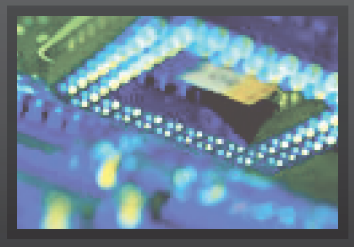
2009-2010

RUTGERS
School of Engineering



SCHOOL OF ENGINEERING NEWS

Delivery of excellent education, research, service and economic development

RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY

Letter from the Dean

The first six months at Rutgers has been exhilarating. I am honored to be appointed Dean of the Rutgers School of Engineering (SoE).

The interview process convinced me that the faculty, staff, and students of the School are ready to make great things happen. I want to take this opportunity to thank my predecessor Yogesh Jaluria for his service as interim dean. He has done much to make my transition smooth including encouraging the Department chairs to continue in their roles. Their collective advice and counsel is very important as we move forward with strategic planning.

Rutgers Engineering should grow in all dimensions of size and stature. Peer benchmarking makes a strong case for growing the size of the faculty and staff. The administration is supportive of a plan for growth that is supported by a business strategy for funding the plan based on a combination of enrollment growth, increased federal research funding, and gifts from alumni and friends. Such growth would lead to enhancing engineering teaching and research that is already outstanding.

We will also develop closer ties with New Jersey's engineering companies to increase sponsored research and student internships. I note that well over half of the School budget is supported by research grants and contracts developed by the faculty and staff.Faculty hiring will be aimed at strengthening the academic departments as well as building upon interdisciplinary research and education. The planning is informed by a culture of shared data and transparency that is developed in collaboration with the Department chairs.

Rutgers SOE News Volume 2, Issue 1 describes many of the exciting SoE activities that were in-process as I joined Rutgers. Rutgers had a record year for research awards in 2008-2009 representing an annual increase of more than 20% and SoE played a key role.

In closing, I reiterate that I am proud to join a School that has such a long and proud engineering heritage. Much of that pride is due to the accomplishments of School alumni. I very much look forward to meeting you over the weeks, months, and years ahead. It is hoped that you will answer the call when we engage you with plans to grow the school. We can't make it happen without you and we look forward to your support.

Sincerely,

Thomas N. Farris

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Dean, Rutgers School of Engineering

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RUTGERS ENGINEERING NEWS
2009 - 2010

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Instruction in Engineering began at Rutgers in 1864, when the state of New Jersey designated the Rutgers Scientific School as the "State College for the Benefit of Agriculture and Mechanic Arts." The present School of Engineering became a separate entity in 1914.

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Li Cai is an Assistant Professor in the Department of Biomedical Engineering and a member of the Cancer Institute of New Jersey. Before Dr. Cai joined Rutgers in 2005, he received postdoctoral training at the Department of Genetics, Harvard Medical School, where he worked on the functional roles of transcription factors in the developing central nervous system. He then worked as a research associate at Dana-Farber Cancer Institute in the field of bioinformatics and genomics, focusing on statistical analysis of genomic data related to retinal development and tumorigenesis.

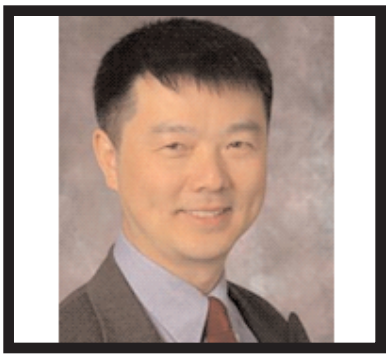
In BME department, Professor Cai teaches a senior department elective course on Tissue Engineering and has introduced a graduate level course on Stem Cell Biology and Bioengineering. He is the director of the Biomedical Engineering Honors Academy.

Professor Cai's laboratory currently investigates the regulation of gene expression in stem cells. Like a double-edged sword, stem cells have the potential to develop into many different cell types for tissue engineering and regenerative medicine, but they are also the source of at least some, perhaps all, cancers. The normal and cancerous behaviors of stem cells may be determined by their unique pattern of gene expression. Using integrative computational and experimental approaches, the Cai lab seeks to identify, verify and characterize key genetic regulatory elements in stem cells that regulate gene expression of stem cells in both normal development and tumorigenesis.

The research conducted in Dr. Cai's lab is supported by the National Institute of Health, the National Science Foundation, the New Jersey Commission on Spinal Cord Research, and the Busch Awards with more than $2 million dollars of grant funding over the last 4 years. Three major projects of the Cai lab are described below.

Project 1. Comparative genomic and molecular genetics approaches to retinal stem cells (supported by The National Eye Institute)

The long-term goal of this project is to develop therapeutic interventions for the generation of functional neurons from neural stem cells (NSC) for replacement therapies of disease and injury in the central (CNS). In order to achieve this goal, it is necessary to understand the logic underlying complex transcriptional networks that control the process of cell fate determination in NSC.



In this project, the Cai lab focuses on the transcriptional network of retinal stem cells, which are an archetypal model for stem cells elsewhere in the CNS. Two specific aims of this project are: 1) to predict evolutionarily conserved NSC enhancers using computational (in silico) methods; and 2) to verify and characterize putative NSC enhancers using molecular genetic (in vivo) methods (Fig. 1).

The findings of this study will ultimately provide a roadmap to the transcription network that controls NSC cell fate determination in the retina, and will have broader applicability to other developmental systems as well. Such a roadmap will be fundamental to the development of potential treatments of ailments ranging from retinal degeneration to spinal cord injury.

P*roject 2. Identification and characterization of genetic regulators in cancer stem cells (supported by The National Cancer Institute)*

Cancer stem cells can arise from mutations in normal stem cells directly, or from mutations in progenitor cells that lead to the regaining of stem cell property. Although normally down-regulated during mammary epithelial differentiation, CD44 is expressed in up to 85% human breast cancers and the ectopic expression of CD44 has been shown to promote metastasis.I t is possible that the deregulation of CD44 in breast stem cell is associated with tumorigenic transformation due to mutations in pathways that regulate CD44 expression. Therefore it is extremely important to dissect the molecular mechanism(s) that regulates CD44 expression in breast stem cells and controls CD44 down-regulation during stem cell differentiation.

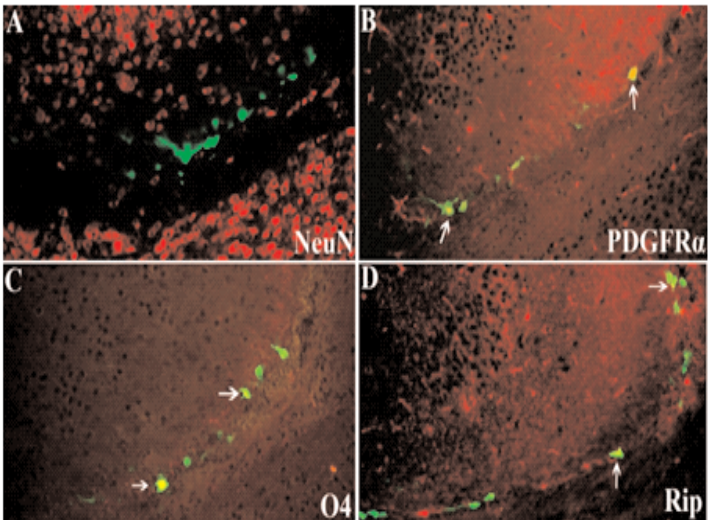


FIGURE 2

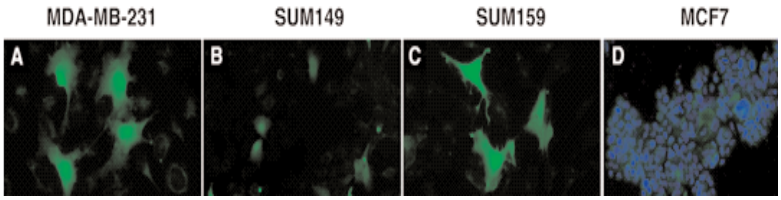


FIGURE 1

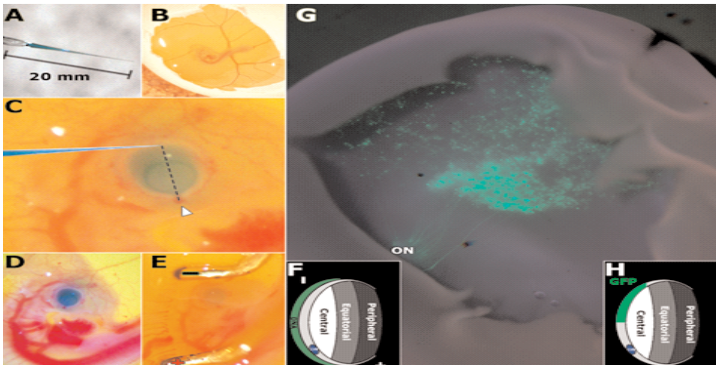


FIGURE 3

Gene expression can be controlled by genetic elements (e.g., cis-regulators, i.e., non-coding DNA sequences that control cell type-specific expression/suppression of genes), in addition to epigenetic controls such as DNA methylation. Due to the highly complex nature of the genome, finding cis-regulators, which determine cell type-specific (stem cells versus differentiated cell) gene expression, in vertebrates remains a difficult task. However, the fact that many cis-regulators are often evolutionarily conserved across species provides a basis for the identification of these cis-regulators using a comparative genomic method.

This approach greatly reduces false positives and provides an integrative way to decode the complicated transcriptional regulation of CD44 (Fig. 2). Understanding regulatory mechanisms of CD44 expression could ultimately lead to the identification of pathways that could be mutated during the tumorigenic transformation of breast stem cells or cells further down the differentiation hierarchy and thus may provide new therapeutic targets for treatment of breast cancer.

Project 3. Control of Olig2 Expression in Spinal Cord Development and Regeneration (supported by The New Jersey Commission on Spinal Cord Research)

Oligodendrocytes (OL) are myelin-forming cells in the brain and spinal cord, and are essential for neuronal function. After a spinal cord injury (SCI), previously myelinated axons can persist at the injury site, but do not become myelinated and hence remain non-functional or die. If these axons could be remyelinated, some neuronal functions that are lost under current therapeutic regimes could be restored. Therefore, the study of the formation of OL progenitors and OL is of great clinical importance for the treatment of SCI. The Olig2 gene in particular has been demonstrated to be essential for the differentiation of neural stem cells into myelinating OL.

In mutant mice, the lack of Olig2 expression leads to the complete loss of OL as well as Motor Neurons (MN). In this project, the Cai lab employs an integrative approach combining state-of-the-art computational prediction and experimental verification for the identification and characterization of OL-enhancer(s) of the Olig2 gene (Fig. 3). This research will define the role for OL-enhancers in regulating Olig2 expression during OL lineage development. A comprehensive understanding of the regulatory mechanisms governing OL formation and regeneration after demyelination will be invaluable in directing stem cell differentiation into myelinating OL for future therapeutic transplantations in SCI patients.

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An Overview of the NSF Engineering Research Center for Structured Organic Particulate Systems (C-SOPS) Chemical and Biochemical Engineering

Building the fundamental science base for the rational design, development, and manufacturing of structured organic composite particulate products for the pharmaceutical, food, and agrochemical industries

A National Science Foundation (NSF) Engineering Research Center (ERC) was established at the Rutgers University School of Engineering in 2006. According to the NSF, the purpose of the ERC Program is to 'create a culture in engineering research and education that links discovery to technological innovation through transformational fundamental and engineered systems research in order to advance technology and produce engineering graduates who will be creative U.S. innovators in a globally competitive economy.' ERCs are expected to be at the forefront of developing innovative R&D programs to stimulate increased U.S. innovation in a global context. They are unique in their research structure in that a working relationship between academic researchers, small innovative firms, and larger industrial and practitioner partners, is developed to guide and carry out research projects culminating in demonstrated industrial relevance.

The Rutgers ERC has a focus on pharmaceutical product development processes and manufacturing methods. The newsmagazine of the American Chemical Society has flatly stated that "…the pharmaceutical industry stands out as having particularly inefficient manufacturing operations." Manufacturing improvements are hampered by the lack of predictive scientific models for the structure and production of the complex, multi-component organic particulate systems, which are the basis of modern drug delivery. The vision of the ERC for Structured Organic Particulate Systems (C-SOPS) is to become the national focal point for science-based development of structured organic particle-based products and their manufacturing processes.

C-SOPS is focusing on three thrust areas that will have maximum impact in mitigating the manufacturing inefficiencies. Individual projects are developed to address scientific and engineering problems in each of those thrust areas.

Thrust 1 (Manufacturing Science) concentrates on developing the technologies needed to extend and integrate into the manufacturing arena the fundamental knowledge and rigorous models resulting from Thrusts 2 and 3.

Thus, the major objectives are: (1) the development and implementation of advanced science-based sensor technologies for effective process monitoring (composition, state, etc.) in the manufacture of engineered composite particulate products; and (2) optimization of the performance of manufacturing processes through development and implementation of advanced model-based informatics, supervisory control strategies, and real-time optimization methodologies.

The topics addressed in Thrust 2 (Composite Synthesis and Characterization) are concerned with constructing composites from individual materials. The major targets are: (1) the development of methods for controlling the spatial structure of organic particulate composites; and (2) the development of multiscale simulation methods for the determination and optimization of structure-function-performance relationships.

Thrust 3 (Particle Formation and Functionalization) focuses on two major goals: (1) the development of new methods for controlled-size particle formation which can be effectively scaled to the manufacturing level; and (2) the control and optimization of physicochemical properties of materials (size, shape, stability, affinity to materials) through systematic functionalization.

Both of these goals require the development of requisite characterization techniques for effective measurement of critical particle properties and for process monitoring.

Testbeds have been developed to validate the results, models, and predictions emanating from the individual projects. Each test bed allows integration and optimization of the separate projects into a complete manufacturing process for a different product form—tablet, drop, or strip film. The projects and testbeds are evolving as the center develops.

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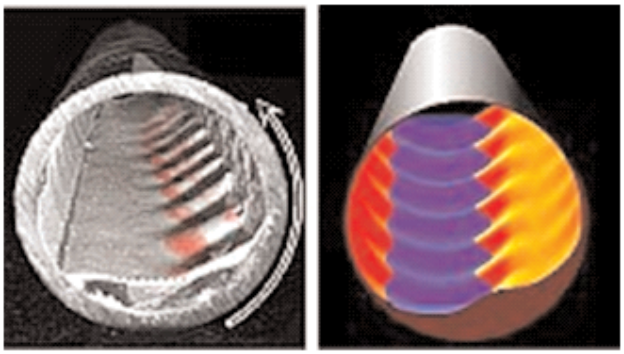
The continuous dry tableting testbed, for example, sequentially integrates the operations of powder mixing, compaction, and tablet formation. These operations are themselves complex phenomena and involve aspects of powder flow, powder cohesion, powder coating, compression, crystal strength, deformation, and fracture. The Center's overarching plan is to replace the empirical methods currently utilized in the pharmaceutical and related industries with a predictive framework for science-based product and process development for Structured Organic Composite Particulates.

As the science and technology that the C-SOPS develops is adopted into industrial practice, boundaries will be pushed beyond the scope of the models we develop. This will drive the need to expand or re-define projects to develop more highly refined models that provide accurate predictions over a wider range of conditions.

Industrial partners include end-use manufacturers such as pharmaceutical, nutraceutical, and food producers who employ similar manufacturing technologies and are held back by the same lack of predictive models.

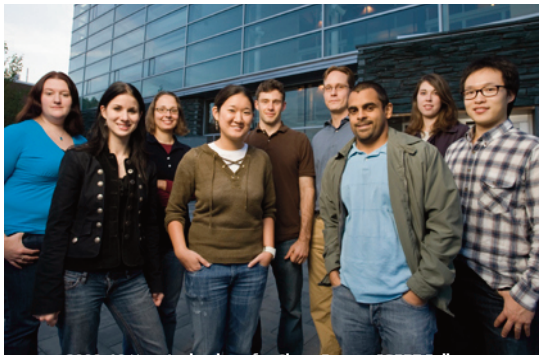
C-SOPS is a multi-university consortium consisting of Rutgers, Purdue, NJIT, and UPRM. The Center Director is based at Rutgers in the Department of Chemical and Biochemical Engineering and the Deputy Director at Purdue. Each location has a site leader who is responsible for the administration at that site. Project leaders are drawn from all four sites, and almost all project teams have at least one participant from each location.

Currently, about 40 faculty members representing 8 scientific and engineering disciplines participate in the work of the project teams.



Sedimentation pattern of fine granule suspension during slow rotation (right). A computer simulation is on the left.

The Engineering Research Center for Structure Organic Particulate Systems (C-SOPS) brings together a cross-disciplinary team of engineers and scientists, as well as industry leaders, to improve the way pharmaceuticals, foods and agricultural products are manufactured. C-SOPS will focus on advancing the scientific foundation for the optimal design of SOPS with advanced functionality while developing the methodologies for their active control and manufacturing. Joining Rutgers University in the Center are Purdue University, the New Jersey Institute of Technology and the University of Puerto Rico at Mayaguez, schools with established teaching and research programs in engineering, pharmaceutical sciences and technology.



2009-2010 Nanotechnology for Clean Energy IGERT Fellows

The Nanotechnology for Clean Energy IGERT (Integrative Graduate Education Research Traineeship) is a new interdisciplinary, multi-university graduate fellowship program. Fellows receive a PhD from one of the following departments at either Rutgers or Princeton University : Chemistry, Physics, Materials Science and Engineering, Chemical Engineering, Mechanical Engineering or Electrical Engineering. Dissertation research focuses on the scientific, technical and policy issues related to sustainable and affordable energy generation and storage technologies, emphasizing innovations in nanotechnology.

Dr. Hill, the newest member of the Civil and Environmental Engineering faculty at Rutgers, is one of a new class of researchers who are shifting their work out of the traditional laboratory to investigate natural and human dimensions of the environment as they actually exist in the outside world, using networks of remote and embedded sensors. "We are discovering that the components of large-scale environmental systems interact at multiple spatiotemporal scales."

"This results in what we call 'emergent phenomena'—outcomes that are the cumulative synergistic effect of multiple simpler processes acting together. For example, imagine a river with three tributaries, each upstream of the next. If a rainstorm hits, it may not drop enough rain to cause flooding along the tributaries; however, if the storm moves from upstream to downstream in such a way that the runoff from the first and second tributaries reaches the intersection of the third tributary with the main river at the same time the rainstorm arrives to drop more water, then a flooding event could occur on the main river. Without looking at the whole system, it would not be obvious that this storm would generate a flood. While this is a simple example, when you consider the complexity of real-world environmental systems, it is easy to see the limitations of reductionist methods for understanding and predicting environmental behaviors."

Dr. Hill joined Rutgers in August 2009, after earning degrees at Cornell University (B.S., 1999) and the University of Illinois Urbana-Champaign (M.S., 2002; Ph.D., 2007) and spending the past two years pursuing his research as a postdoctoral associate at the National Center for Supercomputing Applications (NCSA), located on the University of Illinois campus. "NCSA is a partnership between the State of Illinois and the Federal Government to develop a national infrastructure of information technology, or 'cyberinfrastructure,' to support research," says Dr. Hill.

"At NCSA I worked with a team to establish the WATERS Network, a National Science Foundation (NSF) initiative that provides opportunities to advance our scientific understanding of water as an integrated resource and to develop the national capability needed to predict water quality and quantity everywhere at all times through holistic observation of environmental systems."

During his time at NCSA, Dr. Hill developed many methods that are relevant for preparing sensor data for use in real-time models of large-scale environmental systems and for guiding the sustainable management of these systems. One of the highlights of this research was the development of methods suitable for performing quality control on real-time environmental sensor data streams.

"Ensuring that the data used for real-time modeling and decision making is an accurate representation of the real-world conditions is extremely important, and has been recognized as a key barrier to using sensor data for science by the NSF," says Dr. Hill. When deployed on a research network of meteorological sensors, Dr. Hill's methods outperformed manual quality control and had a false positive/negative rate of less than 2 percent.

Shortly before coming to Rutgers, Dr. Hill began developing methods for integrating measurements from heterogeneous sensor networks. Environmental systems (especially urban systems) are often observed by multiple agencies, such as the United States Geological Survey (USGS) and the National Weather Service (NWS), and by multiple types of sensors, such as electroresistance-based devices and radars.

However, due to challenges associated with accessing these data in real time and with fusing asynchronous data corresponding to different spatiotemporal averages, the full potential of these data for high-resolution monitoring is unrealized. Dr. Hill is investigating methods that combine these measurements to produce optimal estimates of the environmental conditions everywhere within the observed system. In addition to providing detailed spatial information regarding the environmental system, these estimates can also be used for planning additional sensor deployments or for driving real-time forecasting models. This work has already yielded an online Web portal–based system that permits users to create customized radar rainfall products derived from raw measurements from the NWS's Next Generation Weather Radar (NEXRAD) system.

At Rutgers, Dr. Hill continues to develop methods necessary to prepare environmental sensor data for real-time application. These methods are the first step in realizing his vision of using earth observation systems for real-time modeling of coupled large-scale environmental systems, and for real-time sustainable management of these systems. In addition to pursuing these research interests, Dr. Hill also teaches courses in water management and environmental informatics. While at Illinois, he participated in various community projects to encourage interest in engineering and science among children and teens, and he looks forward to joining in outreach efforts in his new community of central New Jersey.

When not in the lab or the classroom, he can usually be found hiking and camping in the great outdoors, tackling a home renovation project, working in his garden, or testing out a new recipe on his family and friends.

"I became a professor so that I could translate my awe at the natural world into projects that improve understanding and management at the human-environmental interface and so that I could inspire new generations of students to engage with the issues that will be crucial for ensuring ecological and human well-being in the future," says Dr. Hill. "I'm proud to take on that challenge at a university with such a great history of science and engineering leadership."

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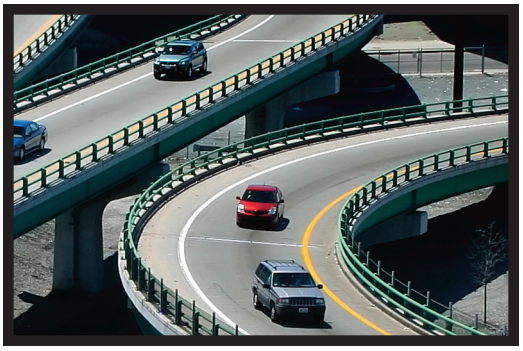
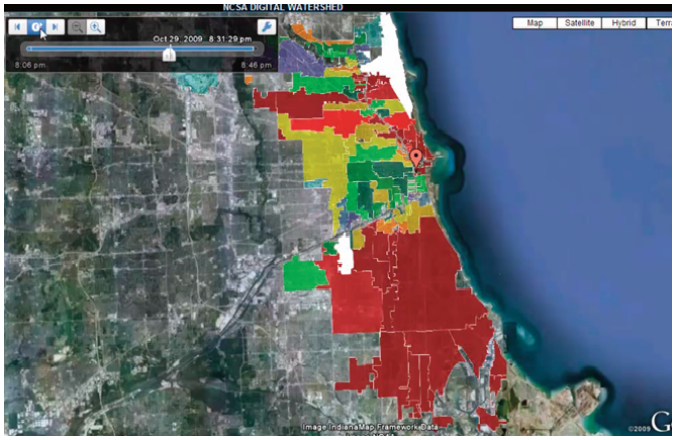


The Department of Civil Engineering has 13 full time faculty and approximately 200 undergraduate and 90 graduate students. About one-third of our graduate students are pursuing a Ph.D. degree. Many of the faculty members hold positions of responsibility in national and international engineering organizations, and serve on advisory councils and commissions on the local, state, and federal level. They are leaders in their fields in structural, construction, transportation, environmental, and geotechnical engineering.



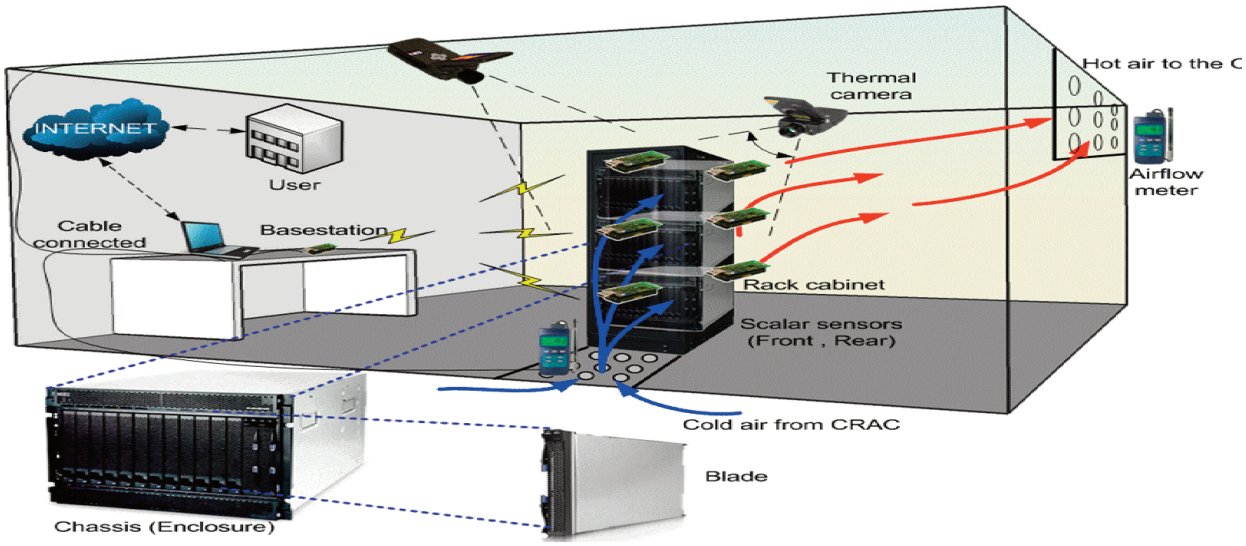
The Rutgers Center for Advanced Infrastructure and Transportation (CAIT) has been awarded U.S. Commerce Department funding toward a $17.9 million project aimed at improving bridge maintenance and safety. Funding from the Commerce Department's National Institute of Standards and Technology (NIST) will cover $8.8 million of the project. The agency made the award through its Technology Innovation Program, which provides cost-shared funding for innovative, high-risk research in technologies that address critical national needs.

The project, formally known as the Automated Nondestructive Evaluation and Rehabilitation System (ANDERS) aims developing technologies for early problem evaluation and rehabilitation of bridge decks. The ANDERS condition evaluation component will utilize multimple nondestructive evaluation technologies to identify and characterize localized deterioration. Another component will analyze how the bridge structure responds to applied impacts and shed light on the effects of localized deterioration.

ANDERS' automated structural identification system will analyze data from both components to simulate extent of bridge deck deterioration and its effect on the bridge's capacity and structural vulnerability. The ANDERS project also will develop materials and robotic equipment able to repair the internal structure of a bridge deck, from hairline crevasses to large delaminations and other flaws and deteriorations.

The project is headed by Dr. Nenad Gucunski, Professor and Chariman of CEE. CEE Professors Permualsamy Balaguru and Husam Najm are co-investigators on the project. Beside a large team from Rutgers' School of Engineering, the ANDERS project etam includes partners from Drexel University and Pennoni Associates Inc. in Philadelphia; Mala GeoScience USA, Inc. in Charleston, S.C.; and PD-LD, Inc. in Pennington, N.J.

CENTER OF AUTONOMIC COMPUTING AWARDED NSF GRANT FOR ESTABLISHING AN INSTRUMENTED DATACENTER INFRASTRUCTURE FOR RESEARCH ON CROSS-LAYER AUTONOMICS



The Center for Autonomic Computing (CAC) at Rutgers, The State University of New Jersey (RU), in collaboration with the University of Florida (UF) and the University of Arizona (UA), has been recently awarded $630,000 from the National Science Foundation (NSF) to setup an instrumented datacenter testbed spanning the three CAC sites — UF, UA, and RU. CAC, an NSF research center funded by the I/UCRC program, combines resources from universities, private companies, and the federal government to conduct fundamental research on making all kinds of computer systems and applications - from humble desktop computers to air traffic control systems - more efficient, reliable, secure, and manageable.

Datacenters are a growing component of society's IT infrastructure, including services related to health, banking, commerce, defense, education, and entertainment. Annual energy and administration costs of today's datacenters amount to billions of dollars; the high energy consumption also translates into excessive heat dissipation, which, in turn, increases cooling costs and servers' failure rates. Also, many current datacenters are not following a sustainable model in terms of energy consumption growth as the rate at which computing resources are added exceeds the available and planned power capacitiesThe proposed testbed will enable a fundamental understanding of the operations of datacenters and the autonomic control and management of their resources and services.

The design of the underlying infrastructure reflects the natural heterogeneity, dynamism, and distribution of real-world datacenters, and includes embedded instrumentation at all levels, including environment, physical resource, virtualization, middleware, and application layers. Its scale and geographical distribution enable studies of challenges faced by datacenter applications, services, middleware and architectures related to both "scale-up" (increases in the capacity of individual servers) and "scale-out" (increases in the number of servers in the system).

One of the fundamental problems that the center is studying is the uneven heat generation in datacenters, which may due to several causes such as uneven workload distribution, poorly designed airflow circulation, failures of the AC system, heterogeneity of physical resources used (to name a few).

As CPU efficiency is very sensitive to hardware temperature increase, optimizing the effectiveness of cooling system by monitoring temperature and humidity of hardware as well as airflow is a crucial task in order (i) to maximize computation performance so to meet increasing demands for computing and storage, (ii) to minimize energy consumption by scheduling jobs in real time, and (iii) to maximize cooling efficiency so to bound growing operating costs.

Rutgers University is developing efficient computing and communication solutions that will enable distributed networks of low-power sensors (e.g., temperature, humidity, airflow) to function not only as passive measurement devices but as intelligent data processing instruments capable of data quality assurance, statistical synthesis, and hypotheses testing as they stream data from the physical environment to the computational world.

Moreover, the proposed testbed will enable fundamental and far-reaching research focused on cross-layer autonomics for managing and optimizing large-scale datacenters. The participant sites will provide complementary expertise—UA at the physical resource level, UF at the virtualization layer, and RU in the area of services, applications, and distributed environment sensing. The collaboration between the university sites will bring coherence across ongoing separate research efforts and will have a transformative impact on the modeling, formulation, and solution of datacenter management problems, which have so far been considered mostly in terms of individual layers.

The testbed will also provide a critical infrastructure for education at multiple levels, including providing students with hands-on experience via course projects and enabling development of new advanced multi-university and cross-disciplinary courses as well as multi-site group projects focused on end-to-end autonomics. Students from underrepresented groups will be actively involved in the research and their participation will be increased through ongoing collaborations with minority institutions. Even broader community participation will result from an evolving partnership with the recently proposed industry cloud initiatives. Additional information about the center can be found at www.cac.rutgers.edu.

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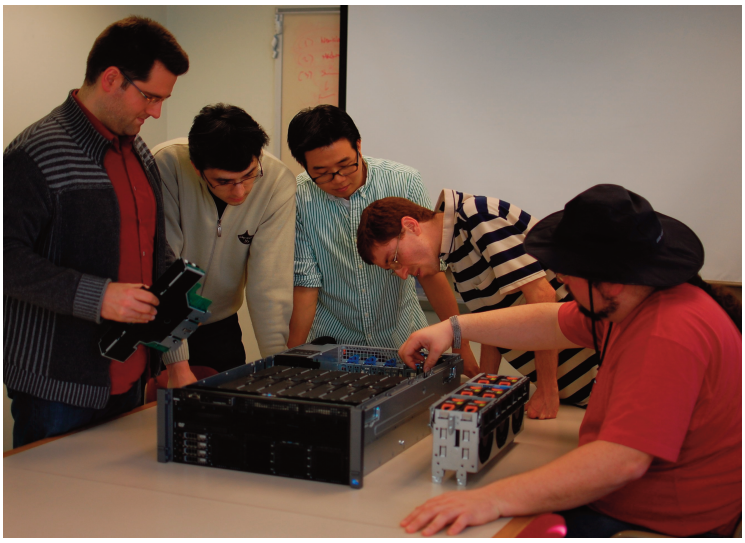
SENIOR DESIGN PROJECT



From left to right, CAC post-doc Ivan Rodero, Ph.D. students Ciprian Docan, Eun Kyung Lee and Andres Quiroz, and system administrator Jim Housell studying the architecture of a state-of-the-art multi-core multi-processor server and discussing about energy-efficient cross-layer strategies for workload characterization, job scheduling and migration, physical resource provisioning, and temperature and heat profiling

ECE NEWS

The Center for Autonomic Computing (CAC) at Rutgers University is collaborating with Microsoft to accelerate real-world parallel and distributed applications on the Windows HPC Server 2008 platform. For example, as part of this effort, students at at CAC are working with industry partners to enable the rapid parallel processing of large amounts of data, such as molecular data used by pharmaceutical companies, and have developed innovative autonomic solutions that can accelerate Hadoop by up to 250% for these applications.

Rutgers Tele-Rehabilitation Institute's groundbreaking research in collaboration with Indiana University School of Medicine on home tele-rehabilitation for adolescents with cerebral palsy have pioneered the use of the Sony Playstation 3 in hand rehabilitation using a virtual Avatar.

DECISION-MAKING OPTIMIZATION PARADIGM FOR COMPLEX SYSTEMS : FROM HEALTH CARE TO TRANSPORTATION TO GENETICS TO INFORMATION SECURITY

Assistant Professor Wanpracha Art Chaovalitwongse works on a new decision-making paradigm for complex data and engineering systems. Prof. Chaovalitwongse has dedicated his career to drive transformative technological advances and employ them at the frontiers of national challenges – including complex systems for health care. Prof. Chaovalitwongse has studied several cross-disciplinary research problems and developed novel computational approaches to frame, model and optimize complex systems based on observable massive data and knowledge of system's fundamental structures. Those approaches pave a way to developing the new decision making paradigm that can help rigorously address in a practical way the most challenging and high-impact of the 21st century's real-world problems.

Below are examples of Prof. Chaovalitwongse's current research projects.

Health care – The brain is among the most complex systems known to human. Prof. Chaovalitwongse has been studying neurophysiological signals that reflect complex interactions among hundreds of thousands of neurons with an attempt to understand what causes neural disorders such as epilepsy, how the disease onset begins at the neuronal level, and to determine practical ways to intervene or treat them. He is particularly interested in understanding the onset of epileptic seizures, identifying the areas of the brain that initiate the seizures, recognizing and detecting the neurological patterns that are associated with the onset, and predicting the next seizure onset.

Prof. Chaovalitwongse has been awarded 3 patents and 2 best paper awards for his work in employing sophisticated computational techniques based on the theories of optimization, data mining and computational statistics to develop an automated seizure warning systems. His research has the potential to greatly reduce morbidity of this disease by 1) providing a warning to the patients at risk, 2) reduce drug usage and side effects from temporally-targeted therapy, and 3) advance our understanding of individual seizure generation.Parkinson's disease (PD) is a very common neurodegenerative disorder that is currently affecting 1 million people, mostly the elderly population, in the United States. Although deep brain stimulation (DBS) surgery is an established and efficacious treatment for PD, the grand challenge of DBS surgery is to effectively and efficiently locate at the neural target and implant the stimulating lead for optimal therapeutic effect.

Prof. Chaovalitwongse has teamed up with a neurologist and neurosurgeon from University of Medicine and Dentistry or New Jersey – Robert Wood Johnson University Hospital to develop an automated functional localization and visualization of neural targets in DBS surgery for PD patients.

This will result in a surgical-aided system for creating online, automated tools for functional localization of the targeted brain areas. Such system can potentially provide quantitative neurophysiological localization while eliminating any subjective, qualitative assessments arising from human operators.

Transportation – It has been reported by World Health Organization that every day approximately 140,000 are injured and 3,000 people are killed by traffic accidents around the world. In the US, automobile collisions account for 47% of all female and 37% of all male teenager deaths. One of the major reasons of these accidents is that drivers did not correctly estimate their current adverse mental states (e.g., fatigue, distractions, emotions, unfamiliarity of environment). Distractions from in-vehicle warnings, navigation, entertainment systems as well as mobile communications (e.g., text messaging, cell phone) have a negative impact on human performance, especially in response to crises (i.e., real-time decision making) by taking appropriate actions to prevent such accidents. Understanding how drivers learn, interact, adopt and get distracted by technology is critical to moving inventions into everyday use.

Together with a colleague with the expertise in Human Factors from the State University of New York at Buffalo, Prof. Chaovalitwongse is working to design an intelligent system that monitors the driver's physiological state and performance, and enables feedback control to help them drive safely. Support by the National Science Foundation, their team is developing an integrated system to analyze complex data from neurophysiological sensor, driving characteristics, and performance to see how adverse mental states, visual attention, physiological change, cognitive workload, in-vehicle technologies affect driving performance. Their system will be based on new rigorous computational approaches to model the sources of dynamics of complex physiological systems as well as the effects of internal and external changes in the driving performance. They envision that their driving-innovative system can eventually sense the driver's physiological condition and performance and provide feedback to the driver to achieve optimal safety.

Genetics – Most wild species are extremely secretive about their lives, making it difficult to study their mating system. It is even more difficult to identify which animals or plants are siblings. Yet, this simple fact is necessary for conservation, animal management, and understanding of evolutionary mechanisms. Prof. Chaovalitwongse has teamed up with biologists and computer scientists from the University of Illinois at Chicago to pioneer the first efficient computational framework for reconstruction of sibling relationships from genetic data geared especially to wild populations. Given a genetic sample of the individuals from the same generation, their framework can identify full siblings without any information on the parents.

Their computational framework was built upon rigorous network and graph theory, representing and analyzing genetic data as interdependent multilayered networks with multiple types of interactions. Their framework can be used to solve previously intractable complex data/systems problems by integrating approaches based on mathematics, statistics, and engineering, using new framing and modeling methodologies. Supported by the National Science Foundation, they have launched a free web-based service for biologists around the world to access their sibling reconstruction suite of software, called Kinalyzer, and use it to analyze their genetic data such as microsatellites.

Information Security – Prof. Chaovalitwongse has teamed up with Professors Pham and Parashar and colleagues from computer science, business and political science to found Rutgers Center for Information Assurance. Through the center, their team led an effort to make Rutgers University designated as a National Center of Academic Excellence in Information Assurance - Education (CAEIAE) and Research (CAEIAR) for the academic years 2009-2014. The CAEIA Program is an outreach program operated by the NSA and the Department of Homeland Security (DHS) to promote higher education in Information Assurance (IA). The CAEIAE and CAEIAR applications were submitted through. The CAEIA recognition puts Rutgers ISE at the forefront of information technology and security related research and educational programs. It will help Rutgers grow ever stronger partnerships with the information technology industry, cyber security, and homeland security.

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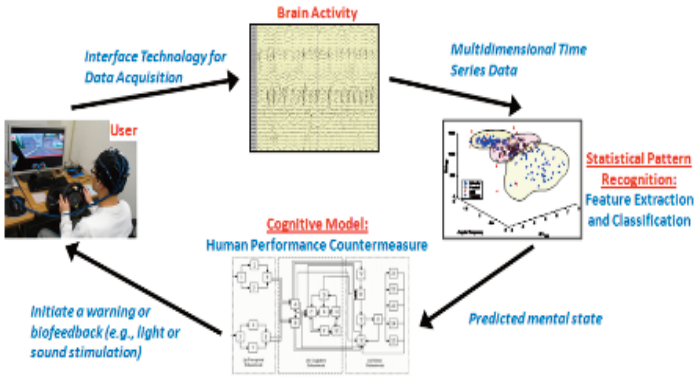
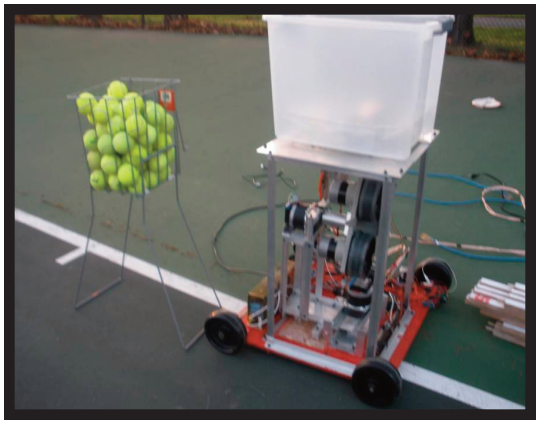


Framework of the new Driving-Innovative System that Prof. Chaovalitwongse and his group envision



"Versatile Tennis Ball Server"
Adarsh Dasika, Anthony Rosa, Jayson Kolb, and Christophe Krieger , seniors in the Industrial and Systems Engineering Department, designed and implemented a versatile tennis ball server that releases tennis balls from five different locations on the baseline. The balls are released from different sweep and elevation angles at different speeds. They have also included features such as topspin and backspin or flat.
The server generates random numbers which determine the characteristics of the released balls which are also dependent on the player's selection of the level of difficulty: easy, medium, and hard. The ball generating algorithm also considers the location of the predecessor ball in determining the location and the direction of the following ball. These specific characteristics make this tennis ball server unique and from any others in the market.

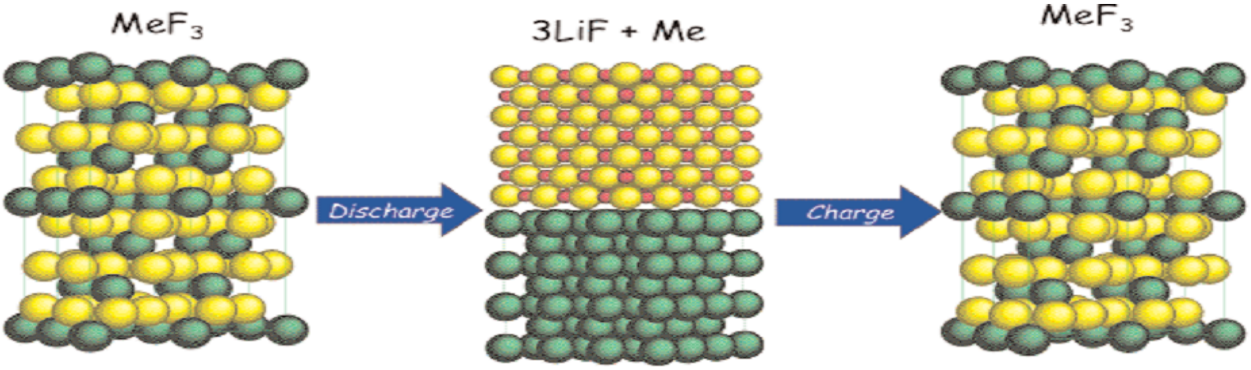
SENIOR DESIGN PROJECT

GLENN AMATUCCI LEADS MSE COMPONENT OF MAJOR NEW ENERGY STORAGE CENTER

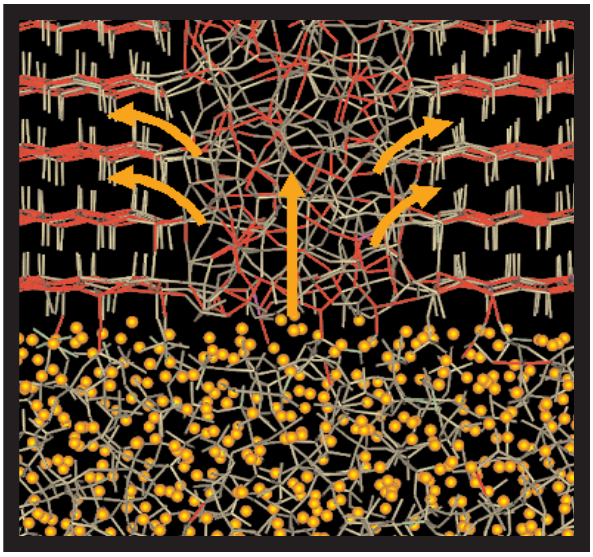
Rutgers University is a major participant and Associate Director of a new $16.5M US Department of Energy Frontier Research Center (EFRC) entitled " Northestern Chemical Energy Storage Center", which is lead by Prof Clare Grey at Stony Brook University. The EFRC includes collaboration with scientists from Stony Brook, SUNY-Binghamton, Massachusetts Institute of Technology, Lawrence Berkeley National Laboratory, University of Michigan, Argonne National Laboratory including the Advanced Photon Source, Brookhaven National Laboratory including the National Synchrotron Light Source and the Center for Functional Nanomaterials, and the University of Florida.

Batteries are well recognized as the key component to the future of electric transportation and the development of the next generation of the US electrical (smart) grid. The new center's efforts will be focused on the fundamental understanding of how electrode reactions occur within batteries and how they may be tailored by appropriate electrode design. The goal is to identify critical structural and physical properties that are vital to battery performance and utilize such knowledge in the design of new battery systems. The underlying ionic transport and crystal structure changes that occur within present and next generation battery materials are on the atomic scale and are exceptionally difficult to characterize. To address this challenge, another thrust of the center is to develop advanced in-situ diagnostic methods for chemical energy storage systems that combine multiple experimental approaches such as spectroscopy and imaging. Rutgers, in its $3.5M effort, has the highest concentration of faculty members in the center. Four Faculty Researchers are participants in this center.

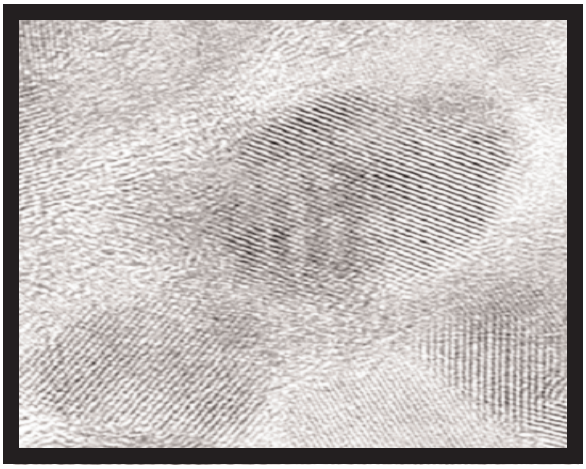
Prof. Amatucci (pictured at right) is the associate director of the overall center and leads one of the four research thrusts. The latter has its focus in the atomic level mechanics of a new type of energy storage material that stores energy through the reversible formation of metal fluoride structures on the nanoscale (one such example system is pictured in the structure model below). This technology was originally developed at Rutgers and is the basis for two recent patents. Such materials demonstrate energy storage capabilities twice as high as current state of the art materials! However, to make such materials truly viable and useful to society, the complex reaction mechanisms taking part in the structure during the charge and discharge of the materials need to elucidated. The goal of this thrust is to investigate and bring to light exactly how these materials work on the atomic level through a variety of advanced characterization techniques and use this knowledge to further refine the materials.



Prof. Steven Garofalini (MSE): Prof. Garofalini is a world recognized expert on the application of molecular dynamics and other modeling techniques to study the path which ions travel through the atomic crystal structures of materials during the charge /discharge cycles. Garofalini will be addressing such simulations for a variety of materials through a holistic approach including various other modeling techniques contributed by faculty at collaborative institutions. Understanding the pathway ions travel through modeling will help to identify boundary phases and other crystal structure issues which impede how fast various battery materials can be charged and discharged. This will lead to better material design methodologies and better batteries in the future.



Prof. Frederick Cosandey (MSE): Prof. Cosandey has a long history of high resolution electron microscopy to analyze battery materials. Within the center Cosandey will apply high resolution transmission microscopy (HRTEM) along with electron energy loss spectroscopy (EELS) to create a visual and chemical atomic-scale picture of the battery materials during the charge/discharge cycles. The image at the left illustrates his ability to "see" the lattice planes and structure of the crystalline material at the nanoscale. The spacing of these planes will allow the identification of which crystal phases are developing and most importantly, where they are developing. These results will be utilized with supporting results from other characterization techniques to paint a detailed mechanistic model of reaction for present day and next generation battery materials.



These MSE faculty will also be collaborating with Prof. Robert Bartynski of the Rutgers' Physics department. Prof. Bartynski is the Director of the Laboratory for Surface Modification (LSM). His research focuses on determining the electronic structure of surfaces, interfaces, thin films and nanostructures using a wide variety of experimental techniques. In addition to determining the chemical state of the near-surface region of the novel energy storage materials developed in the Center, Bartynski will study how their electronic structure varies as a function of composition and charge/discharge cycling. This information will help understand the mechanisms for charge transport, interfacial reactions and ageing in emerging battery materials, ultimately providing feedback for optimization of materials synthesis

The goal is to identify critical structural and physical properties that are vital to battery performance and utilize such knowledge in the design of new battery systems. The underlying ionic transport and crystal structure changes that occur within present and next generation battery materials are on the atomic scale and are exceptionally difficult to characterize. To address this challenge, another thrust of the center is to develop advanced in-situ diagnostic methods for chemical energy storage systems that combine multiple experimental approaches such as spectroscopy and imaging.

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>>MECHANICAL & AEROSPACE ENGINEER

Hao Lin, an Assistant Professor of Mechanical and Aerospace Engineering, is named a winner of the 2009 Presidential Early Career Awards in Science and Engineering (PECASE). Established in 1996 by President Clinton, this award recognizes researchers who show exceptional potential for leadership at the frontiers of knowledge and demonstrate community service through scientific leadership, education or community outreach. The award is considered the highest honor that a beginning scientist or engineer can receive in the United States. Lin was nominated by his funding agency, the National Science Foundation, from which he also holds a five-year Faculty Early Career Development (CAREER) grant.

Lin's research program has two main thrust areas which are united by a theme of electricfield mediated flow and transport at the micro-scales.

In the first thrust area, Lin is advancing the development of lab-on-a-chip systems. A lab-on-a-chip-system is a credit card sized laboratory aimed at performing a variety of tasks such as pathogen and chemical detection, protein and DNA analysis, as well as many others. Many of these on-chip assays employ electric fields to facilitate fluid and sample transport, and to realize novel functionalities. While offering unprecedented potential in efficiency, cost-reduction, and parellelization, the development of these miniaturized systems also faces significant challenges, owing to the complex and emerging flow phenomena involved. Lin's work offers both a fundamental understanding of physics, and accurate prediction tools to aid in system optimization and technological innovation.

Electrokinetic instability (EKI): A complex flow pattern in microchannels for lab-on-a-chip applications

In the second thrust area, Lin investigates how electric fields can be used to deliver molecules into the cellular compartment, a phenomenon known as electroporation. In this technique, an electric field transiently permeabilizes the cell membrane. Active agents, such as DNA, RNA, proteins, and amino acids, can then enter the cell to perform tasks such as directed stem-cell differentiation and gene therapy. Despite extensive research, however, electroporation methods still fall short of desired efficiency and reliability, in part due to a lack of fundamental understanding for the transport processes involved during delivery. Lin's approach is to construct a high-fidelity, quantitative modeling system to predict the transport of species across the membrane, the delivery efficiency, and the dynamics of other key processes involved.

In this project, Lin takes his expertise in electrokinetic transport and electrohydrodynamic flow, and applies it to a biological problem of greater relevance and potential.

This work demonstrates that the transport, a long-ignored aspect, is critical for many biological processes, and many physical principles established within the engineering context can be readily applied to these fields to generate impact. Lin works extensively with experimentalists on this interdisiciplinary project. His collaborators include Dr. Shan from the Mechanical and Aerospace Engineering Department, Dr. Shreiber and Dr. Moghe from the Biomedical Engineering Department, and Dr. Brenneman from the Genetics Department at Rutgers University.

Lin is also actively engaged in educational and outreach efforts, which he believes is an important and indispensable part of his academic activities. His most successful experience with outrearch is his participation in the TARGET program, organized by the School of Engineering and directed by Dr. Evelyn Laffey. This program aims at exposing 7th-11th grade female students to basic practice and principles of engineering. For each grade, Lin in collaboration with his colleague Dr. Shan, holds a one-day workshop in which they train the students to design, build and test a water gun wiht a pressure pumping mechanism.

Through his hands-on approach to learning, the students are able to grasp the basic principles of engineering and optimization. The exposure helps attract this under-represented group into the engineering disciplines, and helps students plan their careers at an early and critical stage of their life.

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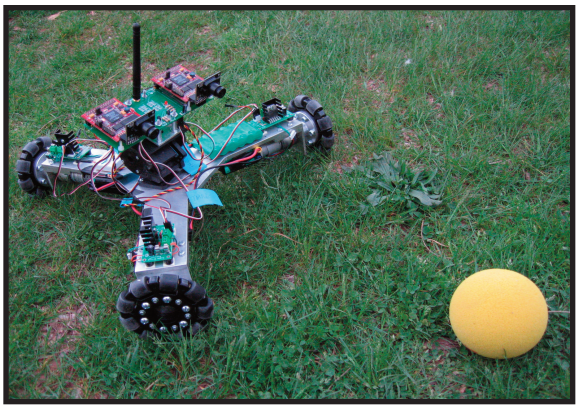
SENIOR DESIGN PROJECT



"RoboSeeker"

Autonomous robot design is a cutting edge field due to the development of processors capable of carrying out more processes at faster speeds. The ability of an artificial intelligence system to perform complex tasks without human input is of particular interest as it would free human resources or allows robots to execute tasks that are dangerous or inaccessible to humans. Systems such as the Mars Rover have been developed by NASA and used to explore space and planetary surfaces. This project is a simplified exploration into autonomous robot systems which are capable of carrying out an assigned task based on environmental stimulus. The objective of the project is to design and train a mobile robot to play fetch. The team built a mobile robot that can navigate naturally around environments. The robot tracks and follows a thrown object autonomously, and eventually retrieves it. Tracking of the object is performed by a gimbal-mount camera system. The robot is equipped with an on-board processor for high-performance image acquisition, motion control, and navigation. Various perception, tracking and interception algorithms are implemented to train the robot for viability and robustness.

MAE NEWS

Professor Yi receives NSF CAREER Award

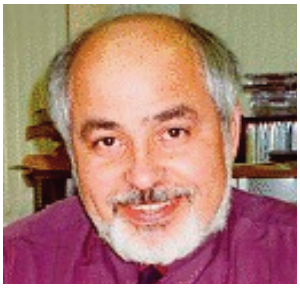
Jingang Yi, whose research interests include autonomous robotic systems, dynamic systems and control, mechatronics, automation science and engineering, with applications to civil infrastructural and transportation systems, biomedical systems and semiconductor manufacturing, received the National Science Foundation's (NSF) Faculty Early Career Development (CAREER) award entitled "CAREER: Human-Inspired Safety-Preserved Agile Vehicle Maneuvers".

The CAREER plan places a strong emphasis on education through integrated efforts in outreach activities, improving interdisciplinary training, recruiting underrepresented minority students into engineering disciplines, and international graduate training.

Professor Jingang Yi will receive $400,000 over five years to design projects in order to understand human expert driving skills and the human-vehicle-environment interaction.

In Memoriam

The Mechanical and Aerospace Engineering Department dedicated the Computer Laboratory for Analysis and Design (CoLAD) in B113 to Professor Abdel Zebib, in grateful recognition of his oustanding dedication, leadership, vision and integrity while serving as Chair of the MAE Department (1989-1999) and as Deputy Dean of the Rutgers School of Engineering (2000-2008). The dedication ceremony took place in B120 on Wednesday, November 11, 2009.



>>>GRANT FUNDING

BIOMEDICAL

- Dr. Boustany received an award from the NSF for her project entitled “Optical Fourier Processing Microscope Based on Two-Dimensional Gabor Filters”. NSF expects to fund this project for three years at $416, 507

- Professor Charless Roth has been awarded a two-year R01 grant for $687,000 from the NIH for his project “Efficient cellular Delivery of Oligonucleotides”

- Professor David Shreiber received Faculty Early Career Development Award from the NSF for $400,000

- Professor Li Cai, with Professor Haiyan Huang (UC Berkeley) received a $421, 096 two year award from the NIH for “Applied Statistics to a Secondary Analysis of Public Repositories for Microarray”

ELECTRICAL

- WINLAB researchers (D. Raychaudhuri, PI and Ivan Seskar co-PI) have been awarded a new $1.725M NSF grant entitled " Major Equipment Upgrade and Improved Operations Support for the ORBIT Open Access Wireless Networking Testbed"

- C. Rose received $740,000 from the National Science Foundation CDI-0835592, CDI Type I: A Communications Theory Approach to Morphogenesis and Architecture Maintenance, PI: C. Rose 2008-2011

CHEMICAL & BIOCHEMICAL

- Alex Neimark has received a grant award of $450,000 from the Army Research Office for the three year research project “Molecular Design and Characterization of Novel Nanoporous Adsorbents with Increased Removal Capacity”

>>> AWARDS & HONORS

BIOMEDICAL ENGINEERING

- Kerri - Ann Norton has been selected for the Hosei International Fund Foreign Scholars Fellowship. The Fellowship elects three candidates worldwide to conduct research at Hosei University in Tokyo, Japan

- Anant Madabhushi has been appointd as Associate Editor of IEEE Transactions on Biomedical Engineering.

- Troy Shinbrot has been elected to the College of Fellows of the American Institute for Medical and Biological Engineering

ELECTRICAL & COMPUTER ENGINEERING

- Manish Parashar and the Center for Autonomic Computing (CAC) are collaborating with Microsoft to accelerate real-world parallel and distributed applications on the Windows HPC Server 2008 platform

CHEMICAL& BIOCHEMICAL

- Alex Neimark has been awarded the 2009 Blaise Pascal International Chair for his work on Statistical Mechanics and Molecular Simulation of adsorption of nanporous materials

INDUSTRIAL &SYSTEMS ENGINEERING

- Tugrul Ozel was awarded 2008 Machine Tool Technologies Research Foundation Award for his research on multi-scale high speech machining of aerospace and medical grade metal alloys

- Dr. Art Chaovalitwongse and Ya-Ju won the 2008 Pierskalla award, together with their collaborator Dr. Rajesh Sachdeo from Jersey Shore University Medical Center, Princeton Medical Center

MATERIAL SCIENCE & ENGINEERING

- James A. Harrington was given the 2008 Director’s award from SPIE - The International Society for Optical Engineering

- James A. Harrington was elected Treasurer of the International Commission for Optics (ICO)

- Professor Richard E. Riman was awarded 2009 Board of Trustees Award for Excellence in Research

- Professor Ahmad Safari has been appointed as councilor of the International Center for Dielectric Research, Xi’an Jiaotong University

>>> AWARDS & HONORS

Industrial Systems & Engineering

-Qi Wen, senior ISE student, won the IIE Regional Student Technical Paper Competition. His technical paper is based on the senior design project "Automated Tennis Ball Collector"

-Outstanding Senior, Junior and Sophomore Awards
Given to students that demonstrate exceptional performance, this year the department is proud to present seniors, Omar Pena and Qi Wen, junior, Anthony Rosa, and sophomore, Kevin Tang.

-Outstanding Teaching Assistant Award
Given to a graduate student who is a teaching assistant and has demonstrated exceptional performance, this year the department is proud to present Yaping Wang

-Excellence Awards from Material Handling Society of New Jersey
Anthony Rosa, Adarsh K. Dasika, Marc S. Fridson, Alyssa J. Gentz, Jayson A. Kolb, Chris W. Krieger, Joel Lora, Ramey P. Packer, Kashyap Purohit, Haithum A. Salem, and Suni P. Sanghani

-FAA (Federal Aviation Adminstration) Design Competition
Runner-up in Runway Safety/ Runway Incursions Challenge, ISE Senior, Kelly Delpome

Biomedical Engineering

-CBE Graduate student and Nanopharmaceuticals IGERT Trainee Carolyn Waite received two awards at the 2009 Annual Retreat on Cancer Research in New Jersey; Also received Gallo Award for outstanding graduate student and New Jersey Cancer Research Award for Scientific Excellence

-Goldwater Scholarship Award
Simon Gordonov, BME Junior and ISURF/IGERT scholar was selected to receive the Goldwater Scholarship Award. Gordonov was the only BME student from New Jersey

-NJCCR Fellowship
Shannon Agner has been award for a 2 year, $50,000, pre-doctoral fellowship from the New Jersey Commission on Cancer Research for her project "Defining image-based breast cancer phenotypes on MRI"

-Wells H. Keddie Scholarship
BME student, Stephanie Loh, has been chosen as one of the recepients with an award of $750 through her project "Genetic Control mechanisms of Dbx1 gene expression"

-School of Engineering Undergraduate Research Symposium
Robert Toth, 4th year BME student awarded first place for his talk titled "Segmentation of the prostate from in vivo MRI images"

-Bevier Fellowship
Panagiota Foteinou, awarded RU Louis Bevier Fellowship for 2009-2010 for working on "Quantitative Models of Systematic Inflammation in Humans"

Electrical & Computer Engineering

-Xiaojun Tang, an ECE Graduate Research Fellow and a Ph.D. student supervised by Prof. Predrag Spasojevic at WINLAB, ECE Department, Rutgers University, received the Best Student Paper Award sponsored by Wiley Blackwell Publishing at the IEEE 70th Vehicular Technology Conference (VTC) in Anchorage, Alaska, USA, September 20, 2009

-Aliye Özge Kaya, a Rutgers ECE Ph.D. student and a member of WINLAB, Professor Mung Chiang from Princeton University and Professor Wade Trappe from Rutgers ECE and WINLAB have won a best paper award at GLOBECOM 2009, in Honolulu, HI

ALUMNI CORNER

>>DEV ITTYCHERIA

Dev Ittycheria, former President and CEO of BladeLogic, earned his BS degree from Rutgers SOE in Electrical Engineering. Recognized jointly by Ernst & Young and Microsoft as "Entrepreneur of the year", Ittycheria's strong leadership skills played a critical role in the success of the ASP Division at Breakaway Solutions, where he served as Senior Vice-President and General Manager. In just 18 months of operation, Ittycheria is accredited for taking the company public and raising Breakaway's ranking to #2 ASP. Under his leadership and strong vision, BladeLogic has grown faster than any of it's competitors . His four ingredients for success include a core team, intellectual property and technology/product, successful sales, and venture capital. Ittycheria's success comes from his motto "Failure is not an option! You must believe in yourself and your idea." He is truly "living to work rather than working to live."

>>RAHUL SHUKLA

Rahul Shukla, received his MS in Industrial Engineering from Rutgers SOE and worked diligently to become President and CEO of S.S. White Technologies Inc. Starting off as a Quality Inspector in 1973, Shukla took a full-time summer job offer at S.S White, formerly a subsidary of Pennwalt Corporation. S.S White became the only company in the world with a sophisticated software system, Perflexion, a computer program developed by Shukla based on Dr. Adam Black III's formulas that designed flexible shaft with scientific precision. Rahul Shukla along with Dr. Black are considered to be the world's forerunners on flexible shaft design. After the parent company of S.S White Technologies Inc. put the company up for sale, Shukla bought the company to become it's President and CEO. Following his interest in motivation speaking, Shukla published his speech "Success Is A Journey and Not A Destination" in 1995.

>>PETER CHERASIA

Peter Cherasia, a Rutgers SOE alumni with a BS degree in Electrical Engineering, established an endowed fund to provide financial assistance to the School of Engineering. This fund is geared towards a faculty scholar award to recognize and foster excellence in teaching and scholarly activity in highly quantitative and computational aspects in engineering research. Cherasia, formerly the CIO and Director of E-Commerce for Bear Sterns, furthered the company's trading position by initiating Project Enhance, extending Prime Broker Globalization Project, and continuing the development of Equity Analytics and Systematic Trading (EAST). Cherasia is now Head of Global Technology and Operations for JPMorgan.

Medal of Excellence 2010

WILSON CHIU
MAE 1999
Distinguished Young Alumnus

DEV ITTYCHERIA
ECE 1989
Alumnus of the Year

HUGH MARTIN
ECE 1978
Alumni Lifetime
Achievement Award

JOHN TARBELL
CBE 1969
Alumni Achievement
in Academia

"Engineers use science to benefit humankind by making life more enjoyable, by helping us live lo
remember those who helped us reach our goals by giving back, whether
-Andrew S. P

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- ☐ I would like to make a gift to Rutgers of $_____.
- ☐ I prefer to make a special pledge of $_____, payable over _____ years, beginning _____.
- ☐ I am enclosing my first installment.
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- ☐ I authorize the Rutgers University Foundation to collect my gift of $_____ through my (circle one):

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- ☐ Please send me information on gift planning options
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Designation(s)

I would like my gift to support the following:

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- ☐ School of Engineering Scholarship Fund
- ☐ Department of _____
- ☐ School of Engineering Initiatives Scholarship/Fellowship Fund

Name:_____
Home Address 1:_____
Home Address 2:_____
City, State, Zip:_____
Home Telephone:_____
Home Email:_____
Employer:_____
Job Title:_____
Business Address 1:_____
Business Address 2:_____
City, State, Zip:_____
Business Telephone:_____
Business Email:_____

Gift Club Levels	Gift Amount
Society of 1766	$1,000.00
Founders Club	$2,500.00
President's Associates	$5,000.00
President's Council	$10,000.00
Governor's Council	$25,000.00

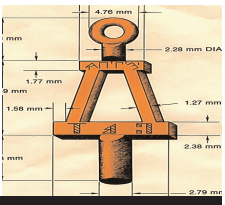
Office of Development, School of Engineering, 98 Brett Road - B-214, Piscataway, New Jersey 08854-8058
732-445-4288; http://soe3.rutgers.edu/giving

Send to: Enrica Gioe Chretien
Director of Development
School of Engineering
98 Brett Road, B-214
Piscataway, NJ 08854-8058

IRA Charitable Gift Rollover

Rumor has it that the IRA Charitable Gift Rollover legislation may be extended for 2010. You may want to watch for the decision on this and, if you meet the age requirements – 70 ½ and older – this could be a very good way to use the minimum required distribution as a gift to SoE via transfer of funds directly from the IRA to SoE. This offers a mean of making a transfer without having to count it as personal federal taxable income. (State rules differ.) We promise to keep an eye on this. If you have any questions or would like more information, please contact me, Enrica Chretien, at 732-445-4288 (office); 732-904-4304 (CELL); or via email at chretien@soemail.rutgers.edu.

nger, more productive lives. As alumni of of the Rutgers School of Engineering , it is important t
r to one's alma mater or to one's community, to the best of your ability"
Patti, ENG '61-



TAU BETA PI

Originally founded in 1885 at Lehigh University, Tau Beta Pi started off as a trial run for the engineering community.Currently, with a commendable total of 234 active chapters, Tau Beta Pi has spread it's creed of "Integrity and Excellence in Engineering" across the nation by offering members many valuable experiences, including networking opportunities and leadership development.The engineering community at Rutgers eagerly anticipated the Tau Beta Pi National Convention which took place from October 15 to October 17 at the Hilton Hotel in East Brusnwick, NJ.

The New Jersey Beta Chapter brought the annual convention to New Jersey for the first time in history and the new members of the Beta Chapter had their intiation ceremony at the Hilton Hotel and were recognized by many well-renowned Tau Bates across the nation. The conference concluded with the Awards Banquet where President Sindhura Lanka, Convention Arrangements Chair, Mandy Szeto and the rest of the team were acknowledged by the Chair of the Committee on Resolutions, K.T Kneiser.

EXECUTIVE BOARD '09

President : Sindhura Lanka
Vice-President: Kevin Kobilinski
Treasurer: Kevin Ngan
Secretary: Sean Carbonaro
EGC Rep: Yuriy Shames
Social Chair: Chris Doe
Community Service: Shubhagata Deb Roy
Web Chair: Isley Serrano
Convention Chair: Mandy Szeto
Convention Vice-Chair: Karan Arora

EXECUTIVE BOARD '10

President: Harold Dieter
Vice-President: Abhishek Golugula
Treasurer: Eric Wasserman
Secretary: Daniel Hengst
EGC Rep: Kenneth Wasserman
Social Chair: Jennifer Ju
Community Service: Nerisa Holder
Web Chair: Rachel Beckett

"Joining Tau Beta Pi has really been an unforgettable experience. Hosting the national convention for the first time in New Jersey and at Rutgers University has given our executive board more than just a leadership experience. I have formed memorable relationships and great friends not just locally but nationally."
- President, Sindhura Lanka, Tau Beta Pi New Jersey Beta Chapter

"The benefits of being a Tau Bate are absolutely indescribable. In order to be eligible for membership, you must first fall within the top eighth of your class if you are a junior or the top fifth of your class as a senior."
-Convention Arrangements Chair, Mandy Szeto, Tau Beta Pi New Jersey Beta Chapter

STUDENT NEWS

ENGINEERS WITHOUT BORDERS

Engineers without Borders at Rutgers University successfully implements sustainable engineering projects abroad

When asked of his experiences working with Rutgers University's Chapter of "Engineers without Borders," James Hughes, current president and former events coordinator, described them to be "life-changing". Hughes states, "this isn't about me" when describing the work performed by EWB overseas. From experiencing life abroad for those select few that demonstrate the caliber and drive to carry out intense projects to partaking in group discussions and workshops, this organization truly promotes internal growth as well as giving students the opportunity to gain awareness of problems that affect the lives of many in other countries.

The Rutgers University Student Chapter (EWB-RU), was founded by two university students, Dorothy Morallos and kevin Tevis, 2005 under the supervision of Dean Donald Brown. Students of EWB-RU have many opportunities to engage in international projects, local projects, as well as research projects

The main goal of the current project in Thailand is to provide a clean supply of water to the commnity by fixing the existing water system and encourage the community as a whole to use the cleaner of two available water sources. By doing so, the students of EWB-RU can analyze the local soil nutrient gradient in order to figure out how to implement private wells in an area that has no government evaluation and regular water testing. The community of Nong Bua can be improved with the introduction of a water purification system and better awareness of public health risks that come with deficiences in water quality.

EWB-RU is also working on a project in the town of Nueva Santa Catarina Ixtahuacán (NSCI) in the western highlands of Guatemala whose population suffers from difficult living conditions that are brought on by a lack of water. The project goal is to redesign and repair the existing water supply and retaining as much of the existing infrastructure as possible. Unfortunately, the local government in NSCI has failed to repair the water system over the past six years, leaving unworkable systems of tanks, pipes and pumps that cannot be utilised by the native population.

EWB-RU provides opportunities in educating students about the importance of sustainability, both overseas and at home. Students have the opportunity to engage in local projects, service learning and research projects.

RUTGERS
School of Engineering

Office of the Dean
Rutgers, The State University of New Jersey
98 Brett Road, Room B203
Piscataway, NJ 08854-8058

RUTGERS ENGINEERING *at a glance...*

SOE UNDERGRADUATE ENROLLMENT (FALL 2009)

BIOENVIRONMENTAL	24
BIOMEDICAL	299
CHEMICAL & BIOCHEMICAL	218
CIVIL & ENVIRONMENTAL	301
ELECTRICAL & COMPUTER	429
INDUSTRIAL& SYSTEMS	114
MATERIALS SCIENCE	66
MECHANICAL & AEROSPACE	529
APPLIED SCIENCES	59
FIRST YEAR	670
TRANSFER	72
TOTAL	2780

SOE GRADUATE ENROLLMENT (FALL 2009)

BIOMEDICAL	102
CHEMICAL & BIOCHEMICAL	72
CIVIL & ENVIRONMENTAL	116
ELECTRICAL & COMPUTER	249
INDUSTRIAL & SYSTEMS	79
MATERIALS SCIENCE	62
MECHANICAL & AEROSPACE	100
TOTAL	780

Rutgers Engineering Calender

Apr 24 - Rutgers Day 2010
Apr 24 - School of Engineering Open House
May 15 - Reunion weekend
May 17 - Medal of Excellence Award
May 17 - School of Engineering Graduation

Annual Events
February - Engineers Week
March - Outstanding Scholars
September - Freshman Convocation
October - Scholarship Reception

Walking Tour Schedule

Fridays @ 1:30 pm
Engineering Building, Room B100
No reservations required
(732)-445-2212 for more information

Below are the dates that we will be conducting walking tours

Sept 10
Sept 17
Sept 24
Oct 1
Oct 8
Oct 15
Oct 22