

DEPARTMENT OF ELECTRICAL + COMPUTER ENGINEERING



Graduate student Ninrat Datiri is Tufts' first GEM fellow from the National Consortium for Graduate Degrees for Minorities in Engineering and Science, or GEM Consortium. (Credit: Alonso Nichols/Tufts University)

AN ENGINEERING GEM

In January 2011, Ninrat Datiri joined Tufts University School of Engineering as the first GEM Fellow.

Through participation in the National Consortium for Graduate Degrees for Minorities in Engineering and Science, or GEM Consortium, Tufts grants fellowships to highly qualified students from underrepresented groups to pursue their graduate degrees. And Ninrat is nothing short of highly qualified.

Ninrat, a doctoral candidate in electrical engineering, was recruited to Tufts by Associate Professor Valencia Joyner Koomson who conducts research on the design of high-performance and low-power systems with applications in biomedical imaging and optical wireless devices. "Ninrat is an extraordinary person, both personally and professionally," said Koomson. "His motivation, his intellect, and his ability to think

creatively made him the ideal candidate for pursuing research in my lab."

In Koomson's Advanced Integrated Circuits and Systems Lab, Ninrat is getting to do what he always wanted to do—invent things.

"We definitely need more role models like Ninrat in the academy," said Koomson.

Ninrat comes to Tufts from a stint at Intel Corporation's Massachusetts Microprocessor Design Center in Hudson, Mass. There, he worked as a Graduate Design Automation and Validation Co-op Engineer

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MESSAGE FROM THE CHAIR



This is an exciting period of growth for the Electrical and Computer Engineering Department. We have increased the size of the faculty again this year by adding expertise in the areas of energy processing systems, network information theory, and distributed control. At the same time, the school is welcoming its strongest, most selective group of freshmen. Graduate applications are higher, and the faculty is supporting a record number of Ph.D. students with competitively-awarded research grants.

We are delighted to welcome Dr. Alex Stanković, the inaugural Alvin H. Howell Endowed Professor, to our faculty. Professor Stanković is a renowned leader in the fields of power systems and power electronics who strengthens the School's focus on engineering sustainability. Along with the other recent additions to the faculty in energy sustainability, Alex will help prepare Tufts engineers to solve the most challenging problems of the future.

The department also welcomes Assistant Professors Khan and Aeron. Dr. Usman Khan joins us from the University of Pennsylvania where he was performing postdoctoral research, and Dr. Shuchin Aeron comes to us from a postdoctoral stint at Schlumberger Doll Research in Cambridge, Mass.

We are proud of three new awardees of the National Science Foundation's CAREER award: Associate Professor Sonkusale, Associate Professor Koomson, and Assistant Professor Vandervelde. This prestigious award is granted to the most promising young faculty in the country each year. An important aspect of this award is to ensure the involvement of undergraduate students in cutting-edge research programs. Tufts ECE department can now boast seven faculty who have received the NSF CAREER award distinction.

After many years of dedicated service to education and scholarship, Professor Noonan has announced his retirement at the end of this year. As our current students and alums will attest, it's impossible to fill his shoes. Another pillar of the department, Professor Fermental, retired last year. Professor Fermental is still helping our students learn controls and electronics, however, as an Emeritus Professor. If you are an alum, please drop them an email with an update on how you are doing.

Tufts is a great place to study and to work. We strive to combine the best of a traditional engineering program with the learning environment of a broader liberal education. We expect our students to look for solutions to significant societal challenges and to become tomorrow's leaders.

Jeffrey Hopwood
Fall 2011

Notables...



Corey Shemelya (above), a doctoral student in Assistant Professor Tom Vandervelde's REAP lab, was named an "optics superhero" by Edmund Optics for his research on the evaluation of materials used in photovoltaic and thermophotovoltaic power generation.

Dante DeMeo won first prize in the student poster competition at the American Vacuum Society Symposium for his construction of a test apparatus that will enable future research into low-temperature thermophotovoltaics and other optoelectronic devices.

Assistant Professor **Tom Vandervelde** won the 2011 Faculty Teaching and Mentoring award from the Graduate Student Office, recognizing his outstanding support of graduate students from course completion through research and post-degree placement.

Emir Magden, E12, won a SPIE scholarship in Optics & Photonics for "prospect for long-term contribution that the granting of an award will make to the field of optics, photonics or related field."

Cam Allen, E11, interned at American Science and Engineering, on research related to processing X-ray backscatter images like those collected at airport security checkpoints. The quality of the research earned Cam a spot at a summer Gordon Conference, a highly prestigious award for an undergraduate.

An Engineering Gem *Continued from page 1*

on the Design Automation tool team resolving Computer Automated Design performance issues in Intel's next-generation microprocessors.

Ninrat had worked on similar server design projects at the Hewlett Packard (HP) in Fort Collins, Colorado and was sponsored by HP as a GEM master's student finishing his degree at North Carolina State University. "At first, I was working on the chipset side with HP and so it was great to be on the other side of the design, the processor side, of a similar type project with Intel," Ninrat said.

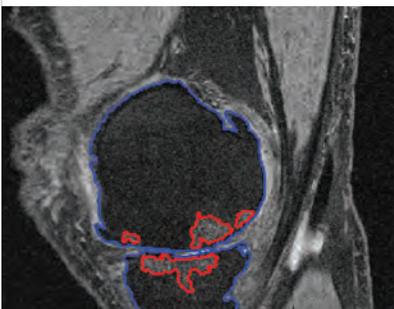
Intel subsequently sponsored Ninrat for his second GEM Fellowship, this time as a doctoral student at Tufts University School of Engineering.

Though his doctoral research project hasn't coalesced yet, history shows that it won't take Ninrat long to figure out what he wants to pursue and to excel once he's decided. "So far it's been a great experience, rewarding experience. I'm looking forward to the challenge of pursuing my Ph.D. here at Tufts," said Ninrat.

Read more about Ninrat: goo.gl/TRuDO

RESEARCH HIGHLIGHTS

Analyzing MRI Images for Signs of Osteoarthritis



Miller's image processing technology will help doctors understand the relation of bone marrow lesions, outlined in red, to osteoarthritis.

ric image segmentation methods has provided the core technology for the project. As a great example of the interdisciplinary nature of the Tufts research enterprise, Mr. Peng serves as the "glue" to the collaboration splitting his time between the ECE Department on the Medford campus and the Rheumatology Department in Boston translating the problems and solution methods from each group to the other.

Research Leave for Humboldt Fellow

Assistant Professor Tom Vandervelde was recently awarded a prestigious fellowship from the German government through the Alexander von Humboldt Foundation. Professor Vandervelde is presently on an extended junior faculty research leave, thanks to the J.S. Mellon Fellowship that Tufts awarded him last spring. As Humboldt Fellow, Vandervelde is currently at the Fraunhofer Institute for Applied Solid-State Physics (IAF) studying far infrared (FIR) optoelectronic materials with a focus on thermal-imaging-camera applications. In addition to Dr. Vandervelde's current FIR research, Fraunhofer IAF will benefit from his knowledge of multi-color infrared photodetectors, which he studied as an Intelligence Community Fellow with the Center for High Technology Materials and Sandia National Laboratories. He is also jointly working with the Fraunhofer Institute for Solar Energy Systems (ISE) to use these optoelectronic materials for development of thermophotovoltaics that convert infrared light into electricity.

QUICK HITS



The Anita Borg Institute named Professor Karen Panetta the 2011 Women of Vision Award winner in the Social Impact category. She is recognized not only for her contributions in both academia and industry but also as one of the leading U.S. experts in innovating successful low-cost methods for disseminating engineering and science to youth, parents, educators and the general public to help recruit young women to the STEM disciplines.



Tom Vandervelde, the John A. and Dorothy M. Adams Faculty Development Professor, won an NSF CAREER Award for his research on thermophotovoltaics and green energy technologies. He also received an Air Force Young Investigator Research Program (YIP) grant for his work on exploring and increasing the capabilities of photodetectors with applications for advances in biomedical diagnostics, health care, and sustainable energy.



Associate Professor Sameer Sonkusale received a NSF CAREER Award for his work in developing promising new techniques to assemble and grow nano-sized wires on silicon chips. Nanowires can be used in sensing devices to detect diseases in any bodily fluid, including urine and saliva.



Valencia Joyner Koomson, recently awarded tenure and promotion to Associate Professor, received a NSF CAREER Award for her research into time-resolved near infrared spectroscopy (NIRS). Optical methods such as NIRS are emerging as promising non-invasive imaging tools for fundamental study of biological processes and structures, and to examine human tissue to identify disease.

Research Awards

Shuchin Aeron, PI. "Algorithms for processing of LWD sonic array data" (Schlumberger-Doll Research Corp.)

Mohammed Afsar, PI. "Advanced Techniques for RF Material Characterization" (MIT Lincoln Lab)

Mohammed Afsar, PI. "Advanced Techniques for RF Material Characterization" (USAF)

Mohammed Afsar, PI. "Millimeter Wave Dielectric Measurement of Fissile Materials for Sensing at Long Distances" (DOE)

Jeffrey Hopwood, PI. "Instabilities in Nonthermal and Uniformity in Atmospheric Pressure Plasma" (DOE)

Jeffrey Hopwood, PI. "RF Microplasma for Ozone Generation" (USAF)

Valencia Joyner Koomson, PI. "3D Integrated 80Gb/s SiGe Heterojunction Bipolar Electroabsorption Modulator" (NSF)

Valencia Joyner Koomson, PI. "CAREER: Wireless Optical Sensors for High Resolution Imaging of Biological Structures" (Catalyst Foundation)

Valencia Joyner Koomson, PI. "BRIGE: Multi-Spectral, High-Frequency Imaging Sensors for Frequency-Domain Biomedical Imaging" (NSF)

Valencia Joyner Koomson, PI. "Collaborative Research: 3D Integrated Imaging Receivers for 10-Gb/s Free Space Optical MIMO" (NSF)

Eric Miller, PI. "Collaborative Research CI-P Computationally-enhanced optical imaging infrastructure" (NSF)

Eric Miller, PI. "II-EN: High-Throughput and Multi-modality Optical Imaging in Computational Biology" (NSF)

Eric Miller, PI. "ALERT (Awareness and Limitation of Explosives-Related Threats)" (DHS)

Mary Beth Ruskai "Quantum Information Theory" (NSF)

Sameer Sonkusale, PI. "Nanoelectrochemical systems on CMOS" (Catalyst Foundation)

Sameer Sonkusale, PI. "Collaborative Research IDBR Metamaterial Enhanced Spectrometer for Terahertz Hyperspectral Imaging of Biological Specimens" (NSF)

Sameer Sonkusale, PI. "CAREER: Nanoelectrochemical Systems on Silicon" (NSF)

Sameer Sonkusale, PI. "Collaborative Research: Active Metamaterial/pHEMT Hybrid Devices for Terahertz" (NSF)

Alex Stanković, PI. "Equation-Free Approach to System-Level Dynamic Modeling in Electric Energy Processing" (NSF)

Alex Stanković, PI. "Cyber-Physical Models for Estimation, Control and Fault Management in Naval Energy Systems" (ONR)

Alex Stanković, PI. "Nanostructured Metallic Layers for Enhanced Photodetector Functionality" (AFOSR)

Tom Vandervelde, PI. "CAREER: Metamaterial-Enhanced Thermal Energy Harvesters" (NSF)

Tom Vandervelde, PI. "Metamaterial anti-reflective coatings for infrared photodetectors" (AFOSR)



NEW FACES ALEKSANDAR STANKOVIĆ

Aleksandar Stanković

Alvin H. Howell Professor in Electrical Engineering

Dr. Aleksandar Stanković (Ph.D., MIT) joins the department as the first Alvin H. Howell Professor in Electrical Engineering. His research interests include analytical and experimental work involving modeling, control, and estimation in electric energy processing for power electronics, power systems, and electric drives. Stanković's work uses electronics to efficiently condition energy sources for practical uses. Among his many awards, Professor Stanković was named a Fellow of the IEEE in 2005 and was elevated to Distinguished Professor at Northeastern in 2006. He is the author of more than 200 refereed journal and conference papers, and is the holder of seven patents. April 28, 2011, Dr. Stanković presented the inaugural Howell Professorship lecture: "Interconnected Energy Grids: a future for electric energy." Watch it here: <http://youtu.be/S95cMQQV8g4>



Shuchin Aeron

Shuchin Aeron (Ph.D., Boston University) joins us as an Assistant Professor from his postdoctoral research scientist position with Schlumberger-Doll Research in Cambridge, Mass. His main research interests lie in network information theory, sensor networks, compressed sensing, and statistical signal processing.



Usman Khan

Usman Khan (Ph.D., Carnegie Mellon) also joins the faculty in ECE as an Assistant Professor from his postdoctoral research position at the University of Pennsylvania's School of Engineering and Applied Sciences, where he has conducted research on power systems modeling and estimation using sensor networks.

Congratulations to Our 2010–2011 Graduates

Undergraduate Awards

Saad Alam and **Daniel Jih** were awarded Morris and Sid Heyman Prize scholarships. Daniel was also awarded the Prize Scholarship of the Class of 1882.

Cam Allen was awarded the Amos Emerson Dolbear Scholarship.

Hisham Bedri was awarded the Ethel M. Hayes Scholarship.

Jessica Montana, Jason Nochlin and **Julia Wagner** were awarded the Harry Poole Burden Prize in Electrical Engineering.

Doctoral Recipients

Michael Trakimas: “Integrated Circuits and Systems for Sparse Signal Acquisition based on Asynchronous Sampling and Compressed Sensing”

Advisor: Sameer Sonkusale

Sungkil Hwang: “Integrated CMOS Microsystems for Electrochemical Sensing”

Advisor: Sameer Sonkusale

Yicong Zhou: “Multimedia Security System for Security and Medical Applications”

Advisor: Karen Panetta

Jun Xue: “Diagnostic of Microwave-Driven Microplasma for Particle Detection”

Advisor: Jeff Hopwood

Master of Science in Electrical and Computer Engineering

James M. Acheson

Ritika Agarwal

Stephen C. Bruno

Benson Emmanuel Stevens Christalin

Dante Frederico DeMeo

Chandler M. Downs

Ruiling Gao

Li Lu

Nicole Ng

Michael Augustus Williams

Chen Wu

Bachelor of Science in Computer Engineering

Laura Jane Costello

Ryan Martin Hofstetter

Irankir Mbuyamu Matungulu

Matthew Grooms Menning

Andrew M. Meyendorff

Jessica S. Montana

Robert Mitchell Nimocks IV

Nicholas Joseph Sullivan

Bachelor of Science in Electrical Engineering

Saad Alam

Cameron S. Allen

Kofi Aninakwa

Hisham Bedri

Han Chen

Daniel James Downing

Jonathan Edward Evans

Joshua F. Gudjohnsen

Murat E. Inonu

Daniel Jih

Andrew W.J. Kim

Kerina Natali Krommenhoek

Kevin M. Mariano

Patrick McKelvy

Bailey Preston Morgan

Michael W. Motola-Barnes

Jason Lyons Nochlin

Christian Kadari Owens

Jeremy Nathan Peterson

Vinh Quoc Pham

Kerem Sahin

Andrew Jackson Saylor

Julia Francesca Cribbs Wagner



ALUMNI UPDATES

'63 Francis Powers was elected chairman for the fiscal year 2011 of the Board of Selectmen in Boxborough, Mass. He was first elected to the board in 2007 and reelected in 2010.

'63 Philip Congdon writes: "After eight years of sleeping late each morning, Phil Congdon has flunked retirement. He was asked by Maine's new governor to join his cabinet and was recently confirmed by the full Senate as a member of the Governor's Cabinet and Commissioner of Economic and Community Development for the State of Maine."

'72 Carlos Godoy, E72, EG76, has been selected as one of the Top 200 Most Influential Hispanics in Technology by the editors of *Hispanic Engineer & Information Technology* magazine. Godoy is an electrical engineer at the Naval Undersea Warfare Center (NUWC) in Newport, RI, and also chief scientist for undersea simulation and analysis in the Torpedo Systems Department. He leads all NUWC Newport-level efforts related to modeling and simulation. Godoy has also played a major role in increasing the hiring and retention of engineers and scientists of Hispanic descent at NUWC Newport. He is a charter member in the Department of the Navy's Advisory Council on Hispanic Employment.

'90 Sharon Donald was named a 2011 "Woman to Watch" by *Mass High Tech*. Ms. Donald is the Division Leader in Embedded Navigation & Sensor Systems for Draper Laboratory Inc., in Cambridge, Mass. Donald leads a group of 75 engineers working on advanced navigation and control embedded software, robotics and communications systems for next-generation defense and intelligence programs. Donald helped to form the Women's Leadership program at Draper to provide a forum where women can network, share concerns and mentor each other. She has led diversity efforts at the firm to foster appreciation and understanding of different cultures and to help recruit and retain employees from diverse backgrounds.

'91 Andy Zidel was promoted to partner at the IP boutique of Lerner, David, Littenberg, Krumholz & Mentlik, in Westfield, NJ.

'92 Ian Jackson has been named to *Who's Who in America*.

'06 Andrew Varley founded a new social enterprise called Swellr (swellr.com), an online marketplace that empowers citizens to fund education-related projects they care about by shopping locally. The site is designed so that educators can raise money for their classrooms or projects by encouraging their communities to shop at local businesses.



Veeraraghavan receives a Tufts Presidential Award for Citizenship and Public Service

'10 Sam Veeraraghavan was named one of the New Faces of Engineering 2011 by the National Engineers Week Foundation. Working under the advisor Professor Karen Panetta, Sam developed technology-based solutions to address global humanitarian issues for children with disabilities, women and students below poverty lines in India.

4 ways to share the events of your life with your classmates

1. Join us each May for Commencement
2. Email classnotes@tufts.edu
3. Visit Tufts Online Community: www.alumniconnections.com/tufts (go to "Classnotes," then click on "Submit/Edit a Class Note")
4. Mail to **Class Notes**, Alumni Relations, Tufts University, 80 George Street, Medford, MA 02155



The class of 2011 celebrates with faculty in Alumnae Lounge. (Credit: George Preble)

INTERDISCIPLINARY LAB FOR COMPUTATION GRAND OPENING

On Nov. 3, 2011, ECE faculty and staff celebrated the grand opening of the Interdisciplinary Laboratory for Computation (ILC). The ILC is a collaborative environment for electrical and computer engineering, computer science, and civil and environmental engineering researchers working in such areas as visualization, signal processing, statistics, and machine learning.



Joe Marks, V.P. & Fellow, Disney Research, gives the keynote address.

Guests listen to Joe Marks' keynote address.



Karen Donoghue, J87, introduces Joe Marks.



Assistant Professors Shuchin Aeron and Usman Khan and Professor Eric Miller



Tom O'Dwyer, director of technology for Analog Devices' Healthcare Group and EE Advisory Board member, talks with guests.



Joe Marks, Associate Professor Soha Hassoun and Chair Carla Brodley

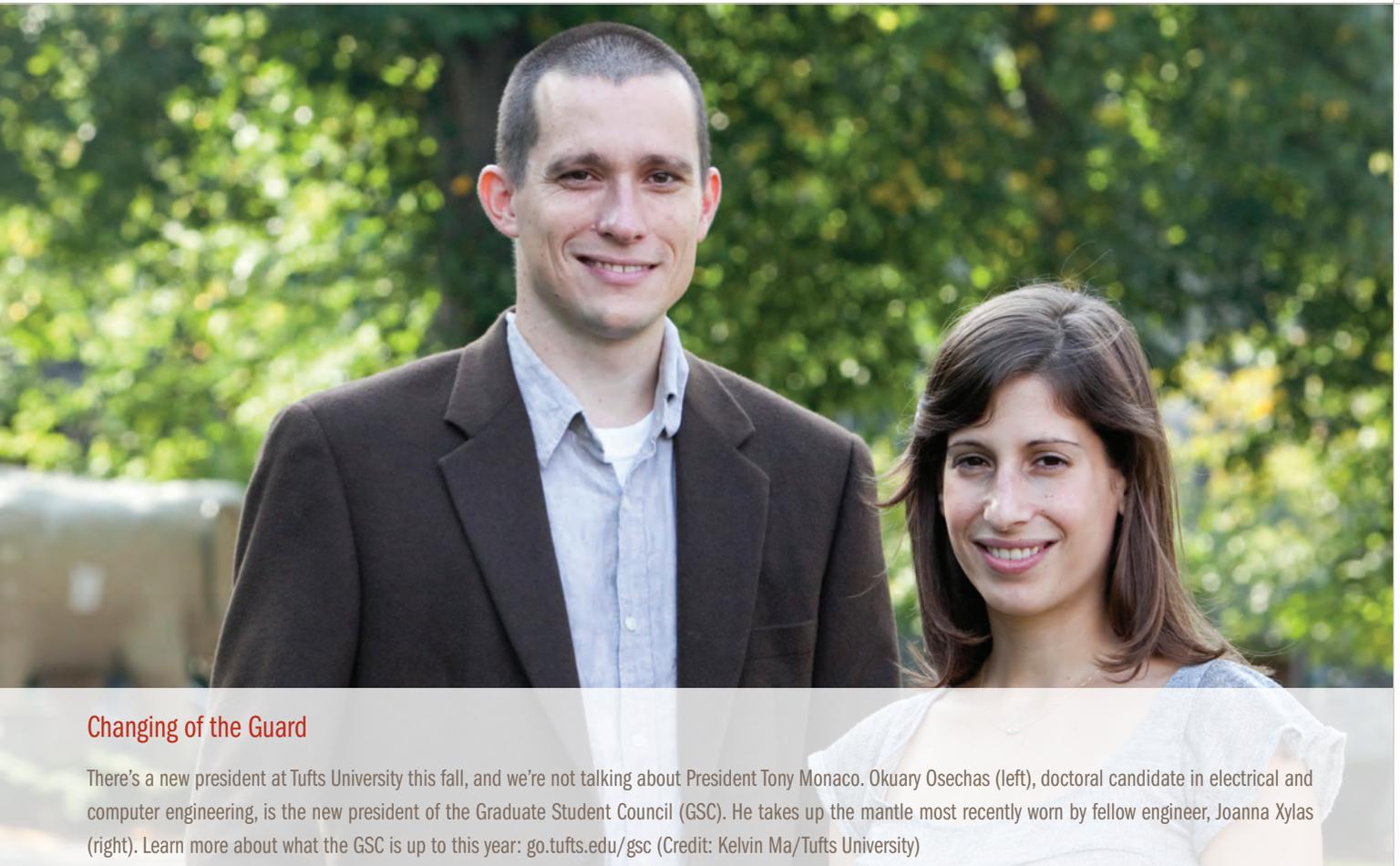


Provost and Senior Vice President *ad interim* Peggy Newell



Jeff Hopwood, Chair of Electrical and Computer Engineering, Joe Marks, V.P. & Fellow, Disney Research, Carla Brodley, Chair of Computer Science, Linda M. Abriola, Dean, Tufts School of Engineering

Department of Electrical
and Computer Engineering
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Medford, MA 02155



Changing of the Guard

There's a new president at Tufts University this fall, and we're not talking about President Tony Monaco. Okuary Osechas (left), doctoral candidate in electrical and computer engineering, is the new president of the Graduate Student Council (GSC). He takes up the mantle most recently worn by fellow engineer, Joanna Xylas (right). Learn more about what the GSC is up to this year: go.tufts.edu/gsc (Credit: Kelvin Ma/Tufts University)