advancing to the World Finals. Awards, prizes, scholarships, and bragging rights will be at stake for some of the world’s finest university students of the computing sciences and engineering.

The teams were coached by Owen Astrachan and the event was coordinated and managed by Susan Rodger.
Keep In Touch!

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Whether it's a new position, a degree, a promotion, or a new addition to the family, we want to help you share the news!

Congratulations to the following alumni who have recently received new jobs.

Amy Nathanson ('05)  
Software Engineer, Microsoft

Matt Ivester ('05)  
Associate Consultant, Marakon Associates

John McDowell ('05)  
Program Manager, Microsoft

Ike Ofodile ('04)  
Associate Technology, Sapient

Pallavi Pratapa ('02)  
Analyst, UBS Investment Bank

Rob Reagan ('02)  
CEO, Digital Labs, Inc.

Steven Roberts ('02)  
Graduate Student, Boston University

Timothy Tang ('00)  
Systems Analyst, Eli Lilly

Scott Ransbottom ('97)  
Assistant Professor, United States Military Academy

Krishnan Rajagopalan ('96)  
Vice President of Digital Media Technologies, Motion Picture Association of America, Inc.

Tim Gegg-Harrison ('95)  
Professor, Winona State University

Student Publications/Presentations

Albert Meixner  
June 4-8, 2005  
2005 International Symposium on Computer Architecture, Madison, Wisconsin  
"Dynamic Verification of Sequential Consistency"

Ke Yi  
October 3-4, 2005  
13th Annual European Symposium on Algorithms, Mallorca, Spain  
Paper presented on "Experiences with PIP: Finding Unexpected Behavior in Distributed Systems"

Patrick Reynolds  
October 23-24, 2005  
SOSP Conference, Brighton, UK  
Paper presented on "A Framework for Reasoning about the Temporal Behaviors of Scientific Applications"

Emma Buneci  
October 28, 2005  
IBM University Day, RTP  
Poster presentation on "A Mechanism for Online Diagnosis of Hard Faults in Microprocessors"

Piyush Shivam  
October 28, 2005  
IBM University Day, RTP  
Poster presentation on "Model-Driven Placement of Compute Tasks and Data in a Networked Utility"

Fred Bower  
November 12-16, 2005  
2005 International Symposium on Microarchitecture, Barcelona, Spain  
Paper presented on "A Mechanism for Hierarchical Linear/Constant Time SLAM using Particle Filters for Dense Maps"

Austin Eliazar  
December 5-8, 2005  
Neural Information Processing Systems (NIPS 2005), Vancouver and Whistler, British Columbia Canada  
Poster Presentation on "Surface Parameterization: Flattening the protein-protein Interface Surface"

Manika Schaeffer  
December 9-10, 2005  
Neural Information Processing Systems (NIPS 2005), Vancouver and Whistler, British Columbia Canada  
Poster Presentation on "Efficient Selection of Disambiguating Actions for Stereo Vision"

Recent Graduates

Ph.D. Degrees

Ronald Bryce Inouye  
Advisor: Alan Biermann  

Austin Eliazar  
Advisor: Ronald Parr  
D.P.-SLAM

Dejan Kostic  
Advisor: Amin Vahdat  
High-Bandwidth Data Dissemination for Large-Scale Distributed Systems

Qiang Xue  
Advisor: Xiaobai Sun  
MDAC: Fast Calculation of the Ground Electronic State via Multilevel Energy Decomposition

M.S. Degrees

Sita Badrish  
Advisor: Carla Ellis  
Energy Efficient Handling of Disk Accesses Using Economic Models

Laura Grit  
Advisor: Jeff Chase  
Broker Architectures for Service-oriented Systems

David Irwin  
Advisor: Jeff Chase  
An Architecture for Adaptive Network Services

Haoying Li  
Advisor: Carlo Tomasi  
Just-in-time Constraints for Dynamic-Programming Stereo

Madhuwanti Vaidya  
Advisor: Herbert Edelsbrunner  
Surface Parameterization: Flattening the protein-protein Interface Surface

John Wambaugh III  
(Physics Ph.D. candidate)  
Advisor: Robert Behringer  
Graph Percolation as an Analog to Granular Force Networks

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DEPARTMENTAL MEETING AND PICNIC

THE DEPARTMENTAL MEETING, hosted by the Chair and DGS, introduced new faculty, staff, and students; made announcements about what would be happening in the department this year; and presented the graduate student achievement awards. Gail Smith received the Staff Excellence Award for her work as assistant for the Transactions on Computer Systems journal and being a wonderful “ambassador” for Duke CS.

Immediately following the meeting was a picnic catered by Bullock’s. Family and friends were invited and the picnic turned out to be a great place to meet and greet.

ALAN W. BIERMANN RETIRES

HONORING THE JUNE retirement of Professor Alan W. Biermann, AI scholars from around the world came together on October 15, 2005 for a day of celebration.

Of the 14 graduate students that Alan advised over his 36-year tenure at Duke Computer Science, 11 participated in the day’s events, which included an afternoon of technical talks and a banquet for his former students, faculty, staff, and friends of the department.

But this isn’t the last we will see of Alan. He will be around to finish a grant and continue working on a few other projects and a couple of new ideas that have recently come along.

Alan shared his thoughts about the party, “This has to be the most wonderful retirement celebration that ever was or ever will be. Eleven of my fourteen Ph.D. students returned to give talks and to honor me. Many others came to the afternoon seminars and/or the evening party and the quality of the presentations was spectacular. We video taped the afternoon talks so anyone can revisit them as needed and we already have had same requests. I am delighted with two keepsakes given to me by the department, a Duke Captain’s chair with engraved plaque and a gorgeous crystal bowl. I wish to thank Pankaj Agarwal, Susan Clear, Amber DeFusco, Dana Nau, Doug Smith, Gail Smith, and Jewel Wheeler for their work on organizing this unbelievable event. I will never come down from this high.”

TECHCONNECT 2005

TECHCONNECT WAS HELD on September 19 at CIEMAS Auditorium and Atrium-Fitzpatrick Center. This annual event brought students and employers together. Each year, a panel of employers is selected to provide advice to students seeking internships and full-time jobs. Through this panel presentation, students get a good understanding of the characteristics employers seek as well as a realistic view of the job market for students interested in engineering and technical careers.

The panel discussion was followed by a vibrant networking event. Students from all classes were welcome to visit with employer representatives, many of whom were Duke alumni. This venue provided a less formal environment than the traditional Career Fair, which took place earlier in the day in the Bryan Center.

The event was hosted by the Career Center, Department of Computer Science, and Pratt School of Engineering. Sponsors included APT, GM, Cisco, Brown and Caldwell, Microsoft, Harris, Parsons, Appian, Qualcomm, Sapient, and Medtronic.

Students listen to panel of industry speakers

DUKE CS HOSTS CHARITY EVENT BENEFITING CHILD’S PLAY

DUKE COMPUTER SCIENCE hosted a charity event, Gamer’s Paradise 2005, on Dec. 3, 2005. All gifts and donations went directly to hospitals for distribution to sick children. The all-day charity event was sponsored by Duke ACM in partnership with DAGGER and Psi Upsilon Fraternity.

For the past three years, gamers around the world have raised nearly a million dollars in toys, games and cash for Children’s Hospitals across the globe through the grassroots charity, Child’s Play.

The public was invited to play video games (LAN, console, and recreational) for charity. Speakers from the gaming industry were also on hand to educate participants.

Students play Dance Dance Revolution (DDR) for charity

Students listen to panel of industry speakers

Shruti Jain, Barbara Grosz, Alan Biermann, Pankaj Agarwal (l-r)
EVENTS

PODCASTING SYMPOSIUM

ON SEPT. 27-28, Duke University’s Information Science + Information Studies (ISIS) program held what organizers believed to be the first-ever academic podcasting symposium.

The symposium brought together scholars, journalists and podcasting practitioners to discuss how this new technology is shaping—and being shaped by—business, law, journalism and Internet culture.

Casey Alt, ISIS administrative director was the symposium coordinator. He explained why the group chose to hold the symposium this semester. “By having this symposium now—while podcasting is still in its infancy—academics have a chance to be a part of the discussions that shape how it is used, the rules that govern it and what kind of culture grows up around it,” he said. “Podcasting is still malleable.”

Duke computer science professor Richard Lucic was the moderator for the panel discussion on the business of podcasting. “Economics have brought podcasting to a crossroads,” he said. “What was once a hobby for a few techie-types is now being pressed into service by big businesses like IBM and CBS, and that’s bound to affect the culture of creativity and independence that originally surrounded podcasting.”

ANNUAL HOLIDAY PARTY

THE DEPARTMENT held its Annual Holiday Party on December 2 in the LSRC Dining Hall. Food was catered by Three Seasons and entertainment provided by The Pitchforks, Duke’s premier a cappella singing group.

Graduate student Jeff Phillips organized the yearly department t-shirt contest. Faculty, staff, and students were invited to submit their design ideas and present their works of art at the holiday party. With almost 70 percent of the vote, Joanna Shih’s design was the winner. Order your t-shirt today!

INDUKE

THE COMPUTER SCIENCE and Electrical and Computer Engineering departments at Duke University are national leaders in research and education. The inDuke program offers a unique opportunity for value-based collaborations with an academic research institution on the leading edge of computing and engineering technologies. Industry partners gain priority access to exemplary students and to technical information across a broad spectrum of research, as well as the opportunity to influence the direction of that research and to participate in a valuable forum for technical information exchange. Department faculty and students also benefit by the exposure to industry-relevant issues and real world technological challenges.

For more information: http://www.cs.duke.edu/induke/

TALKS

BELOW IS a sample of some of our upcoming talks. For the full listing, please go to: http://www.cs.duke.edu/dept_info/colloquia/

January 23: Wireless Sensor Networks in Action by: John A. Stankovic
February 13: Modeling Temporal behaviour in Complex Socio-Technical Systems by: Alan Burns
February 20: Making Science Public by: Tim Lenoir
April 10: Computational Models for Medical Image Analysis by: Nicholas Ayache
April 17: RNA Molecules: Glimpses Through an Algorithmic Lens by: Anne Condon
NEW STAFF MEMBER, **CHERYL WALLACE**

WE ARE PLEASED to announce our new Business Office and Human Resources Manager, Cheryl Wallace. Cheryl has almost 22 years of experience at Duke, in a number of departments including the medical center, Nicholas School, procurement services, and Travel & Reimbursement.

Cheryl is responsible for the direction and coordination of our numerous business office operations. She designs, plans, and implements human resources programs and policies including staffing, compensation, benefits, employee relations, training, and health and safety programs. Cheryl also supervises the processing of payroll data, ensures that computing, withholding, or deductions associated with net pay are done properly, organizes and reviews forms associated with federal, state, and local authorities, such as W-2s, oversees the distribution of paychecks, and ensures payroll records are updated and reports on any matters of interest.

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**AMBER DEFUSCO TAKES THE SMARTCOMMUTE CHALLENGE**

**FROM AUGUST 15 – September 30,** anyone employed in Wake, Durham, or Orange County or in Research Triangle Park was urged to take the Challenge! Our Administrative Secretary, Amber DeFusco pledged to try getting to work by an alternative method—carpooling, vanpooling, public transit, biking, walking, or telecommuting—at least once during the Challenge.

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**VISIT HERE TO LEARN MORE ABOUT CS STAFF:**

HTTP://WWW.CS.DUKE.EDU/FACULTY_STAFF/