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I am very happy to share with all of you some exciting developments at Rutgers and at our department.

On July 1, 2013 we celebrated the first day of the new Rutgers University, which now includes the former University of Medicine and Dentistry of New Jersey (UMDNJ). With the addition of a medical school, Rutgers is now positioned as one of the most comprehensive public research universities in the country. Also on July 1, Rutgers officially joined the Committee on Institutional Cooperation (CIC), the academic consortium that includes all members of the Big Ten Conference (in which our Scarlet Knights athletic teams will begin competing in 2014) and the University of Chicago. CIC membership provides opportunities for teaching and research collaborations, library resource sharing, expansion of study abroad options, and joint purchasing arrangements with fellow CIC members.

The ECE Department has been a vibrant and inspiring environment, that continues to grow in numbers and recognition. In Fall 2012 we welcomed Assistant Professor Laleh Najafizadeh, whose expertise in the fields of brain imaging, biophotonics, microelectronics and signal processing brought a new dimension to our departmental research. Two more Assistant Professors will join us in the new academic year; Janne Lindqvist, with research interests in human-computer interaction, mobile systems security and privacy, and Anand Sarwate, with research interests in statistical algorithms for distributed systems, communications, privacy and security. Our faculty were recognized with prestigious honors, in particular, Shantenu Jha received the NSF Early Career Award, Manish Parashar was elevated to AAAS Fellow and also received the IBM Faculty Award, and Marco Gruteser was awarded the NJ Inventors Hall of Fame Award. Our graduate faculty Dick Frenkel was recognized with the 2013 National Academy of Engineering (NAE) Charles Stark Draper Prize for his pioneering contributions to the world’s first cellular telephone networks, systems, and standards. WINLAB, ECE’s best known research center and major player in the wireless arena was selected by DARPA to administer the DARPA Spectrum Challenge; 70 teams from around the country have been competing head-to-head for the best radio protocol for communication in the presence of other users and interference. ORBIT, WINLAB’s unique wireless testbed has been the host of the contest.

Our students had great success with internships at a variety of agencies and companies, including NASA, Google, AT&T, Verizon, Amazon, JP Morgan, Northrop Grumman, Johnson and Johnson, Massachusetts Electric, Siemens, Raytheon, National Instruments, Fujitsu, and Exelon. Many of our undergraduates received valuable research experience by working with faculty and graduate students. It was their undergraduate research experience that helped our class of 2012 graduates Adriya Devarakonda, Michael Koval and Jennifer Padgett receive the prestigious National Science Foundation’s Graduate Research Fellowship, and Rahul Sheth the Department of Energy Graduate Fellowship; these students are currently pursuing doctoral degrees at UC Berkeley, Carnegie-Mellon, Cornell and Stanford, respectively.

Our revamped capstone program, designed to encourage student creativity and allow for interdisciplinary teams was a huge success this year. The capstone projects were of high quality, with some having great commercialization potential. The “Thermovolt Systems” project, by Todd Katz, Daniel Cox, Eric Greendyk and Jonghyun Bae, won first place in the ECE capstone competition. It also impressed ECE advisory board member Arne Ballantine of Bloomenergy, who brought Thermovolt to Bloomenergy for further testing.

On a sad note, the ECE community is still coping with the loss of beloved ECE Professor Paul Panayotatos, who passed away last April after a long illness. During his 30 year career at Rutgers, Dr. Panayotatos was a tireless supporter of the ECE Department and the university working with students, leading the department through a successful ABET evaluation last year, and served in various university committees, including most recently as chair of the University Senate, and member of the presidential search committee. To honor his memory, his family, friends, colleagues and alumni, established the Paul Panayotatos endowed scholarship for graduate studies; the scholarship will support outstanding graduate students with interests in sustainable systems.

I hope this newsletter will give you a taste of the ECE environment here at Rutgers. Please feel free to contact me at athinap@rutgers.edu should you have any comments or need further information.

Sincerely,
Athina Petropulu
Waheed U. Bajwa  
Assistant Professor  
Research Interests: High-dimensional inference and inverse problems, compressed sensing, statistical signal processing, wireless communications, and applications in biological sciences, complex networked systems, and radar & image processing

Shantenu Jha  
Assistant Professor  
NSF Career Award  
Research Interests: High-performance and distributed computing, computational and data-intensive science and engineering, large-scale cyberinfrastructure for science & engineering.

Grigore Burdea  
Professor  
NSF Initiation Award  
Research Interests: Virtual rehabilitation, telerehabilitation, haptics virtual reality

Kristin Dana  
Associate Professor  
NSF Career Award  
Research Interests: Computer vision, pattern recognition, machine learning, convex optimization, novel cameras, camera networks, computer graphics, robotics, computational photography, illumination modeling

David Daut  
Professor  
Research Interests: Communications and information processing area. Special interests include stochastic processes in communication, detection and estimation theory, information theory and coding, multidimensional digital signal processing, optical communications systems

Zoran Gajic  
Professor and Graduate Director  
Research Interests: Power control of wireless networks

Marco Gruteser  
Associate Professor  
NSF Career Award  
Research Interests: Location-aware systems, pervasive computing systems, privacy and security, mobile networking, sensor networks and performance evaluation

Jaeseok Jeon  
Assistant Professor  
Research Interests: Nanoelectronic materials, devices and processing technologies, nano-electro-mechanical systems (NEMS)

Wei Jiang  
Associate Professor  
DARPA Young Faculty Award  
Research Interests: Silicon nanophotonics: modulators, switches, light emission Photonic crystals: devices & physics (e.g. slow light, superprism) silicon photonic microsystems: optical phased arrays, spatial light modulators, on-chip optical interconnects, optical information processing microsystems. Nanoimprint and molding plasmonics and metamaterials; disordered and quasi-periodic media other interests: polymer photonics; fiber optics; laser beam steering; gratings; liquid crystals; phased array antennas

Janne Lindqvist  
Assistant Professor  
Research Interests: Systems security and privacy, mobile systems, social computing, context-aware communication, and human factors in computing systems

Yicheng Lu  
Distinguished Professor  
IEEE Fellow  
Research Interests: Microelectronics material and devices

Narayan Mandayam  
Professor  
Peter D. Cherasia Faculty Scholar and Associate Director of WINLAB, IEEE Fellow, Distinguished Lecturer of IEEE  

Ivan Marsic  
Professor  
Research Interests: Mobile computing, software engineering, computer networks.

Sigrid McAfee  
Associate Professor  
Research Interests: Defects in semiconductors, nanotechnology, financial Engineering

Peter Meer  
Professor  
IEEE Fellow  
Research Interests: Statistical approaches to computer vision.

Laleh Najafizadeh  
Assistant Professor  
Research Interests: Functional brain imaging, brain connectivity, diffuse optical brain imaging, electroencephalography, cognitive rehabilitation, circuit design and microelectronics, ultra low-power circuits for biomedical applications, data converters, system on chip, wireless IC design

Sophocles Orfanidis  
Associate Professor  
Research Interests: Statistical and adaptive signal processing, Audio signal processing, Electromagnetic waves and antennas

Manish Parashar  
Professor  
IEEE Fellow, AAAS Fellow, NSF Career Award  
Research Interests: Computational and data-intensive science and engineering applied parallel & distributed computing (cloud, grid, hpc) autonomic computing, extreme-scale computing pervasive computational ecosystems

Athina Petropulu  
Professor & Department Chair  
IEEE Fellow, NSF Presidential Faculty Fellow  
Research Interests: Statistical signal processing, blind source separation, cooperative protocols for wireless networks, physical layer security, MIMO radar, compressive sensing

Dario Pompili  
Associate Professor  
NSF Career Award, ONR Young Investigator Award, DARPA Young Faculty Award  
Research Interests: Wireless ad hoc and sensor networks, underwater acoustic
communications, underwater vehicle coordination, team formation/steering, task allocation, thermal management of datacenters, green computing, cognitive radio networks, dynamic spectrum allocation, traffic engineering, network optimization and control.

**Lawrence Rabiner**  
Distinguished Professor  
IEEE Fellow, National Academy of Engineering, National Academy of Sciences, IEEE Kilby Medal, IEEE Piore Award, IEEE Millennium Medal  
Research Interests: Digital signal processing, digital signal processing, speech recognition, speech analysis, speaker recognition, and multimedia.

**Dipankar Raychaudhuri**  
Distinguished Professor & Director of WINLAB  
IEEE Fellow  
Research Interests: Future network architectures and protocols, wireless systems and technology, dynamic spectrum access and cognitive radio, experimental prototyping and network research testbeds.

**Christopher Rose**  
Professor  
IEEE Fellow  
Research Interests: Technical interests include applications of communication/information theory, biology, (nano/micro/macro) mechanical systems Past wireless interests have included novel mobile communications networks, applications of genetic algorithms to control problems in communications networks and interference avoidance methods using universal radios to foster peaceful coexistence in what will be the wireless ecology of the 5GHz U-NII bands

**Peddapullaiah Sannuti**  
Professor and Undergraduate Director  
IEEE Fellow  
Research Interests: Simultaneous internal and external stabilization of linear time-invariant systems in the presence of constraints is pursued. Internal stabilization is in the sense of Lyapunov while external stabilization is in the sense of $L_p$ stability with different variations, e.g. with or without finite gain, with fixed or arbitrary initial conditions, with or without bias.

**Anand D. Sarwate**  
Assistant Professor  
Research Interests: Machine learning, distributed systems, and optimization, with a focus on privacy and statistical methods

**Deborah Silver**  
Professor  
Research Interests: Scientific visualization, computer graphic

**Predrag Spasojevic**  
Associate Professor  
Research Interests: Communication and information theory, coding and sequence theory, signal processing and representation, cellular and wireless lan systems, adhoc and sensor networks

**Wade Trappe**  
Professor & Associate Director of WINLAB  
Research Interests: Multimedia security, wireless security, wireless networking and cryptography

**Roy Yates**  
Distinguished Professor & Associate Director of WINLAB  
IEEE Fellow  
Research Interests: Resource management in wireless systems, dynamic spectrum access and spectrum regulation, information theory for wireless networks and future internet architectures

**Yanyong Zhang**  
Associate Professor  
NSF Career Award  
Research Interests: Computer architecture, operating systems, parallel computing cluster computer, performance evaluation and sensor networks

**Jian Zhao**  
Professor  
IEEE Fellow, NSF Initiation Award  
Research Interests: Silicon Carbide (SiC)

**Michael Caggiano**  
Professor Emeritus  
Research Interests: Electrical Packaging, and microwave packaging

**Hana Godrich**  
Instructor  
Research Interests: Signal processing, radar systems, power systems

**Warren Lai**  
MERL Instructor  
Research Interests: Micro- and nano-fabrication for applications in IC, electronics, photonics, mems, sensors and nanotechnology, including advanced process development, novel device integration, material engineering, metrology, characterization, reliability and manufacturability.

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**Deborah Silver**  
Professor  
Research Interests: Scientific visualization, computer graphic

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NSF Career Award  
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**Jian Zhao**  
Professor  
IEEE Fellow, NSF Initiation Award  
Research Interests: Silicon Carbide (SiC)
ECE Students Highlighted in ‘The Institute of IEEE’ in the April Issue

The ECE Department’s IEEE student branch was highlighted in The Institute of IEEE in the April issue. In the article, Elie Rosen, the branch president described the group’s robotics activities.

ECE students members of the Rutgers branch designed and built a 90 kilogram autonomous robot named ‘Navi’ to compete in the Intelligent Ground Vehicle Competition held annually in Rochester, Michigan. Last year’s contest saw students from more than 40 universities around the world design and build robots to navigate over an obstacle course. The Rutgers team performed well and the group is looking forward to next year’s tournament in 2014.

The full article can be found at: http://theinstitute.ieee.org/people/students/student-branch-spotlight-rutgers-university

The Engineering Governing Council’s Engineering Cup Competition

This year, the Department of Electrical and Computer Engineering won third place in the Engineering Cup, a week long sporting event that consisted of volleyball, football, basketball, soccer, and Frisbee tournaments.

Participants included Justin Cruz, Sean Wang, Sheldon Wong, Damon Show, Scott Xu, David P, and David Andres of the Circuit Breakers, who won first place in the Frisbee tournament!

Three ECE Students Received the Prestigious NSF Graduate Research Fellowship

Aditya Devarakonda, Michael Koval and Jennifer Padgett (class of 2012) for received the National Science Foundation’s Graduate Research Fellowship.

The NSF Graduate Research Fellowship Program (GRFP) recognizes and supports outstanding graduate students in NSF-supported science, technology, engineering, and mathematics disciplines who are pursuing research-based master’s and doctoral degrees at accredited US institutions.

GRFP Fellows receive 3 years of support with $30,000 annual stipend and $12,000 cost-of-education allowance to the institution.

ECE Student Received the Department of Energy Graduate Fellowship

Rahul Sheth (class of 2012) received the Department of Energy Graduate Fellowship.

ECE Student Wayne Chang Awarded the Turing NYC Summer Fellowship and Internship

The NYC Turing Fellowship is a program that “matches top students with top startups” in the NYC area. They receive over a thousand applications and invite the top 40 into the city for interviews; about 20 actually get the fellowship. Wayne competed with students from other top northeast schools such as Harvard, Princeton, and Brown.

This picture is the actual interview and was taken in the NY Times building.
Ashwin Ashok Received Travel Grant for ACM MobiSys

Ashwin Ashok received a travel grant and presented his demonstration “BiFocus - Using Radio-Optical Beacons for An Augmented Reality Search Application”, at the ACM International Conference on Mobile Systems (MobiSys), in Taipei, Taiwan, June 2013. Ashwin is a PhD student member of WINLAB working under the supervision of Prof. M. Gruteser.

Dionysios Kalogerias Received Travel Grant from IEEE SPAWC Conference

ECE student Dionysios Kalogerias received a $1,500 travel grant from the 2013 IEEE Int. Workshop on Signal Processing Advances in Wireless Communications (SPAWC), held in Darmstadt Germany, where he presented the paper: “On the Coherence Properties of Random Euclidean Distance Matrices,” by D. Kalogerias and A. Petropulu.

Dionysios is member of the Communications and Signal Processing laboratory, working towards a PhD under the supervision of Prof. A. Petropulu.

ECE Student Moustafa AbdelBaky Received the IBM Ph.D. Scholarship for a Third Year in a Row!

This is a highly competitive award and recognizes the student as well as the quality of the student’s institution.

Moustafa is pursuing his Ph.D. under the guidance of Professor M. Parashar and is a member of the Cloud and Autonomic Computing Center. His work focuses on providing cloud abstractions on all three levels (infrastructure, platform, and software) for science and engineering applications using hybrid infrastructure such as Blue Gene, Open Science Grid, Amazon EC2, Future Grid, and XSEDE.


ECE PhD Students Huiqing Fu and Yulong Yang Won Travel Stipends to Attend Privacy Enhancing Technologies Symposium

Left to right: Huiqing Fu and Yulong Yang with Shubham Jain and Prof. Janne Lindqvist
The ECE Department has Established a Travel Grants Program

ECE PhD students can receive awards ranging of up to $1000 in support of conference participation. It is expected that 5-10 awards per year will be made. These awards come in two forms:

- ECE Research Excellence Award
  In support of travel for a student with a paper accepted at a conference.
- ECE Student Development Award
  In support of conference travel or access for students seeking a research experience.

This year’s awards winners are:

**ECE Research Excellence**
- Talal Ahmed $300
- Dionysios Kalogerias $300
- Eun Kyung Lee $300
- Shunqiao Sun $300

**ECE Student Development Award**
- Haroon Raja $200
- Tong Wu $200

Information on the ECE Travel Award application can be found at ece.rutgers.edu/phd-student-mentoring.

“3+2” Program with UESTC China

The ECE Department established a “3+2” cooperative education program with the University of Electronic Science & Technology (UESTC), Chengdu, China. In this program, qualified students from UESTC may earn a bachelor’s degree from the home institution and a M.S. in Electrical and Computer Engineering degree from Rutgers University by completing three years of coursework at UESTC and two years of coursework at Rutgers. Eligible UESTC students must meet the admission standards of Rutgers’ ECE program and the English language requirement of the Graduate School New Brunswick.

UESTC is a highly ranked university, focussing on electronics and information science and technology. 24 UESTC students enrolled in ECE in Fall 2013.

ECE Students Selected for the Grace Hopper Scholarship

ECE PhD students Melissa Romanus and Ashley Zebrowski were selected for the Grace Hopper Scholarship, which supports their attendance at the Grace Hopper Conference the premier conference for Women in Computing. The dates are October 2-5, 2013 in Minneapolis, Minnesota. GHC is the largest technical conference for women in computing and results in collaborative proposals, networking, and mentoring for junior women and increased visibility for contributions of women in computing.

Ashley and Melissa are members of the Research in Advanced Distributed Cyberinfrastructure and Applications Laboratory (RADICAL), pursuing a PhD in the area of distributed computing under the supervision of Prof. Shantenu Jha. Ashley will be presenting work on multi-level scheduling in a distributed environment. The work is made possible through the Pilot-Jobs, which allow application-level scheduling approaches to work in conjunction with system-level scheduling. SAGA is used for interoperability between heterogeneous resources. Melissa’s research involves studying the correlations between compute and data in a distributed application in order to make better placement decisions across heterogeneous resources.

Graduate Program Academic Achievement Awards

The following doctoral graduates were awarded the ECE Graduate Program Academic Achievement Awards at the Departmental Graduation Ceremony on Saturday May 18, 2013:

- CHEN Baozhi (advisor D. Pompili)
- LI Yao (advisor P. Spasojevic)
- LIU Yupeng (advisor A. Petropulu)
- TAN Jun (advisor W. Jiang)

Baozhi is currently with Bloomberg, Yupeng is with Broadcom and Jun is with the Brookhaven National Laboratory.

Announcing the Rutgers ECE - Northrop Grumman Fellowships

The ECE Department is pleased to announce two new Fellowships that support graduate studies through a combination of an ECE Fellowship with guaranteed income from a summer internship with Northrop Grumman.

In particular, the Fellowship includes some stipend from ECE, and a paid internship at Northrop Grumman at Linthicum (Baltimore), Maryland during summer 2012. Northrop Grumman is a leading global security company providing innovative systems, products and solutions in aerospace, electronics, information systems, and technical services to government and commercial customers worldwide.

This opportunity is open to new master or PhD level ECE students with interest in computer engineering with FPGA expertise, and/or electrical engineering with digital design expertise. US Citizenship is required. Interested students should contact John McCarthy (john.mccarthy @ rutgers.edu).

“3+2” Program with UESTC China

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- LIU Yupeng (advisor A. Petropulu)
- TAN Jun (advisor W. Jiang)

Baozhi is currently with Bloomberg, Yupeng is with Broadcom and Jun is with the Brookhaven National Laboratory.
Undergraduate Student Awards

John B. Smith Memorial Prize:
It is awarded to the highest ranking graduating senior. We are pleased to say that in 2013 we had four students all of whom have a perfect GPA of 4.00. Alphabetically, these students are:

Gradeigh Clark (currently a PhD Student at ECE Rutgers)
Xianyi Gao (currently a PhD Student at ECE Rutgers)
Parth Patel (currently a senior at ECE Rutgers)
Aaron Sun (currently at University of Pittsburgh Medical School)

James L. Potter Award:
It goes to the person who, in the opinion of the department, has best exhibited the characteristics of original and independent investigation and creativity in his professional field and has obtained high academic standing.

Jennifer Shane (currently a PhD Student at ECE Rutgers as a Raytheon-Rutgers ECE Fellow)
Omer Mano (currently graduate student at Yale)
Matthew Keys (currently with USRadar Inc.)

George Goubau Memorial Prize:
It is presented to a student who exhibited excellence in the study of Electromagnetic Phenomena.

Gradeigh Clark (see above)

IEEE Princeton/Central Jersey Section Award
It is given to that member of IEEE who promoted the ideals of IEEE while achieving high academic standing.

Elie Rosen (currently graduate student at ECE Rutgers)

Departmental Service Award:
This service award goes to a student who best exhibited the leadership qualities and exemplified them through his/her service to the department and fellow students. The winner was the Rutgers University IEEE Student Branch for developing and fine-tuning Navi, a 90-kilogram, fully autonomous robot.
The Capstone Design Program Results

The Electrical and Computer Engineering Department Capstone Design Program came to a close after presentation of impressive posters and formal judging by our panel of industry representatives. This year’s version of Poster Day seemed particularly interesting and exciting with over 40 projects, lots of cool demos, eager and articulate presenters and an audience that was shoulder to shoulder in the ECE building for well over two hours.

The judges of this year’s competition included: Jeff Steele, National Instruments Corporation; Nagi Naganathan, LSI Corporation; Emina Soljanin, Alcatel-Lucent, Bell Labs; Mohammad Ali Maddah-Ali, Alcatel-Lucent, Bell Labs; Kumar Ramaswamy, Igalgi, Inc.; Hana Godrich, Godrich Consulting LLC; Jignesh Panchal, Verizon; Jane Luo, Qualcomm; Ariela Zeira, InterDigital Communications, Inc.; Cindy Klepich, IBM Global Technology Services.

We wished we could award prizes to them all (and more).

**Computer-Integrated Weight Resistance with Feedback Control**
**Team:** Josh Beninson, Nelson Tong, Tarun Katikaneni
**Instructor:** Manish Parashar

**GPS Shoe**
**Team:** Justin Levatino, Michael van Genderen, John Waldt
**Advisor:** Manish Parashar

**Android Remote Monitor Application**
**Team:** Mark Law, Elvison Dominguez, Phu Phan
**Advisor:** Manish Parashar

**Remotely Processed Visual and Odometric SLAM**
**Team:** Wayne Chang, Omer Mano, Eric Wengrowski
**Advisor:** Kristin Dana

**Computer Vision-Based 3-D Reconstruction for Object Replication**
**Team:** Ryan Cullinane, Cady Motyka, Elie Rosen
**Advisor:** Kristin Dana

**Flexion Defined Gesture Recognition Glove**
**Team:** Jennifer Shane, Marshall Siss, Austin Spadaro, Siva Yedithi
**Advisors:** Kristin Dana, Christopher Rose

**MPG - iPhone Driving Assistant**
**Team:** Justin Levatino, Michael van Genderen, John Waldt
**Advisors:** Christopher Rose, Manish Parashar

Congratulations to all the students and also to the faculty advisors who supported technical brilliance and creativity in their students. Links to capstone posters and abstracts can be found at [ece.rutgers.edu/Capstone_Design_2013](http://ece.rutgers.edu/Capstone_Design_2013).
Photovoltaic Thermal System

Team: Todd Katz, Dan Cox, Eric Greendyk, Jonghyun Bae
Advisor: Wei Jiang

Abstract: Photovoltaic Systems (PV) have been developed over the years as an alternative way to resolve the issue of limited energy resources; however, due to its operating properties, this clean source of energy is very inefficient. Counter-intuitively, recent studies have shown that there is actually an inverse relationship between solar cell temperature and the efficiency of the cell. Solar panels are usually installed on rooftops, and can reach very high temperatures. In a normal PV system, this heat is wasted energy. In this project, combining conventional PV with a thermal system is shown to radically increase the overall efficiency of a system. While the electrical efficiency of the PV system has a negligible change, the added benefit of using the wasted heat energy to create hot water adds efficiency; therefore, tremendous added value in comparison to a stand-alone PV system.

Wireless Orchestra

Team: Eric DeJesus, Westley Propati, Miroslav Tomaska, and Songfei Zhang
Advisors: Swapnil Mhaske, David Daut, Predrag Spasojevic.

Abstract: The goal of this project was to mechanize the learning of cyber-physical orchestra conducting. Here, computers become the musicians and a human synchronizes their actions. Its success required sophisticated National Instruments (NI) LabView integration of geographically distributed hardware and software modules. The modules include a Microsoft Kinect, NI-USRPs radios, NI-s My-DAQ boards, and Speakers. A Kinect module interpreted music conducting commands, USRP-s transmitted Kinect generated commands to music stations, and NI-s My-DAQ boards performed distributed sound equalization at remote speakers. This project brought together concepts from computer science, human to computer interfacing, machine learning, digital signal processing, and wireless communications. Such an advanced single-semester project would have been difficult without both hard work and the advanced environment of the Software Defined Radio-Based Instructional Laboratory sponsored by National Instruments.

Remote Input Solutions

Team: Kartik Bhatnagar, Madhumitha Harishankar, Rashmi Loka, Shravanthi Muthuraman
Advisor: Manish Parashar

Abstract: Remote Input Solutions is an Android application designed to enable a user of an Android phone of API 2.2 or above, to control a Windows/ Mac/Unix desktop remotely by using her phone as a mouse and keyboard. With the plethora of capabilities attributed to a smart phone today, there seems to be no reason why an Android smart phone should necessarily remain isolated from a user’s other computing devices. This application was built with the motivation of providing a further functionality to an Android user, by now translating the ease of use and mobility of his phone to the ease of control of a remote desktop.
Poster Day 2013
ECE Capstone Heats Up

By Chris Rose

As most everyone knows, the ECE Capstone Design Program underwent a major revision a few years ago. To excite student and faculty creativity we removed the rigid multi-track prerequisite structure in favor of a more open “cornucopia” model wherein students use whatever skills they have acquired (or would choose to acquire in senior year coursework) to formulate and solve problems of their choosing under faculty guidance. The result has been a second straight year of extremely creative projects — many cross disciplinary — culminating what some have said was our best ECE Poster Day ever.

This year, posters were judged by ECE industrial advisors immediately after the poster session. It was profoundly satisfying to see the judges excited by the quality, scope and creativity of the projects. Some judges even expressed a strong desire for certain projects to be commercialized as soon as possible. In fact, one energetic (pun intended) group is heating up (pun also intended) in just that way (SEE INSET ON THERMOVOLT SYSTEMS). However, we at present have no formal mechanism through which Capstone Design projects can be developed and brought to market. This would be a wonderful addition, especially since one could imagine graduating seniors, in essence, generating their own jobs as opposed to being supplicants for employment.

We see ECE Capstone Design as a work in progress and there are still logistical and pedagogical improvements to be made. Enrollment over the five capstone sections needs to be evened out and we need (as faculty) to do a better job helping students formulate projects during the Fall term so they can hit the ground running in the Spring. We would also like to have even greater faculty involvement in Capstone. We are currently debating various structural improvements that fit within the ethos of the new Capstone Program and within the workload constraints of the department.

One often repeated idea is to incorporate industrial projects into the Capstone Program mix as a force multiplier and we are working on the logistics for such collaboration.

And although interdisciplinary projects have been on the rise, another of our goals is to have more eye-popping projects which span departments. One approach under careful consideration is the institution of “Grand Challenge” projects that take Capstone to another level. For instance, imagine a competition wherein autonomous sensor-laden gliders are carried into the stratosphere via balloon and then released to take various measurements before finding their way home — to, say, the Rutgers Football stadium at halftime during a game on national TV! Projects of this type would be technically challenging and also capture the imagination not only of our ECE students, but SOE students and faculty in general, not to mention the lay public who in a very real way supports our work at Rutgers. And this is the main goal of Capstone Design — to open our students’ (and faculty’s) eyes to their collective ability to create a future of our choosing.

THERMOVOLT SYSTEMS

Talk about thrilling! We won this year’s ECE Team Project award for our Thermovolt Systems project! We would like to thank all the “little people” involved, except that we ARE the little people: Todd Katz, Daniel Cox, Eric Greendyk and Jonghyun Bae in ECE. Our “big people” who supervised the project were Professors Dunbar Birnie (MSE) and Wei Jiang (ECE) and graduate student Vishnu Vijaykumar in MSE.

The work was an outgrowth of Prof. Birnie’s work on making solar cells more efficient. The basic idea is to riddle the panels (which often sit on very hot roofs) with water pipes and use the heated water in the home while at the same time cooling the solar panels to more efficient operating temperatures. Talk about killing two birds with one stone! (footnote: John Kivlin’s help at Helios Solar Works (http://www.heliossolarworks.com) was essential in bringing the project from concept to reality.)

Now, while we’re pleased that the judges liked our work, we are most importantly starving graduating seniors in need of employment. In fact, one of us who’s particularly hungry (Todd) had already founded and run a company. So, from the very beginning we had an eye on how our project could be commercialized.

So, winning the ECE competition was a first step — but an important step in terms learning to operate as a team and of getting the right exposure. During the ECE Advisor Board review, Arne Ballantine of Bloom Energy in California was quite impressed with the work of the team and immediately wondered if there would be clever ways to further increase the efficiency of the hardware by using sources of external heat. Bloom Energy is working with Thermovolt to create tests to evaluate that possibility. July is the target date for this first testing.

Thermovolt Systems is also in the process of speaking with world renowned architect Allan Shope and All Rounder Systems, a Caribbean based company specializing in solar energy.

So, what started for us as a Capstone project has blossomed into what might be a remunerative (intellectually and otherwise) career endeavor. We couldn’t be more pleased, and we suspect our professors are equally thrilled.
Towards Learning the Language of the Brain!
Laleh Najafizadeh

Research in the field of neuroscience, involving functional brain imaging techniques, has been growing rapidly over the past two decades, providing new insights into our understanding of how human brain functions, not only in healthy people, but also in patients with brain-related disorders, including those with traumatic brain injury (TBI), Autism, schizophrenia, Alzheimer’s, or different levels of psychiatric illnesses, such as depression. Advances in imaging techniques have now enabled researchers to monitor and record brain activities both directly, by measuring neuronal response, and indirectly, by measuring brain’s hemodynamic response. Examples of these imaging techniques include electroencephalography (EEG), magnetic resonance imaging (MRI), positron emission tomography (PET), and more recently, diffuse optical imaging (DOI), each offering their own advantages and limitations. Several multi-modal imaging studies have also been conducted by utilizing a combination of different brain imaging techniques, to maximize the data collection process. Yet, the full functionality of human brain still remains a mystery. Thanks to technological advances, we now know, for example, that the human brain is made of approximately 100 billion neurons, with each neuron having the capability of connecting to thousands of other neurons; we know how specific regions of our brain function; and that the connectivity patterns in certain areas of the brain are different in Autistic and healthy children. However, the “language of the brain”[1] is still foreign to us. Our brain is constantly rewiring itself, and its dynamic changes are not known to us. Furthermore, its information processing mechanisms are not yet fully understood, and it is not known how neuronal activities lead to our behavior, decision making, thoughts, and perception of the world.

At the Integrated Circuits and NeuroImaging Laboratory, one of our goals is to develop efficient signal processing techniques to better understand and interpret the brain’s dynamic function in both healthy and diseased groups. Using a high-density array EEG system, we are studying the development of brain’s dynamic functional connectivity patterns, by recording resting state and task-based brain activities and employing signal processing techniques. From the technological perspective, we are also working on developing a portable brain imaging system which would make wireless monitoring of brain activities possible. Such a system would be beneficial for functional brain imaging studies of babies, children, and low-functioning subjects. Additional information can be found at: www.ece.rutgers.edu/~laleh/.


Prof. Laleh Najafizadeh (standing up) with her research group, Maria Oprea, Philip Chan, and Mohammad Reza Zargarzadeh. Missing in the photo from her group are L. Zhu and Y. Huang.

Prof. Laleh Najafizadeh is an Assistant Professor in ECE and director of the Integrated Circuits and Neuroimaging Laboratory. Her interests include Functional Brain Imaging, Cognitive Rehabilitation, Microelectronics, and Ultra Low Power Circuits for Biomedical Applications.”
New ECE Faculty
Janne Lindqvist to Lead Human-Computer Interaction Group

Starting September 1, 2013, Dr. Janne Lindqvist will start as an assistant professor of Electrical and Computer Engineering. Janne is also a member of WINLAB. Prior to the appointment, he was an assistant research professor here at Rutgers, after doing a two-year post-doc with the Human-Computer Interaction Institute of Carnegie Mellon University’s School of Computer Science. Janne received his Doctor of Science (2009) and Master of Science (2005) degrees from Helsinki University of Technology, Finland, both in Computer Science and Engineering.

Janne’s Human-Computer Interaction (HCI) group’s outside funding so far consists of three NSF awards he received in 2012 totaling nearly $1.3 million. The group’s work is divided into three complementary themes:
1. Security & Privacy, 2. Social Computing, and 3. Automotive Computing. The overarching current thrust for these themes is “Nudging People with Computer Systems.” The motivation for this thrust is that computer systems today affect directly or indirectly billions of people. For example, using mobile phones directly integrates computer systems into people’s daily lives. The research program focuses on redesigning computer systems for detecting and nudging behavior change for important societal purposes. Example projects include undistracted driving (mitigating distracted driving with mobile phones) and bringing people together in local communities to help each other with daily and weekly errands. We will next discuss results on redesigning mobile phone platforms to make privacy-sensitive sensor access (e.g. localization) transparent to users, and how this affects their behavior.

The motivation for this line of work is that smartphone apps provide several useful ways for people to extend the capabilities of their phones. The latest numbers publicly available from popular app markets such as Google Play for Android (over 700k apps, 25 billion downloads) and Apple App Store for iPhone (over 700k, 35 billion downloads) show that people find a lot of value for the apps. Unfortunately, as popular press and research has shown, there are considerable security and privacy risks with these app markets.

The mobile phone platforms have been addressing the problem by providing 1) installation time app capability disclosures on the Android platform, and 2) first-time usage requests on the iPhone platform. There is already a body of research that the approach implemented on Android is not effective, people do not pay attention to them. The group’s work investigates a design space, which surfaces to people how often and where their location is being accessed. Towards this end, they built a system that allows deployment of their approach to devices that people already own, so that they can study people’s behavior during their daily lives for ecological validity. This is first such an approach implemented in the research community that allows also large-scale deployment of the system.

Through a randomized experiment, the group examined how people would use and react to this novel privacy disclosure mechanism on a smartphone platform. They found behavior changes, such as uninstalling apps, stopping using some apps or reducing the time using the app. They also found that people were making privacy vs. utility tradeoffs, that is, if they considered that an app is useful for them, they would not uninstall it.

Dr. Janne Lindqvist
From Informed Human Brains to Society-Scale Silicon Brains: Uncovering the DNA of Social Knowledge

By Narayan B. Mandayam

Dr. Narayan B. Mandayam, who is currently the Peter D. Cherasia Faculty Scholar and Professor of ECE at Rutgers, is part of a collaborative team of researchers from NYU-Poly and the University of Alberta working on a new project titled “From Informed Human Brains to Society-Scale Silicon Brains: Uncovering the DNA of Social Knowledge.” This project is supported by a highly prestigious grant from The National Academies Keck Futures Initiative (NAKFI) program of the National Academy of Sciences (NAS), the National Academy of Engineering (NAE), and the Institute of Medicine (IOM) with support from the W.M. Keck Foundation. Launched in 2003, NAKFI has been catalyzing interdisciplinary research at the intersection of science, engineering and medicine, and enhancing education among researchers, funding organizations, and universities. Dr. Mandayam and his collaborators focus on the digital technology-enabled transformation human society is undergoing in the past decade: not only informed human brains, but also society-scale informed silicon-based “brains” - large scale knowledge repositories created collaboratively online by people who contribute their knowledge, expertise and energy to a common pool accessible to everybody. While knowledge repositories are not “brains” in the same sense a human brain is, they do represent a novel form of a dynamically-created and easily accessible knowledge pool. Inspired by similar efforts in the life sciences, such as the Human Genome Project, this project explores the basic patterns, or “building blocks” of the process through which individual human brains co-create society-scale silicon brains, such as Wikipedia, open source software and scientific datasets. Furthermore, the project seeks to identify the relationship between sequential patterns of these building blocks and attributes of the resulting silicon brains. To illustrate this approach, take the example of the creation process of Wikipedia, “the largest collection of shared knowledge in human history” whose goal is to store and share human knowledge: Each Wikipedia article consists of a large number of edits made by numerous people with a range of interests and motivations. Each edit can be categorized as one of a relatively small number of possible wiki building blocks, such as: add new content, delete hyperlink, restructure content. Thus, each Wikipedia article can be represented as a string of collaboration building blocks resembling a “DNA” of the knowledge creation process. Dr. Mandayam seeks to use approaches from game theory, prospect theory, behavioral theory and stochastic modeling to describe the evolution and dynamics of the knowledge creation process.
NSF CAREER Award for Dr. Shantenu Jha!

Dr. Shantenu Jha received the NSF CAREER Award for his project “Abstractions and Middleware for D3 Science on NSF Distributed Cyber infrastructure”. This is a 5 year project with budget $700,000. The abstract is given below.

Dr. Jha joined the Department of Electrical and Computer Engineering in January 2011 as an Assistant Professor. His interests lie in areas of high-performance and distributed computing, computational and data-intensive science and engineering, large-scale cyberinfrastructure for science & engineering.

This CAREER Award project will develop middleware to support Distributed Dynamic Data-intensive (D3) science on Distributed Cyberinfrastructure (DCI). Existing NSF-funded CI systems, such as the Extreme Science and Engineering Discovery Environment (XSEDE) and the Open Science Grid (OSG), use distributed computing to substantially increase the computational power available to research scientists around the globe; however, such distributed systems face limitations in their ability to handle the large data-volumes being generated by today’s scientific instruments and simulations. To address this challenge, the PI will develop and deploy extensible abstractions that will facilitate the integration of high-performance computing and large-scale data sets. Building on previous work on pilot-jobs, these new abstractions will implement the analogous concept of “pilot-data” and the linking principle of “affinity.”

The result will be a unified conceptual framework for improving the matching of data and computing resources and for facilitating dynamic workflow placement and scheduling. This research has the potential to significantly advance multiple areas of science and engineering, by generating production-grade middleware for accomplishing scalable big-data science on a range of DCI systems. Increasingly, the high-performance computing resources available to scientific researchers are distributed across multiple machines in multiple locations. The integration of these resources requires a fabric of “middleware,” upon which a wide variety of user applications, tools and services can be built and run. As more accurate, and more ubiquitous scientific instruments and models produce ever-larger volumes of data, however, this distributed cyberinfrastructure (DCI) is confronting unprecedented data-handling challenges that exceed the capabilities of existing DCI middleware. In this project, the PI will develop, test and implement new middleware solutions, specifically designed for the coming era of big-data distributed supercomputing.

Prof. Narayan Mandayam Received NAKFI Grant Award

From Informed Human Brains to Society-Scale Silicon Brains: Uncovering the DNA of Social Knowledge. Dr. Narayan B. Mandayam, who is currently the Peter D. Cherasia Faculty Scholar and Professor of ECE at Rutgers, is the recipient of a prestigious NAKFI Grant Award announced by the National Academies on May 9, 2013. The National Academies Keck Futures Initiative (NAKFI) is a program of the National Academy of Sciences (NAS), the National Academy of Engineering (NAE), and the Institute of Medicine (IOM) with support from the W.M. Keck Foundation. Launched in 2003, NAKFI has been catalyzing interdisciplinary research at the intersection of science, engineering and medicine, and enhancing education among researchers, funding organizations, and universities. NAKFI’s objectives include enhancing the climate for conducting interdisciplinary research, and breaking down related institutional and systemic barriers.

Prof. Athina Petropulu received 2012 IEEE Signal Processing Society Meritorious Service Award for “exemplary service in technical leadership capacities”.

The award was presented to her at the Awards Ceremony at IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2013) in Vancouver, Canada.

Prof. Pompili’s Group Won Best Paper Award at 2012 HiPC

ECE students E. K. Lee, H. Viswanathan and Prof. Dario Pompili have won the Best Paper Award at the IEEE International Conference on High Performance Computing (HiPC), held in Pune, India in Dec. 2012. The acceptance rate of this conference is 25%. Shown in the picture are ECE students Hari Viswanathan, Chris Camasta and Eun Kyung Lee with Prof. Dario Pompili.

The paper is entitled, “VMAP: Proactive Thermal-aware Virtual Machine Allocation in HPC Cloud Datacenters.” Abstract—Clouds provide the abstraction of nearly-unlimited computing resources through the elastic use of federated resource pools (virtualized datacenters). They are being increasingly considered for HPC applications, which have traditionally targeted grids and supercomputing clusters. However, maximizing energy efficiency and utilization of cloud datacenter resources, avoiding undesired thermal hotspots (due to overheating of over-utilized computing equipment), and ensuring quality of service guarantees for HPC applications are all conflicting objectives, which require joint consideration of multiple pairwise tradeoffs.

The novel concept of heat imbalance, which captures the unevenness in heat
Continued on next page

Richard Frenkiel, (middle in photo) WINLAB senior advisor and ECE Graduate Faculty, was one of the recipients of the 2013 National Academy of Engineering (NAE) Charles Stark Draper Prize for his pioneering contributions to the world’s first cellular telephone networks, systems, and standards.

The engineering profession’s highest honor for 2013, recognizes three outstanding achievements: creation of first generation cellular telephony; advancements that enabled LASIK and PRK eye surgery; and a bold new way of educating engineering students. The awards were presented at a gala dinner event in Washington, D.C., on Feb. 19, 2013. Martin Cooper, Joel S. Engel, Richard H. Frenkiel, Thomas Haug, and Yoshihisa Okumura will received the $500,000 annual award given to engineers whose accomplishments have significantly benefited society for their pioneering contributions to the world’s first cellular telephone networks, systems, and standards.

Richard Frenkiel received the Bachelor of Science Degree in Mechanical Engineering from Tufts University and the Master of Science Degree in Engineering Mechanics from Rutgers University in 1965. He joined Bell Laboratories in 1963, and soon afterward became involved in the design of cellular systems, an involvement which was to last for sixteen years. He was an author of the technical report on cellular which AT&T submitted to the FCC in 1971, and which became the basis for the first cellular systems.

For his work in cellular and cordless, Mr. Frenkiel has received the Alexander Graham Bell Medal of the IEEE in 1987, the Achievement Award of the Industrial Research Institute in 1992, and the National Medal of Technology in 1995. He was named New Jersey Inventor of the Year in 1995, was elected to the National Academy of Engineering in 1997, and received the Engineering Achievement Award of the Rutgers Alumni Association in 2004. After the commercialization of AT&T’s first cellular system in Chicago, Mr. Frenkiel ventured into the very different world of Consumer Electronics. He became head of R&D for AT&T’s Cordless Telephone business, and led the team that designed the 5000 series of cordless telephones. These telephones set a new standard of voice quality, and incorporated other new features in terms of battery life and security, thus moving cordless telephones from the status of unreliable gadgets to that of legitimate telecommunications devices. He was also responsible for the first manufacture of those products in Singapore.

Following his retirement from AT&T in 1993, Mr. Frenkiel joined WINLAB, the Wireless Information Networks Laboratory at Rutgers, where he serves as Senior Advisor. He has also served two terms on the Township Committee of Manalapan Township, and was Mayor of Manalapan in 1999.

In 2012, Richard Frenkiel was recognized with the Rutgers School of Engineering Alumni Lifetime Achievement Medal.
A proactive thermal-aware virtual machine consolidation technique, VMAP, is proposed to maximize computing resource utilization, minimize datacenter energy consumption for computing, and improve the efficiency of heat extraction. This approach enables proactive datacenter management through prediction of future temperature trends, rather than relying on state-of-the-art reactive management based on current temperature measurements.

The effectiveness of VMAP has been verified through experimental evaluations with HPC workload traces under single and federated-datacenter scenarios (in the machine rooms at Rutgers University and University of Florida).

Prof. Wade Trappe Received the 2013 Outstanding Engineering Faculty Award

Prof. Wade Trappe received the 2013 Outstanding Engineering Faculty Award in recognition of his contributions. Per Dean Farris’ message, this award is an important opportunity for our Engineering community to recognize the special achievements and contributions of its dedicated faculty members.

The award was given to Dr. Trappe at the Engineering Award Ceremony and reception on April 5th. Dr. Trappe is a Professor of Electrical and Computer Engineering and also Associate Director of WINLAB. Prof. Trappe’s research has focused on securing wireless networks, and expanding the collection of tools that may be used to secure emerging mobile systems. The traditional approach to wireless network security has been simply to apply best practices from conventional cryptography-based security methods, as employed in wired networks. By contrast, Prof. Trappe has had his mark through a re-examination of security concepts in the context of wireless systems and their applications. Working at the boundary of theory and systems development, Prof Trappe’s research has exploited the properties of wireless channels and communications to yield novel and fundamental contributions that include:

- Authentication techniques employing forge-resistant signatures derived from a user’s wireless channel in order to combat spoofing attacks,
- Protocols using multiple staggered authentication keys to preclude denial-of-service attacks in secure wireless multicasting,
- Wireless signaling and routing protocols that provide contextual privacy for wireless sensors, and
- Techniques for diagnosing and mitigating radio-interference-based denial of service attacks.

Based on these contributions, Prof. Trappe has built up a strong national reputation as a leading authority in the field of wireless network security. He is also well recognized within the Department of Defense communities, including Army Research Office (ARO) and DARPA. Currently, Dr. Trappe and a team at WINLAB were chosen by DARPA to administer the DARPA Spectrum Challenge (http://www.darpa.mil/spectrumchallenge/). The purpose of the DARPA Spectrum Challenge is to encourage teams from around the country to design radio protocols that can best use a given communication channel in the presence of other dynamic users and interfering signals. The Spectrum Challenge will entail head-to-head competitions between a team’s radio protocol and an opponent’s in a structured testbed environment. Dr. Trappe is also recognized as an outstanding faculty mentor. He has supervised to completion 14 PhD students. Two of his former students, Wenyuan Xu and Yingying Chen, are in academia and have received NSF CAREER awards.

ECE Prof. Marco Gruteser and CS Prof. Rich Martin won NJ Inventors Hall of Fame award

ECE Prof. Marco Gruteser (pictured left) and CS Prof. and member of ECE Graduate Faculty Rich Martin (pictured right) have been awarded the NJ Inventors Hall of Fame award for their work on detecting cell phone use by driver and passengers.
P. Meer and J. Lindqvist Join 7 Other Rutgers Faculty as Most Cited Authors in Computer Science

The website Arnetminer.org published a list of 28 “first-tier” conferences series in Computer Science, and identified the top three most-cited papers in each offering of the conference since 1996 (http://arnetminer.org/conferencebestpapers). According to their data Rutgers faculty have authored 9 top-3 papers. 5 of them are the most cited papers from that conference. The list, by area of Computer Science, includes the following ECE affiliated faculty:

**Artificial Intelligence**

*Michael Littman* (ECE Graduate Faculty): #1 at the AAAI Conference on Artificial Intelligence (2005)

**Computer Vision**

*Peter Meer* (ECE Faculty) and *Dorin Comaniciu* (Rutgers ECE PhD, 1999): #1 at the IEEE Conference on Computer Vision and Pattern Recognition (2000)

**Human Computer Interaction**


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**Bridge Inspection Robot in the News**

*Prof. Kristin Dana* (shown in photo first from left) and graduate students *Parneet Kaur* and *Prateek Prasanna*, have collaborated with researchers from Rutgers CAIT (Center for Advanced Infrastructure and Transportation) to develop a computer vision platform for a bridge inspection robot. This vision platform is comprised of three components: 1) crack detection to automatically detect fine surface cracks using high-resolution cameras and machine learning; 2) pattern recognition for ground penetrating radar to determine rebar deterioration beneath the surface; 3) image stitching for a large-scale composite image from the assessment video. Additionally, a panoramic camera mounted on the robot obtains a 360-degree view of the inspection site in order to provide context imagery. This work is part of a bridge assessment project led by Prof. *Nenad Gucunski* and funded by the FHWA (Federal Highway Administration). The team demonstrated the robot system to Victor Mendez, the federal highway administrator, in November 2012. The project is a multidisciplinary effort combining researchers in various disciplines from several departments. Prof. Dana and her students collaborated with Hung La, Ronny Lim, Basily Basily, Francisco Romero, Hooman Parvardeh, Seong-Hoon Kee, Ali Maher and Nenad Gucunski.

The bridge inspection robot was featured in a recent news article that can be found at: [http://www.nbcwashington.com/news/local/One-of-a-Kind-Robot-Inspects-DC-Area-Bridges-193127901.html](http://www.nbcwashington.com/news/local/One-of-a-Kind-Robot-Inspects-DC-Area-Bridges-193127901.html)

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**Prof. Burdea Received Distinguished Career Award at Conference on Virtual Rehabilitation**

Professor Grigore (Greg) Burdea received the Distinguished Career Award at the 10th International Conference on Virtual Rehabilitation, Philadelphia, August 26-29. This is in recognition of his textbook, founding the Int. Society on Virtual Rehabilitation (www.isvr.org) and being Chair of the conference Steering Committee until August 2013. Prof. Burdea is the Director of the Tele-Rehabilitation Institute at Rutgers.
Prof. Chris Rose Received the School of Engineering Teaching Award for ECE

The School of Engineering has voted for Dr. Chris Rose to receive the 2013 Teaching Award for Electrical and Computer Engineering. This award is given out to a professor in each department who the students feel have done an excellent job in teaching this past academic year. The Award was presented to Dr. Rose at the Engineering Governing Council Leadership Conference, to be held on April 28th at the Brower Commons Faculty Dining Room on College Avenue.

Best Poster Award for Diaz-Montes, Rodero, and Parashar at ACM CAC Conference

The poster entitled Autonomic computing on federated advanced cyberinfrastructures, by Javier Diaz-Montes, Mengsong Zou, Ivan Rodero and Manish Parashar won best poster award at The ACM Cloud and Autonomic Computing Conference (CAC 2013), held in Miami FL in August 2013.

The work proposes a federation model that enables scientists to use various distributed infrastructures such as supercomputers and clouds for solving relevant scientific applications. It illustrates the effectiveness of the approach through the discussion of representative use case application scenarios such as molecular dynamics, medical image processing, or fluid dynamics.

The Darpa Spectrum Challenge

A team of ECE researchers at WINLAB, including Wade Trappe, Ivan Seskar, and Chris Rose are working with DARPA to host the Spectrum Challenge (http://www.darpa.mil/spectrumchallenge/) on the ORBIT Wireless Testbed at Rutgers University.

The purpose of the DARPA Spectrum Challenge is to encourage teams to design radio protocols that can best use a given communication channel in the presence of other dynamic users and interfering signals. The radio protocols, which will be implemented in a software radio platform, must be designed to guarantee successful communication while in the presence of other radios that may have conflicting co-existence objectives. The Spectrum Challenge entails head-to-head competitions between a team’s radio protocol and an opponent’s in a structured testbed environment. WINLAB will prepare the ORBIT wireless testbed (see photo) for hosting contests where the qualifying teams compete to demonstrate which protocols can best communicate competitively against each other or cooperatively with each other.

The initial qualification phase involved 90 participating teams from all over the world, with 15 teams qualifying directly for the Challenge Tournaments and, after a Wildcard tournament, 3 additional teams were subsequently chosen as Wildcard teams to also participate in the Challenge Tournaments. The Preliminary Challenge Event will take place on September 11-12th.
In Memoriam: Paul Panayotatos

Paul Panayotatos, an internationally respected researcher and professor of electrical and computer engineering at Rutgers University, died on Sunday, April 7, following a long illness.

During his 30 year career as a faculty member of Rutgers School of Engineering, Dr. Panayotatos was a vigorous supporter of the Electrical and Computer Engineering Department and the university working with students, leading the department through a successful ABET evaluation last year, and serving as a member of various university committees, including most recently as chair of the University Senate.

His research interests included co-integration of GaAs on Si for optical interconnects, organic semiconductor solar cells, silicon micromachining for microelectromechanical devices (MEMS) and compound semiconductor devices. As a respected faculty member at Rutgers, Dr. Panayotatos held a number of distinctive positions, including Board of Governors faculty representative and member of the search committees for both the current executive vice president for academic affairs and the university president.

“Dr. Panayotatos will be widely remembered as a gentleman, a man of principle and a tireless advocate for ECE,” said Athina Petropulu, department chair of Electrical and Computer Engineering. “He did not allow his two-year long illness to define him, but rather, despite all odds, he went about managing his departmental and university responsibilities with renewed energy and optimism. He gave us all lessons of courage. He will be sorely missed.”

Dr. Panayotatos received his undergraduate degree in physics from the University of Patras, Greece, and his master’s and doctoral degrees in electrical engineering from Columbia University. Following his graduation, he served in the Greek Navy and then briefly joined the faculty of Columbia University as assistant professor before finding a home at Rutgers in 1982.

Dr. Panayotatos is survived by his mother, Sofia, and his sister, Elisabeth. He was buried in Argostoli of the Greek island Kefalonia, where his family is from.

In memory of Professor Paul Panayotatos and to honor his exceptional service to the School of Engineering, we have established the “Paul Panayotatos Endowed Scholarship” for graduate students in Electrical and Computer Engineering. Contributions can be made online at ece.rutgers.edu/donate. Donations can be designated to the ECE Department in memory of Professor Panayotatos.
R&D 100 Award for Parashar and Collaborators

Manish Parashar, Hoang Bui, Tong Jin, Qian Sun, and Fan Zhang are part of the ADIOS team lead by Scott Klasky at ORNL that has been selected for R&D Magazine’s R&D 100 Awards. The R&D 100 award recognizes “revolutionary technologies newly introduced to the market,” spans industrial, academic and government-sponsored research. ADIOS is a collection of software services that is now being adopted by both commercial and academic users to manage big data for extreme scale computing for research in areas such as combustion, fusion and sub-surface modeling in oil and gas exploration. Rutgers’ primary contribution is “DataSpaces,” a software framework that provides essential services for managing and processing data produced by large-scale simulations, while addressing issues related to scale, performance, and energy costs. It essentially enables scientists to examine and query data while their large-scale simulations are producing it. ADIOS and DataSpaces are being used by a large number of applications. Georgia Institute of Technology and North Carolina State University also contributed to the development of ADIOS.

Faculty Promotions

Dr. Roy Yates Promoted to Distinguished Professor.

The designation of Distinguished Professor is reserved for those selected faculty in the University who have achieved scholarly eminence in their discipline and fields of inquiry. Only those faculty who have demonstrated outstanding achievement in scholarship in their discipline and fields of inquiry by earning significant recognition inside and outside the University are eligible for promotion to Distinguished Professor. Typically, such recognition is reflected in clearly demonstrable national and international reputation in one’s discipline.

Professor Roy Yates received the B.S.E. degree in 1983 from Princeton and the S.M. and Ph.D. degrees in 1986 and 1990 from MIT, all in Electrical Engineering. He joined ECE Department at Rutgers in 1990 as an Assistant Professor. He is a co-author of the text Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers, published by John Wiley and Sons. He received the 2003 IEEE Marconi Prize Paper Award in Wireless Communications, the 2006 ICC Wireless Communications Symposium best paper award, and the 2011 Rutgers University Faculty Scholar-Teacher award. He became an IEEE Fellow in 2011.

Collaborating primarily with his students, Dr. Yates pioneered the development of distributed algorithms for optimization of shared resources in wireless systems. In particular, he has made fundamental research contributions to wireless networks ranging from physical layer subjects such as transmitter waveform design, signal detection, and interference suppression to higher layer issues such as power control, system designs for efficient data delivery, and spectrum allocation.

Dr. Yates has been an active mentor to undergraduate and graduate students as the supervisor of 19 completed Ph.D. theses. Among these, four of his former PhD students (S. Ulukus at Univ. of Maryland, A. Yener at Penn State, M. Saquib at Univ. of Texas at Dallas, and C.Y. Huang at National Chiao Tung University) now hold tenured faculty positions.

Dr. Wade Trappe Promoted to Professor

Wade Trappe is a Professor in the Electrical and Computer Engineering Department at Rutgers University, and Associate Director of the Wireless Information Network Laboratory (WINLAB), where he directs WINLAB’s research in wireless security. He has served as PI or co-PI on several NSF projects involving security and privacy for sensor networks, physical layer security for wireless systems, a security framework for cognitive radios, the development of wireless testbed resources (the ORBIT testbed, www.orbit-lab.org), a clean-slate architecture for the future Internet, and new RFID technologies. Prof. Trappe led a DARPA initiative into validating and prototyping physical layer security mechanisms, an Army Research Office project on the theory of physical layer security, is currently leading an Army CERDEC project on cognitive radio networks and MIMO communications, and is part of the ORBIT team administering the DARPA Spectrum Challenge. He has developed several cross-layer security mechanisms for wireless networks, jamming detection and jamming defense mechanisms for wireless networks, and has investigated privacy-enhancing routing methods. He has published over 100 papers, including five best papers awards (two in media security, one in Internet design, one in cognitive radio systems and one in mobile computing). His papers have appeared in numerous IEEE/ACM journals and premier conferences, spanning the areas of signal processing and security. His experience in network security and wireless spans over 15 years, and he has co-authored a popular textbook in security, Introduction to Cryptography with Coding Theory, as well as several notable monographs on wireless security, including Securing Wireless Communications at the Physical Layer and Securing Emerging Wireless Systems: Lower-layer Approaches. Professor Trappe is a Senior Member of the IEEE and has served as an editor for IEEE Transactions on Information Forensics and Security (TIFS), IEEE Signal Processing Magazine (SPM), and IEEE Transactions on Information Theory (TIT).
Dr. Dario Pompili
Promoted to Associate Professor With Tenure

Dr. Pompili joined the faculty of the Dept. of Electrical and Computer Engineering (ECE) at Rutgers Univ. in 2007, where he is now an associate professor and the director of the Cyber-Physical Systems Laboratory (CPS Lab). He is also the site co-director of the NSF-funded Center for Cloud and Autonomic Computing (CAC) and, since 2012, the associate director of application collaborations of the Rutgers Discovery Informatics Institute (RDI2), which provides academic/industry researchers with the resources, skills, and expert support to leverage computation technology.

He received a Ph.D. in ECE from the Georgia Institute of Technology (GaTech) in 2007, where he worked at the Broadband Wireless Networking Laboratory (BWN-Lab) with Prof. I. F. Akyildiz. He had previously received his Laurea (integrated B.S./M.S.) and Doctorate degrees in Telecommunications and Systems Engineering from the University of Rome “La Sapienza,” Italy, in 2001 and 2004, respectively.

In 2011, Dr. Pompili received the NSF CAREER award to design efficient communication solutions for underwater multimedia applications. In 2012, he received the ONR Young Investigator Program (YIP) award to develop an uncertainty-aware autonomic mobile computing grid framework as well as the DARPA Young Faculty Award (YFA) to enable complex real-time information processing based on compute-intensive models for operational neuroscience.

New Faculty Hires

Janne Lindqvist received his M.Sc. degree in 2005, and D.Sc. degree in 2009, both in Computer Science and Engineering from Helsinki University of Technology, Finland. Between 2009 and 2011 he was a post-doc with the Human-Computer Interaction Institute at Carnegie Mellon University’s School of Computer Science. In 2011 he joined Rutgers as research assistant professor of Electrical and Computer Engineering and member of WINLAB. In 2013 he joined ECE as an Assistant professor. Janne works at the intersection of human-computer interaction, mobile computing and security engineering. His work has been featured several times in MIT Technology Review and recently also in New York Times, phys.org, Tech Republic, and other online venues. During his first year at Rutgers, Janne was awarded three NSF grants totaling nearly $1.3 million and a MobiCom best paper award.

Anand D. Sarwate received B.S. degrees in Electrical Engineering and Mathematics from MIT in 2002 and his Ph.D. in Electrical Engineering from UC Berkeley in 2008. Before joining Rutgers he was Research Assistant Professor at the Toyota Technological Institute at Chicago, a philanthropically endowed academic computer science institute located on the University of Chicago campus. From 2008-2011 he was a postdoctoral researcher at the Information Theory and Applications Center (ITA) at UC San Diego. His research is currently focused on the intersection of machine learning, distributed systems, and optimization, with a focus on privacy and statistical methods. He blogs semi-regularly at ergodicity.net.

Dr. Wei Jiang
Promoted to Associate Professor With Tenure

Wei Jiang received his B.S. degree in physics from Nanjing University, Nanjing, China, in 1996, and his M.A. degree in physics and his Ph.D. degree in electrical and computer engineering from the University of Texas, Austin, in 2000 and 2005, respectively. He is currently an associate professor in the department of electrical and computer engineering of Rutgers, the State University of New Jersey. His research interests encompass silicon photonics, photonic crystals, nanophotonics, and their applications in communications, computing, and sensing. Prior to joining the Rutgers faculty, he conducted research from 2004 to 2007 at a technology startup Omega Optics, Inc., Austin, Texas, where he was the principal investigator of a number of research projects funded by AFOSR, AFRL, NSF, and NASA. Prof. Jiang contributed to the fundamental understanding of slow light, superprism effects, and photonic crystal interface properties, and is an inventor of the slot photonic crystal waveguide. In 2007, the first high-speed photonic crystal modulator was demonstrated on silicon through his research project. Prof. Jiang is a senior member of IEEE, and a member of OSA and SPIE. He received the 2012 DARPA Young Faculty Award, the 2011 Rutgers ECE Outstanding Young Researcher Award, and the 2005 Ben Streetman Prize from UT-Austin.

Transactions on Mobile Computing (TMC). He served as the lead guest editor for September 2011 special issue of the Transactions on Information Forensics and Security on “Using the Physical Layer for Securing the Next Generation of Communication Systems,” and also served IEEE Signal Processing Society as the SPS representative to the governing board of IEEE TMC.

Dr. Wade Trappe has been a remarkably effective and efficient graduate educator and mentor. His students have followed very successful careers in industry (Qualcomm, AT&T Labs, Siemens, Lucent, Telcordia, Ask.com, Apple). Two of his former students have gone to academia and have already received NSF CAREER awards.
Dr. Jha’s project “Exploiting Sparsity for Interference Management in Broadband Communications: Theory, Applications, and Testbeds”. This is a 3-year, $1,048,411.50 grant in collaboration with UT-Dallas and Qatar University.

**Kristin Dana** received a 1–year $35,000 grant from Johnson & Johnson for the project “Skin Appearance and the Skin Microbiome”.

**Marco Gruteser** received a 4-year $456,000 NSF grant for the project “Harnessing the Automotive Infовrse”. This is a collaborative research project with Ramesh Govindan at USC including industry collaboration with Fan Bai and team members at General Motors. The total award is $917,000.

**Prof. Gruteser** also received $50,000 Grant-in-aid from Qualcomm for the project “Exploiting Smartphone-based Vehicle-Pedestrian Accident Risk Detection”. This project will explore smartphone localization and sensing technologies to detect traffic situations that are dangerous for pedestrians. He has also been awarded a contract for a 3-year $256,000 grant from DARPA for his project “High Speed Light Modulator with Flexible Inter-pixel Processing”.

**Shantenu Jha** received a 5-year $700,000 grant from NSF for his project “CAREER: Abstractions and Middleware for Distributed Dynamic Data-intensive Simulation Workflows”. This project is scheduled to start in Fall 2013. Also, Dr. Jha’s project “AIMES: Integrated Middleware Framework for Extreme Collaborative Science” was awarded $990,000 by the DOE as a 3-year project.

**Wei Jiang** received a 2-year $300,000 grant from DARPA for his project “High Speed Light Modulator with Flexible Inter-pixel Processing”.

**Narayan Mandayam** received a $25,000 grant from The National Academies Keck Futures Initiative (NAKFI) for his project “From Individual Formed Brains to a Society-Scale Informed Brain: Uncovering the Social DNA of Knowledge Creation”.

**Lawrence Rabine**r received a $45,000 grant from MathWorks to support efforts to bring advanced speech processing exercises to MATLAB Central in order to spread knowledge of signal processing and to show how it is applied in modern speech processing systems.

**Manish Parashar** was selected to receive the 2013 Open Collaborative Faculty Award for $75,000.

**Manish Parashar** received a two-year $300,000 grant from NSF for the project “Exploring Cloud Paradigm and Practices for Science and Engineering”. Professor Parashar’s collaborators on this project are Research Associate Javier Diaz Montes and Assistant Research Professor Ivan Rodero.

**Drs. Parashar and Rodero** also received a three-year $547,283 grant from NSF for the project “Scalable Data Coupling Abstraction for Data-Intensive Simulation Workflows”.

**Manish Parashar, Ivan Rodero** and **Dario Pompili** received a 3-year $300,000 grant from NSF for the project “An Experimental Platform for Investigating Energy-Performance Tradeoffs for Systems with Deep Memory Hierarchies”.

**Athina Petropulu** received a 3-year $256,000 grant from NSF for her project “Controlling Teams of Autonomous Mobile Beamformers”. This is a collaborative project with Michael Zavlanos of Duke University and the total project cost is $550,000.

**Dipankar Raychaudhuri** received a $50,000 grant from NSF for his project “I-Corps: Cloud-Based Mobile Video Encoding Service”. Also, Dr. Raychaudhuri received a one-year $545,000 grant from NSF as a supplementary funding for the FIA Mobility First project. This project is entitled: “FIA: Collaborative Research: MobilityFirst: A Robust and Trustworthy Mobility-Centric Architecture for the Future Internet”. The co-PIs are Roy D. Yates, Wade K. Trappe, Marco O. Gruteser, Richard P. Martin with Yanyong Zhang, Kiran Nagaraja and Ivan Seskar as senior personnel.

**Ivan Seskar** and Dr. Raychaudhuri received a 3-year $288,000 grant from NSF for the project “WISER Dynamic Spectrum Access Platform and Infrastructure”, in collaboration with Prof. Dirk Grunwald of U Colorado, NSF CRI (Computing Research Infrastructure). The total project cost is $670,000. The project will further develop the WINLAB/Colorado cognitive radio platform for research community use.

**Wade K. Trappe** was awarded five grants as PI: Rutgers is collaborating with ACS and CMU on the project entitled “Management of RF Network and Tasking Infrastructure (MARTI)” under the DARPA RadioMap program, Rutgers portion is $100,000; Rutgers has been awarded a project “Spectrum Challenge: Hosting Spectrum Games to Find Successful Radio Protocols” for $575,000 by DARPA to host the DARPA Spectrum Challenge; and the project entitled “Scalable Mobile Ad-Hoc Network (MANET)-based Real-Time Peer-to-Peer (P2P) Voice-Over-IP (VoIP)/Multimedia Networking” was awarded $43,000 by the US Army. Professor Trappe is also involved in two additional DARPA projects with Lockheed Martin, “RADAR Communication Spectrum Sharing System” for $70,000 and “Trust Enabled Networks with Policy” for $128,125, both of which are scheduled to start in Fall 2013.

**Jaroslaw Zola** received a three-year $59,843 grant from NSF for the project “Sculpting fluid flow using a programmed sequence of micro-pillars”.

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<td>#8,377,683</td>
<td>Zinc oxide-based nanostructure modified QCM for dynamic monitoring of cell adhesion and proliferation</td>
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<td>Jian Zhao</td>
<td>Ser. #PCT/US12/64315</td>
<td>A voltage-gated bipolar transistor for power switching applications</td>
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<td>Tam Vu, Richard Howard, Predrag Spasojevic, Marco Gruteser</td>
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<td>Goran Ivkovic, Predrag Spasojevic, Ivan Seskar</td>
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<td>Single sensor radio scene analysis for packet based radio signals using 2nd and 4th order statistics</td>
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Software Defined Radio-Based Instructional Laboratory for Wireless Communications

The heart of the Laboratory is a National Instruments (NI) LabView Software and the NI-USRP (Universal Software Radio Peripheral) Software Defined Radio (SDR) platform. The SDR platform consists of six software defined radio-based instructional stations. Each station consists of two matched NI USRP-2920 radios and a PC-based NI LabVIEW software suite. The NI USRP-2920 transceivers provide hands-on laboratory learning in RF communications. The combination of NI USRP hardware and NI LabVIEW software offers students an opportunity to experiment with a wide range of real-world signals. Each NI USRP-2920 unit houses a tunable RF transceiver covering a frequency range of 50 MHz to 2.2 GHz and allows for up to 20 MHz baseband I/Q bandwidth, streaming at up to 25 MS/s for host-based processing with NI LabVIEW.

Professor Spasojevic, in collaboration with NI, has developed a set of projects that provide hands-on learning and experimenting in the following ECE Courses:

- 16:332:559 Advanced Topics in Communications Engineering: SDR and Communication Techniques
- 14:332:428 Capstone Design - Communications Systems

The lab projects are supported by the LabVIEW Communication Design Software and National Instruments engineers, who work closely with the Graduate Student Swapnil Mhaske and Dr. Spasojevic to ensure success of the integrated hardware and software module design.

As an important project example is the Wireless Orchestra, a Senior Capstone Design Project constructed by: Eric DeJesus, Westley Propati, Miroslav Tomaska, and Songfei Zhang and advised by Swapnil Mhaske, Professor David Daut and Professor Predrag Spasojevic. This project won the Second Place in a competition with 40+ other ECE Capstone Design Projects in 2013. The goal of this project was to mechanize the learning of cyber-physical orchestra conducting. Here, computers become the musicians and a human synchronizes their actions. Its success required sophisticated LabView integration of geographically distributed hardware and software modules. The modules include a Microsoft Kinect, NI-USRPs, NI-s my-DAQ boards, and Speakers. A Kinect module interpreted music conducting commands, USRP-s transmitted Kinect generated commands to music stations, and NI-s My-DAQ boards performed distributed sound equalization at remote speakers. This project, brought together concepts from computer science, human to computer interfacing, machine learning, digital signal processing, and wireless communications. Such an advanced single-semester project would have been difficult without both hard work and the advanced environment of the Software Defined Radio-Based Instructional Laboratory.
Recent ECE Alumni were asked to comment on their student experience.

Hanna Bondarik Mosolygo, Class of 2007
Intellectual Property Attorney at Ward & Zinna, LLC
“I never dreamed of becoming an attorney. Yet, I chose to attend Rutgers and obtain an electrical and computer engineering degree precisely because of the many opportunities that would be available to me at the end of the road. I enjoyed the diversity that Rutgers had to offer — I met many individuals, including students and professors, from various backgrounds and cultures that helped me to develop good communication skills. I also enjoyed the challenging and interesting curriculum that Rutgers had to offer, and mostly the hands-on courses — including, building circuits in the Electronic Devices Lab, building Lego robots in Robotics and Computer Vision, and creating virtual worlds in Virtual Reality Lab, among others. However, the most important set of skills I walked away with were the problem solving skills, which I still utilize today. My undergraduate degree, along with the experience I obtained at Rutgers, enabled me to be a valuable candidate in the competitive job market.”

Rahul Sheth, Class of 2009
Third Year PhD Student at Stanford University, consultant for Pixar Animation Studios
“I decided to attend Rutgers because it was both close to home and able to provide me with a great education for a good value. Upon entering Rutgers, I was set on learning about computing technologies but unsure about specializing in hardware or software. The Electrical and Computer Engineering program allowed me to explore my interests in both computer hardware and software while being flexible enough to allow me to complete minors in both Mathematics and Statistics. The best part of my experience at Rutgers was the ability to both work and do research as part of the Center for Advanced Information Processing (CAIP). As a systems administrator for CAIP, I was able to gain valuable practical experience in areas not covered by classes. As a researcher, I did multiple independent studies on computer visualization- and vision-related problems, expanding my depth in those fields, and worked enough to complete an undergraduate thesis. These experiences helped me decide that I wanted to do a Ph.D. in Computer Science after graduation. I chose Computer Science over Electrical Engineering when applying to graduate programs because I discovered through the ECE program that software interested me more than hardware. I also chose to continue to a Ph.D. partly because of my time at CAIP, where I interacted with many graduate students and faculty and immersed myself in the research atmosphere.

Currently, I am a third-year Ph.D. student in the Computer Science department at Stanford University as well as a consultant for Pixar Animation Studios. I work on new methods for real-time and interactive physically-based simulations with a focus on deformable bodies. This involves both developing new algorithms and being able to implement them on today’s heterogeneous architectures, so having knowledge of both the research process and how computer systems work has been invaluable. I think that my time at Rutgers prepared me well for succeeding in my current situation by building both my skills and work/research experience.”

Cogan Noll, Class of 2010
Software Engineer at Google in Mountain View, California
“I started at Rutgers in 2006 with the intention of majoring in Computer Engineering. I didn’t really know what a Computer Engineer did at the time, but I knew I liked video games, so it seemed like good choice for a major. After attending a few classes, I took an interest in programming, and I found that it was something that I actually enjoyed doing.”
My favorite classes were the ones where I got to build real software. For my Software Engineering class junior year, my team built a social networking site that allowed university students taking similar courses to connect with each other online. And for my senior design project in Robotics and Computer Vision, we built a robotic computer monitor that could track and identify faces and position itself wherever the user was located. I also joined the Rutgers autonomous airplane club my junior and senior year, where our goal was to build an airplane that could fly autonomously, navigate a course of waypoints, and take pictures of targets along the way. We didn’t exactly succeed, but I had a lot of fun, and it was experiences like these that ultimately helped prepare me for my current job.”

After graduating Rutgers, I was seeking a position that would integrate my engineering background with something else. And that is how I stumbled upon a legal career. I started working for a patent law firm as a scientific advisor assisting attorneys with preparation and prosecution of patent applications as well as conducting scientific research and analysis in patent litigation. After a few years, I went back to school to obtain a legal degree, and presently I am a practicing patent attorney. Rutgers opens the door to endless opportunities — it just requires a little work and an open mind from you to get there.”

Aditya Devarakonda, Class of 2012
PhD Student at UC Berkeley
2012 NSF Graduate Research Fellow

“First and foremost, I would like to thank Prof. Manish Parashar and Dr. Ivan Rodero for their incredible support during my application (and subsequent admission) to UC Berkeley and, now, in winning the NSF fellowship. They’ve been amazing mentors. The ECE department and Rutgers, as a whole, also share the credit for these successes. The rigorous ECE coursework provided the fundamentals necessary to undertake challenging undergraduate research. As I progressed, both in research and in my curriculum, the department allowed greater flexibility in course requirements and enabled me to pursue courses and an undergraduate thesis program that directly benefited my research.

Since graduation my research focus has shifted from cloud federation and distributed molecular dynamics to one with a more theoretical flavor. I currently work on developing machine learning algorithms that provably avoid communication. This research builds on existing work on communication-avoiding linear algebra algorithms and extends the principles to machine learning.”

Michael Koval, Class of 2012
Won the 2012 NSF Graduate Research Fellowship, but declined it to accept the 2013 NASA Space Technology Research Fellowships

He writes: “While at Rutgers (2008-2012) I double majored in electrical and computer engineering and computer science with a strong interest in robotics and artificial intelligence. By far, the most memorable part of my time at Rutgers was my involvement with the IEEE Student Branch. I would not have developed such a strong interest in robotics if not for my leadership of RU-IEEE’s Vex Robotics Competition and Intelligent Ground Vehicle Competition teams.

Since graduating, I have started a Ph.D. program in the Robotics Institute at Carnegie Mellon University. I am a member of the Personal Robotics Lab and work on the DARPA Autonomous Robotic Manipulation (ARM) project as a member of the CMU/NREC team. My research focus is to use sensor feedback to successfully manipulate objects in cluttered and uncertain environments. In the long term, I hope this work will help bring robotic manipulators out of factories and into everyday human environments.”

Jennifer Padgett, Class of 2012
PhD Student at Cornell
2012 NSF Graduate Research Fellow

“Rutgers ECE provided me with several enriching research opportunities that prepared me for graduate school. During my junior year in ECE I was privileged to work with Professor Mammone on smart grid technology, and during my senior year to work with Professor Pompili on adaptive underwater sampling and the creation of an autonomous underwater vehicle. The combination of these experiences along with the diverse array of classes offered by ECE gave me the foundation I needed to excel in graduate studies and be a successful researcher. My current research is in the computer vision medical image analysis fields with the Vision and Image Analysis group at Cornell University. My current research is in the computer vision medical image analysis fields with the Vision and Image Analysis group at Cornell University.”

Theresa Lye, Class of 2013
PhD Student at Columbia University
Recipient of Presidential Scholarship by Columbia University

“In addition to my classes, I had the opportunity to conduct digital signal processing research under the guidance of Dr. Petropulu. For roughly two semesters and a summer, I worked on various independent study and research projects in digital signal processing. The projects spanned a number of topics, including an application of the
discrete Fourier transform as my first project, blind signal separation, speech synthesis and recognition, and beamforming. From this experience, I learned a great deal about digital signal processing and was able to get a taste of the breadth of interesting topics in the field. I was amazed by what could be achieved in signal processing, such as how mixtures of sound could be separated into their separate sounds through statistical analysis in blind signal separation. I also gained valuable experience on the research process. Along with my classes, it was a formative experience that inspired and prepared me to pursue graduate studies with a focus on signal processing, and I will be pursuing a doctoral degree at Columbia University starting the fall of 2013."

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