CSL: COORDINATED SCIENCE LAB
1308 West Main St. Urbana, IL 61801
Phone: 217-333-2511
Website: csl.illinois.edu

Coordinated Science Lab

2014 ANNUAL REPORT

CSL: COORDINATED SCIENCE LAB

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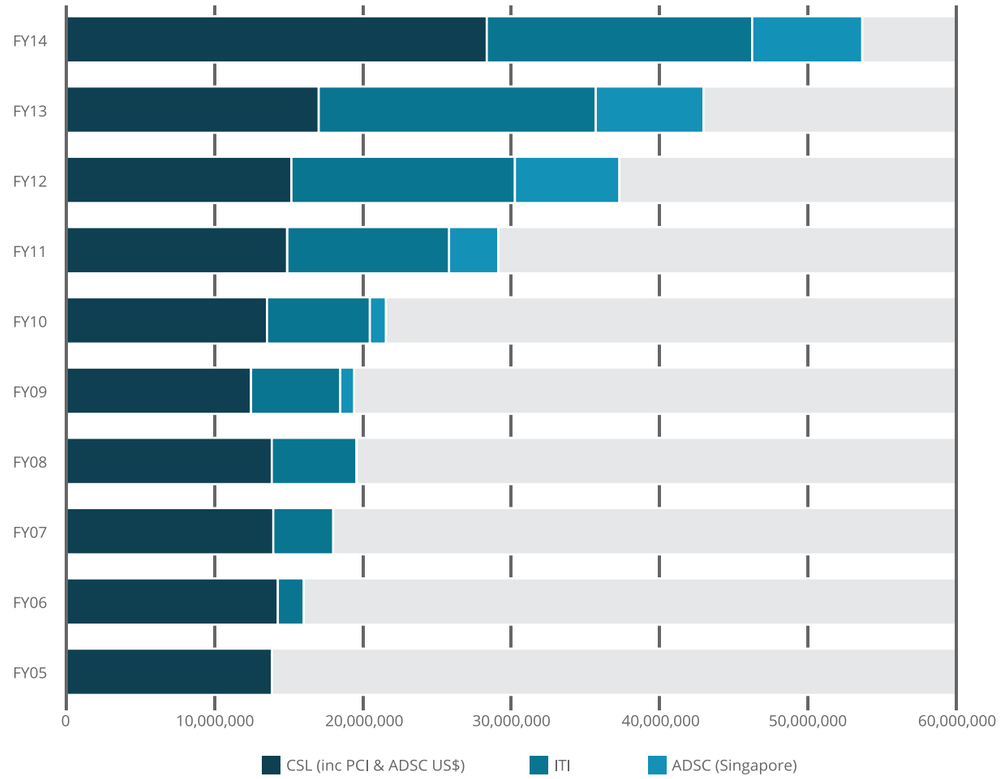
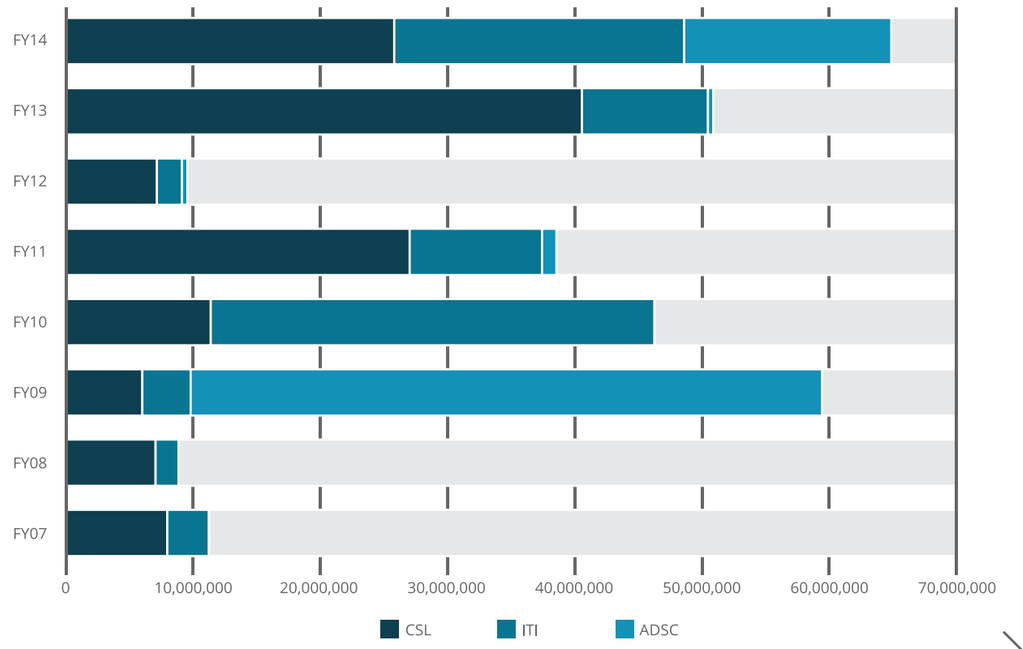
2014 Annual Report

Total Expenditures by Fiscal Year



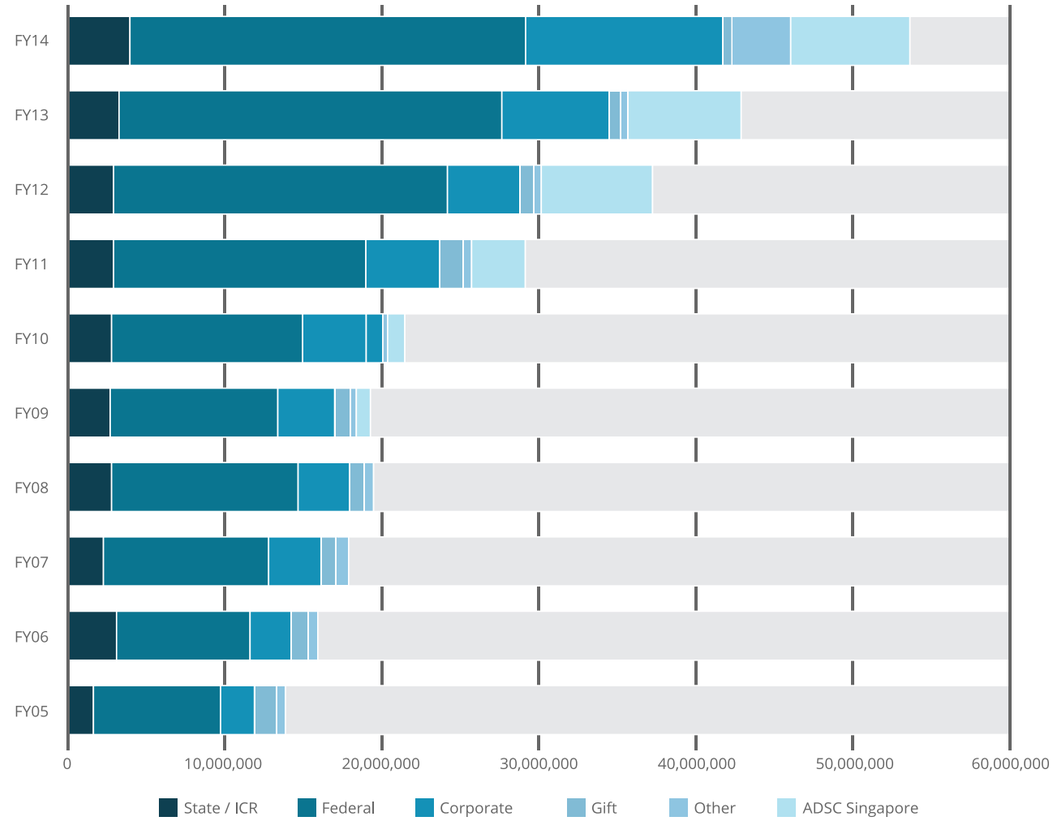
New Contracts / Grants Awarded by Fiscal Year



CSL Financials

CSL had a banner year for research – check out the data here.

CSL & Institute Expenditures by Type



Director's Message

Klara Nahrstedt, Acting Director

FOR CSL, 2014 HAS BEEN A YEAR OF INCREDIBLE GROWTH.

Our research programs have expanded exponentially, fueled by new grants and initiatives. During the past fiscal year, CSL's expenditures grew from a little more than $16 million in 2013 to more than $28 million this year, anchored by funding for the SONIC Center (5 years, $30 million) and XPACC: The Center for Exascale Simulation of Plasma-Coupled Combustion (4 years, $16 million). In addition, researchers have advanced major initiatives in big data, ethics, health care and robotics.

Big data has been a common theme in our work, underscoring efforts that range from accelerating the material-to-device processes to advancing computational genomics.

CSL led a multi-laboratory effort to win a $1.5 million DIBBs grant that will enable researchers to create new tools that help scientists better collect, correlate and curate data produced during the materials creation and device generation processes. CompGen, an initiative of The Institute for Genomic Biology and CSL, helped collect big wins in computational genomics, starting with a $9.3 million Big Data to Knowledge grant funded by the National Institutes of Health. CompGen also is partnering with Mayo Clinic and the University of Chicago on a proposed NSF center that would produce new tools for genomic analysis, powered by high-performance computing platforms.

CSL has further invested in health care through the Health Care Engineering Systems Center (HCESC), which researchers launched this year. HCESC is partnering with the Jump Applied Research for Community Health through Engineering and Simulation (Jump ARCHES), a $50 million collaboration between Illinois and OSF Medical Center in Peoria. HCESC, headquartered in CSL, aims to develop new technologies and cyber-physical systems, enhance medical training and practice, and drive the training of medical practitioners of the future. CSL has also helped lead the College of Engineering's efforts to bring a new medical school to campus.

Other highlights of the year include a $2.7 million grant to develop ethics curricula for a new leadership academy launched by the Nanyang Technological University in Singapore (PI: C. K. Gunsalus). And more recently, CSL researchers Seth Hutchinson, Soon-Jo Chung and Tim Bretl landed a $1.5 million grant through NSF's National Robotics Initiative to build robotic bats that will assist in monitoring construction sites.

Further, the Information Trust Institute won big grants in cybersecurity from the National Security Agency and the Department of Energy, along with a renewal of the successful Illinois Cyber Security Scholars Program, which is equipping the next generation of cybersecurity professionals with the skills they need to succeed in a rapidly changing field.

What's more, CSL is poised to continue our upward trajectory. We aim to pursue new opportunities in aviation, big data and agriculture, among other areas.

By leveraging our disciplinary excellence in interdisciplinary ways, CSL will continue to help lead research growth at Illinois for years to come.

Bringing Engineering to Life

From new engineering systems to technology that enables a better understanding of the basic processes of life, CSL researchers are pushing the boundaries of innovation in genomics and medicine. Here is a look at some of the biggest efforts underway:

New Health Care Center to Apply Engineering Innovations to Medicine

Illinois has launched the Health Care Engineering Systems Center (HCESC), which is housed in CSL. HCESC is partnering with the Jump Trading Simulation and Education Center (JUMP) of the OSF Saint Francis Medical Center in Peoria, Ill., with the aim of developing new technologies and cyber-physical systems, advancing medical simulation and training and driving a transformation in the practice and quality of health care.

The collaboration will provide clinical immersion to engineers and foster collaborations between engineers and physicians. It will draw on Illinois' strengths in health information technologies, sensing and devices, materials and mechanics, and human factors/industrial ergonomics and design to develop collaborative projects that could be used for simulation in training of medical practitioners of tomorrow.

For more information: healtheng.illinois.edu.

Kesavadas Appointed First Director of HCESC

Thenkurussi (Kesh) Kesavadas has been chosen as the first director of Illinois' Health Care Engineering Systems Center (HCESC). Kesavadas earned his Ph.D. in industrial engineering from Pennsylvania State University, and he is co-founder of Simulated Surgical Systems LLC, which launched the world's first comprehensive virtual reality robotic surgery simulator to train surgeons to operate the da Vinci™ surgical robot. As director, he will lead the development of the new center and its research program. He also will serve as "Engineer in Chief" of the Jump ARCHES collaborative partnership between Engineering at Illinois and OSF HealthCare and the University of Illinois' College of Medicine at Peoria.

Since 1996, he has been a faculty member at the University at Buffalo where he founded the UB Virtual Reality Laboratory. As a professor in the Department of Mechanical and Aerospace Engineering, he has pursued research in medical robotics and simulation, virtual reality in design, and haptics and human-computer interaction.

In addition to his director role at the Health Care Engineering Systems Center, Kesavadas has a faculty appointment as professor in the Department of Industrial and Enterprise Systems Engineering.

Robert Pilawa-Podgurski
2014 Engineering Council Award for Excellence in Advising; 2014 Richard M. Bass Outstanding Young Power Electronics Engineer Award from the IEEE Power Electronics Society; Best Paper Award at the IEEE Workshop on Control and Modeling for Power Electronics

Grigore Rosu
2014 College of Engineering Dean's Award for Excellence in Research

Peter Sauer
IEEE PES Prabha S. Kundur Power System Dynamics and Control Award at IEEE PES General Meeting

Jose Schutt-Aine
2014 College of Engineering Outstanding Advisors List

Jose Schutt-Aine's research group
Best Student Paper Award at IEEE EPEPS 2013 (with former student Thomas Comberiate); Best Paper Award at IEEE EDAPS 2013 (with former student Patrick Goh)

Naresh Shanbhag
Associate Editor of the newly established IEEE Journal of Solid-State Exploratory Computational Devices and Circuits

David Sheridan, Hyungsul Kim and Debjit Pal
2014 Best Paper Award at the International Conference on VLSI Design (Shobha Vasudevan)

Andy Singer
Invested as Fox Family Professor

Marc Snir
2013 Seymour Cray Computer Engineering Award

Raphael Stern
2014 Eno Fellow with the Eno Transportation Foundation; 2014 Dwight David Eisenhower Transportation Fellow with the U.S. Department of Transportation; 2014 Data Science for Social Good Fellow with the Eric and Wendy Schmidt Foundation (Daniel Work)

Adam Tilton
Won the COZAD New Venture Competition at the University of Illinois (Prashant Mehta)

Shobha Vasudevan
2014 College of Engineering Dean's Award for Excellence in Research

Martin Wong
Named Executive Associate Dean for the College of Engineering in January 2014

Daniel Work
2014 NSF CAREER Award

Man-Ki Yoon
Intel Ph.D. Fellowship for 2014-2015 (Sibin Mohan)

Hongbo Zhang
2013 EDAA Outstanding Ph.D. Dissertation Award (Martin Wong)

CSL Awards continued

Here's a quick look at some of our researchers' most noteworthy accomplishments in the 2014 academic year.

Ali Khanafer
Natural Sciences and Engineering Research Council of Canada (NSERC) Postdoctoral Fellowship

Negar Kiyavash
2014 College of Engineering Willett Faculty Scholar; Spring 2014 List of Teachers Ranked as Excellent at UIUC; 2014 College of Engineering Dean's Awards for Excellence in Research

Philip Krein
Named Chair of the IEEE/PSMA Workshop on Power Electronics and Electrical Challenges for Engineering Energy-Efficient Buildings; History Chair for the IEEE Power Electronics Society

Avinash Kumar
IAPR Piero Zamperoni Best Student Paper Award at the IEEE International Conference on Pattern Recognition (Narendra Ahuja)

Rakesh Kumar
2014 College of Engineering Outstanding Advisors List

Ross Liederbach
NSF Graduate Research Fellowship (Philip Krein)

Michael C. Loui
Inaugural holder of the Dale and Suzi Gallagher Professorship in Engineering Education at Purdue University

Steven Lumetta
2013 IBM Corporation Faculty Award

Joseph Lyding
2014 Award for Outstanding Research from the Prairie Chapter of the American Vacuum Society

Sai Ma, Viraj Athavale and Samuel Hertz
Best Paper Award at the 2014 Design Automation Conference (Shobha Vasudevan)

Sayan Mitra
C. Holmes MacDonald Outstanding Teaching Award by IEEE-Eta Kappa Nu

Klara Nahrstedt
2014 ACM Special Interest Group on Multimedia award for Outstanding Technical Contributions to Multimedia Computing, Communications and Applications; selected to the Computing Research Association's Computing Community Consortium Council; inducted into the German National Academy of Sciences Leopoldina

Alex Olshevsky
2014 NSF CAREER Award

Cuong Pham
2014 William C. Carter Award at the 2014 IEEE/IFIP International Conference on Dependable Systems and Networks (Ravi Iyer and Zbigniew Kalbarczyk)

Cuong Pham, Zachary Estrada and Phuong Cao
Best Paper Award at the 2014 IEEE/IFIP International Conference on Dependable Systems and Networks (Ravi Iyer and Zbigniew Kalbarczyk)

CompGen Researchers Plan New Center with Mayo Clinic and UChicago

Academia and industry are partnering up to solve "real life" problems in biotech and medicine through a proposed collaborative research center.

The University of Illinois at Urbana-Champaign, Mayo Clinic and the University of Chicago are leading the development of the Center for Computational Biotechnology and Genomic Medicine, which would be funded as a National Science Foundation Industry/University Cooperative Research Center (I/UCRC). More than 25 companies supported the effort, which is a requirement for funding.

Ravi Iyer, George and Ann Fisher Distinguished Professor of Engineering, serves as PI for the project, with Illinois being the lead institution. Co-PIs are Liewei Wang, Professor of Molecular Pharmacology and Experimental Therapeutics at Mayo Clinic and Kevin White, Director of the Institute for Genomics and Systems Biology at the University of Chicago. The project involves more than 30 faculty, researchers and students from across a wide range of disciplines at the three universities. Illinois faculty include Deming Chen, Matthew Hudson, Wen-mei Hwu, Victor Jongeneel, Steve Lumetta, Jian Ma, Olgica Milenkovic, Klara Nahrstedt, Gene Robinson, Sandra Rodriguez-Zas, Saurabh Sinha, Monica Uddin, Bryan White, and Derek Wildman.

Researchers from all three universities will meet with industry leaders at a planning meeting March 2-3, 2015, at the University of Chicago Gleacher Center. Academic researchers will work with industry participants to understand their R&D needs, match them with capabilities and propose relevant research projects. The result will be the creation of a broad portfolio of projects that leverage the computational and engineering resources of Illinois and University of Chicago and the medical research resources of Mayo Clinic.

For more information: http://ccbgm.illinois.edu/

Illinois Lands Big Data to Knowledge Grant

Today's researchers, working with the advantages of new, sophisticated laboratory technology, have unleashed a river of valuable biomedical data—much more, in fact, than many of them have the tools to properly analyze, or the capacity to store. Researchers at Illinois and Mayo Clinic received a $9.3 million, 4-year award to create one of several new Centers of Excellence for Big Data Computing through the National Institutes of Health Big Data to Knowledge (BD2K) initiative.

The Illinois-Mayo center, which spun out of the CompGen initiative, will focus on the analytical challenges posed by the rapidly growing body of genomic and transcriptomic data produced by genome-wide, high-throughput experimental technologies. The Center's research goal is to create a revolutionary analytical tool that allows any biomedical researcher to place a gene-based data set in the context of "community knowledge," the entire body of previously published gene-related data.

Big Data / Small Devices

From massive data sets to nanoscale devices, CSL researchers are pushing the boundaries of computational platforms, techniques and principles. Here's a look at some of the projects currently underway.

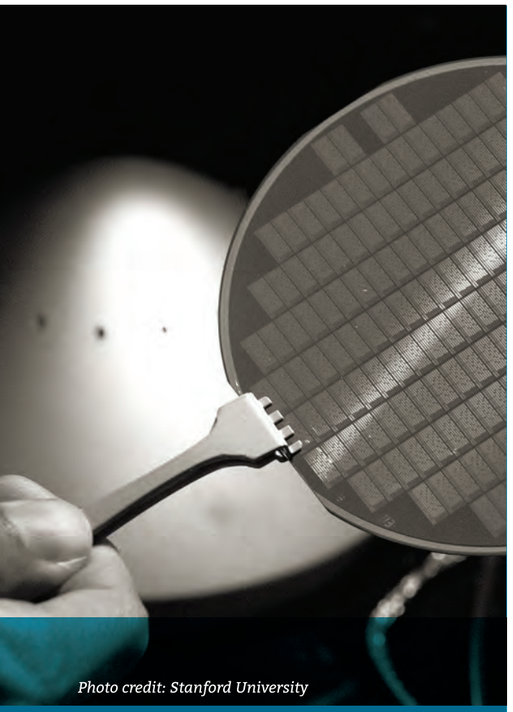


Photo credit: Stanford University

SONIC is a multi-university center founded in 2013 under the STARnet program, administered by the Semiconductor Research Corporation (SRC) with funding from various semiconductor companies (Intel, IBM, TI, Micron, GlobalFoundries, United Technologies Corporation and Applied Materials), defense contractors (Raytheon), and the Department of Defense (DARPA and the US Air Force). Illinois is the lead institution, with UC Berkeley, Stanford, UCSD, UCSB, Michigan, CMU and Princeton as partners.

It has 23 faculty and over 80 graduate students and postdoctoral fellows.

SONIC Center Yields Advancements in Quest to Extend Moore's Law at Nanoscale Level

From discovering design principles for information processing on unreliable fabrics to developing unique architectures based on those principles, the Systems on Nanoscale Information fabriCs (SONIC) Center has produced spectacular results in its second year.

SONIC's mission is to extend Moore's Law into the nanoscale regime through a revolutionary systems-driven approach based on communications and brain-inspired information-processing principles. It brings together a unique research community of neuroscientists, information and coding theorists, architects, circuit designers and device researchers.

"SONIC researchers are focusing on breaking the tyranny of determinism imposed by our reliance on the von Neumann architecture by developing the principles of statistical information processing on nanoscale fabrics—both CMOS and beyond CMOS," said Naresh Shanbhag, SONIC director and professor of electrical and computer engineering.

In Year 2, SONIC researchers discovered multiple design principles for information processing on unreliable fabrics, developed unique architectures based on these principles, and demonstrated their ideas via CMOS and beyond-CMOS prototypes.

They demonstrated the viability of using innovation-rate sampling and subarray beamforming in portable ultrasound imaging systems to reduce energy approximately 50 times, thereby enabling low-power ultrasound front-ends to be integrated into small probes and connected to digital backend processors via USB ports. They also showed the feasibility of high-speed imaging sensors with in-pixel ADCs using current-induced domain wall motion and racetrack nanowires. The result is the capability of producing ADCs that are 1000X smaller than CMOS ADCs, enabling a frame rate 50 times faster than that of a CMOS digital pixel sensor. SONIC broke two world records in ultra-high-speed data transmission using system techniques: a 64Gb/s serial 1 m cable in 65nm CMOS at ultra-low power of ~90mW levels, and 1.2Mbps over 12m underwater communications in turbulent conditions—10 times faster than previously reported results.

SONIC's nanoscale highlights included the world's highest current-density carbon nanotube transistors and the 3D monolithic integration of CMOS, RRAM and CNFETs.

SONIC's Annual Review Meeting, held at NCSA on Oct. 9–10, 2014, showcased its second year of success to a record 31 sponsors.

"With a successful Year 2 completed, SONIC is charging ahead into Year 3 with an ambitious research agenda aiming to catalyze a transformation of computing from its deterministic roots into the realities of the nanoscale era," Shanbhag said.

J. Gary Eden
Elected into the National Academy of Engineering in 2014

Zachary Estrada
2014 Mavis Future Faculty Fellowship (Ravi Iyer)

Grace Gao
Two Best Presentation of the Session Awards at ION GNSS+ 2014 Conference; Air Force Summer Faculty Fellow; Teachers Ranked as Excellent, University of Illinois at Urbana-Champaign

Soudeh Ghorbani
Best Paper Award at the 2014 Workshop on Hot Topics in Software Defined Networking (Brighten Godfrey)

Brighten Godfrey
2014 Alfred P. Sloan Research Fellow in Computer Science; 2014-2015 University of Illinois at Urbana-Champaign Center for Advanced Study Beckman Fellow

William Gropp
SIAM/ACM prize in Computation Science and Engineering; invested as Thomas M. Siebel Chair in Computer Science; SIAM Activity Group on Supercomputing Career Prize at the SIAM Conference on Parallel Processing and Scientific Computing

Siva Hari
2014 David J. Kuck Outstanding PhD Thesis Award; the Illinois Computer Science Department's nomination for the ACM dissertation award (Sarita Adve)

Naira Hovakimyan
2015 Plenary speaker at the 55th Israel Annual Conference on Aerospace Sciences; 2014 TUM-IAS honorary Hans Fischer senior fellow at Technical University of Munich, Germany; 2014 Alexander von Humboldt Research Award; 2014 Keynote speaker at the International Conference on Unmanned Aircraft Systems

Zhenqi Huang
DENSO Best Student Paper Award at the 2014 International Conference on Hybrid Systems: Computation and Control (Sayan Mitra)

Tsung-Wei Hwang and Pei-Ci Wu
First place at the ACM/SIGDA TAU 2014 CAD Programming Contest on Timing Analysis for CPPR (Martin Wong)

Wen-mei Hwu
2014 IEEE Computer Society B. Ramakrishna Rau Award; founded MulticoreWare, which was recognized by Inc.com in 2014 as the #110 fastest-growing, privately held company in America; Collins Award for Innovative Teaching

Ravishankar Iyer
2013 IBM Corporation Faculty Award

Jay P. Kesan
Appointed as a Thomas Edison Scholar by the U.S. Patent and Trademark Office

CSL Awards

Here's a quick look at some of our researchers' most noteworthy accomplishments in the 2014 academic year.

Sarita Adve
Program chair of the 2014 International Conference on Architectural Support for Programming Languages and Operating Systems

Homa Alemzadeh
Paper selected as the Maxwell Chamberlain Memorial Paper in Adult Cardiac Surgery by the Society of Thoracic Surgeons and presented at the Society of Thoracic Surgeons annual meeting (Ravi Iyer)

Andrew Alleyne
ASME Henry M. Paynter Award

Saptarshi Bandyopadhyay
2014 IEEE MSC Best Student-Paper Award Finalist at the IEEE Multi-Conference on Systems and Control (Soon-Jo Chung and Fred Hadaegh)

Tamer Başar
2014 IEEE Control Systems Award

Mohamed Ali Belabbas
2014 NSF CAREER Award

Robin Berthier
Best Paper Award at the IEEE SmartGridComm 2014

Deming Chen
IBM Corporation Faculty Award; Best Paper Award at the 2013 International Conference on Hardware/Software Codesign and System Synthesis

Benjamin Chidester
2013 Fellowship with MIT Lincoln Labs (Minh Do)

Soon-Jo Chung
2014-2015 University of Illinois at Urbana-Champaign Center for Advanced Study Beckman Fellow; 2014 College of Engineering Dean's Award for Excellence in Research

Venanzio Cichella
Winner of 2014 online audience vote in the 2014 Science Magazine "Dance your Ph.D." competition; awarded a 2014 travel grant from NSF to attend the CPS week in Berlin, Germany; among the five EURAXESS Science SLAM finalists of 2013 (Naira Hovakimyan)

Anupam Das
Best Paper Award in the 2014 ACM Symposium on Information, Computer and Communications Security (Nikita Borisov and Matthew Caesar)

Minh Do
2014 IEEE Fellow

Alejandro Dominguez-Garcia
Selected by the National Academy of Engineering to attend the 2014 United States Frontiers of Engineering Symposium

Parasara Sridhar Duggirala
2014 Feng Chen Memorial Award in Software Engineering; selected to attend the Fall 2014 Heidelberg Laureate Forum

Illinois DIBBs Lays Foundation to Accelerate Materials-to-Device Processes

It can take 20 years from the creation of a new material in the laboratory to the fabrication of next-generation devices that employ the material—and that time lag is passed on to consumers, delaying their access to more advanced cell phones, computers and other devices.

CSL is leading research that seeks to accelerate the technology transfer process—perhaps by as much as 50 percent—through a new cyber-infrastructure grant funded by the National Science Foundation. The $1.5 million project, funded under the NSF Data Infrastructure Building Blocks (DIBBs) program, will transform materials-to-device processes by creating new data infrastructure that will enable researchers to better collect, curate and correlate scientific data generated during material creation and device fabrication processes.

To create the tools necessary to capture, store, curate, analyze and correlate data sets related to materials, circuits and device fabrication, experts in computational and computer science will develop two data building blocks, called T2C2 (the Timely and Trustworthy Curator and Coordinator), which will function as the curator and the coordinator of the materials-to-devices datasets.

"We have scientists who are producing cutting-edge materials accompanied by enormous amounts of digital data from high-end instruments, and then writing down results in a notebook or storing them on local disks. Only the most interesting results are published, while others get deleted or stored in a drawer for 10 years," said Klara Narhstedt, the acting director of the Coordinated Science Laboratory (CSL) and professor of computer science. "Our goal with the NSF DIBBs grant is to make sure this innovative research is not only preserved, but also easy for other scientists, such as circuit and device builders, to access, so they can build upon the work."

Bresler Leads $950,000 Big Data Grant

A team led by ECE and CSL Professor Yoram Bresler has won almost $950,000 from the National Science Foundation to develop more efficient algorithms and computational methods for analyzing Big Data and extracting useful information. Bresler is working with fellow ECE and CSL Assistant Professor Yihong Wu, Mathematics Professor Marius Junge, and Statistics Visiting Assistant Professor Kiryung Lee.

Bresler's team is mainly focused on analyzing objects of data called tensors. Tensors are multi-dimensional arrays of data listed by certain categories, or dimensions. Bresler's team aims to develop efficient algorithms and computational tools that dive through uncharted depths of complex data, returning with the information that researchers need. The algorithms accomplish this by systematically going through the data and finding regular patterns or structures, which enable a concise representation of the data, such as similar elements that can be combined.

CSL Events

Highlighting the CSL events of 2014

ITI 10-Year Anniversary Celebration

2013 Supercomputing Conference

ITI 10-Year Anniversary Celebration

ITI celebrated its 10-year anniversary on Sept. 17–18, 2014, to recognize the accomplishments of ITI over the past decade. The celebration included a student poster session, various speakers and panels, and tours of the TCIPG, Power, TEEV, and Cyber Physical Systems Integration labs. The keynote speaker, Farnam Jahanian of Carnegie Mellon University, spoke on the evolution of Internet threats and essentials for a cyber-secure society, while ITI Director David Nicol spoke about the future of ITI.

2014 CSL Student Conference

The ninth CSL Student Conference was held Feb. 20–21, 2014, with student presentations and posters, talks by invited speakers, panels and a reception. The talks featured research in the areas of reliable and high-performance computing; decision and control; circuits; computational and physical electronics; thin film electronics; signal, image, and speech processing; remote sensing; and space science and communications. The yearly event is organized by graduate students in CSL and is a creative way for students to present their work to fellow students and faculty.

2014 SONIC Annual Meeting

The second annual SONIC Review Meeting was held Oct. 9–10, 2014, at the National Center for Supercomputing Applications (NCSA) at Illinois. Almost 100 students, faculty and industry partners from across the nation gathered for poster sessions and to hear speakers talk about the work going on at SONIC.

2013 Supercomputing Conference

Illinois students and faculty attended the 2013 Supercomputing Conference in Denver, Nov. 17–22, 2013. The conference is the nation's largest for high-performance computing, and Parallel Computing Institute Director Bill Gropp acted as this year's conference chair. PCI affiliate Marc Snir (CS) received the 2013 IEEE Computer Society Seymour Cray Computer Engineering award. Additionally, PCI research was demonstrated throughout the conference, including Laxmikant Kale's research group's fault tolerance cluster.

App Software Edits Photos, Videos in Real Time

An app developed at the Advanced Digital Sciences Center in Singapore allows people to create a short video clip and alter the background using pre-designed animated templates to create a Hollywood style mini-movie in seconds. The app, SnapClip, was developed by an external partner Basilo Labs, and incorporates algorithms developed at ADSC into its core modules. This allows users to do the photo and video editing quickly and in real time.

Sanders Named ECE Illinois Department Head

CSL Professor William H. Sanders was appointed as ECE ILLINOIS' new department head in August 2014. Sanders served as the department's interim head since July 2013. Sanders, a Donald Biggar Willett Professor of Engineering, previously served as the director of CSL.

C. K. Gunsalus - PI on the NTU -Singapore Grant

Illinois Partners with NTU to Develop New Generation of Asian Academic Leaders

In medicine and other fields, the growing use of evidence-based practices has saved money and improved performance by using data to inform decision-making. But in academic institutions leaders have been slower to adapt to the trend.

The National Center for Professional and Research Ethics at Illinois is partnering with Nanyang Technological University (NTU) in Singapore to develop higher education's next crop of leaders into more ethical and evidence-based decision-makers. With a $2.7 million grant, Illinois is collaborating with NTU to conduct research, develop curricula, provide guidance and create tools to train current and future executives of major research universities as part of a new NTU academy focusing on leadership, expected to launch next year.

As part of the collaboration, NCPRE Illinois will partner with NTU to jointly develop the framework for the academy. Researchers will create new curricula that will develop leaders focused on institutional integrity and data-driven practices. They will also provide guidance on the development, structure and programming of the academy and continue their work on environmental factors influencing decision-making, especially cross-culturally and in Asia.

In addition, Illinois hosted an Illinois-NTU leadership conference in November to explore the research university of the future.

2014 CSL Student Conference

2014 Allerton Conference

2013 TCIPG Industry Workshop

The 2013 TCIPG Annual Industry Workshop was held Nov. 5–7, 2013, and focused on technology development, technology transition, education and awareness for the power grid. Speakers and panelists from industry, national labs, government agencies and TCIPG partner institutions led discussions on research results and key challenges facing the industry. The workshop topics focused on architectures, components and best practices for a resilient power grid.

2014 Allerton Conference

The 2014 Allerton Conference on Communication, Control, and Computing was held Sept. 30–Oct. 3, 2014, and gathered leaders in industry, academia and government to discuss innovation in the fields of communication, control and computing. This year's conference, organized by CSL professors and co-chairs Olgica Milenkovic and Angelia Nedich, featured for the first time an extra day of tutorials at the Coordinated Science Laboratory. Professor Jon Kleinberg of Cornell University gave the plenary talk on the convergence of social and technological networks.

GPU Technology Worshop: Southeast Asia

The Advanced Digital Sciences Center helped co-organize the GPU Technology Workshop South East Asia with NVIDIA in Singapore on July 10, 2014. The conference, focusing on visual computing technology, featured a line-up of local and international keynote speakers, parallel sessions, technology demos and an exhibition floor showcasing the latest hardware and software applications. ADSC also co-organized a joint seminar on July 9 with the A*STAR Computational Resource Centre, at which NCSA's Cristina Beldica spoke about NCSA's Blue Waters and the challenges of scaling applications on tens of thousands of nodes.

Immersive Telepresence and Adaptive Streaming Workshop

The Advanced Digital Sciences Center hosted a workshop on immersive telepresence and adaptive streaming on March 18, 2014, featuring Klara Nahrstedt, CSL's acting director and Illinois computer science professor, as the keynote speaker. The event was held in Singapore and included talks from faculty at various universities, including Klagenfurt University, the National University of Singapore, Nanyang Technological University, the University of Oslo and more.

News Briefs

From forming a new partnership to expanding our robotics program, CSL researchers have had a very busy year. Read on below.

Taxi GPS Data Helps Researchers Study Hurricane Sandy's Effect on NYC Traffic

When Hurricane Sandy struck the east coast in late October 2012, the "superstorm" disrupted traffic in New York City for more than five days. Sandy offered a chance for Illinois researchers to try out a new computational method they developed that promises to help municipalities quantify the resilience of their transportation systems to extreme events using only GPS data from taxis. According to Dan Work (CEE), who led the project, the research could help cities know how their traffic systems respond to extreme events and examine ways to improve them.

View video about the project here: http://youtu.be/3FYeuQQa4tQ

Hwu's MulticoreWare Ranks in Top 110 Fastest-Growing Private Companies

ECE Professor Wen-mei Hwu's start-up MulticoreWare - which provides GPU-accelerated software and GPU-computing infrastructure software to tech giants such as Amazon, Netflix and Google - was recently recognized by Inc.com as one of the fastest-growing, privately held companies in America (ranked #110 out of 5,000).

MulticoreWare saw a three-year growth of 3,322 percent, with revenue increasing from $224,601 in 2010 to $7.7 million in 2013. The top 500 companies were highlighted in the September issue of Inc. magazine.

Eden Awarded Nearly $1 Million Grant to Continue Microplasma Research

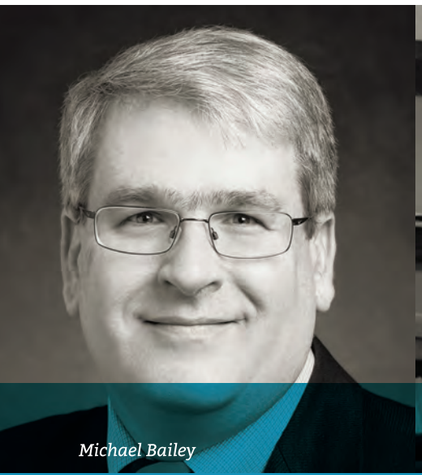
With rising concerns on how to reduce carbon dioxide emissions, Professor J. Gary Eden (ECE) and his colleagues are researching how to convert the environmentally harmful molecule into substances industrial companies use in production every day. Eden was awarded a $917,744 grant from the Air Force Office of Scientific Research (AFOSR) to fund his purchase of laser and gas analytical equipment. He plans to use this equipment to continue his research of microplasma devices.

CSL Researchers Awarded $1.5 Million to Build Robot Bats

CSL Professor Seth Hutchinson has teamed with CSL and Aerospace Engineering Assistant Professor Soon-Jo Chung, CSL and Aerospace Associate Professor Timothy Bretl, and Civil and Environmental Engineering Assistant Professor Mani Golparvar-Fard to develop this project with the goal of building a robot with the characteristics of a bat that would be able to supervise construction sites. The robots would enable supervisors to ensure that construction is progressing according to plans.

New Faculty & Staff

2014 CSL Faculty & Staff Additions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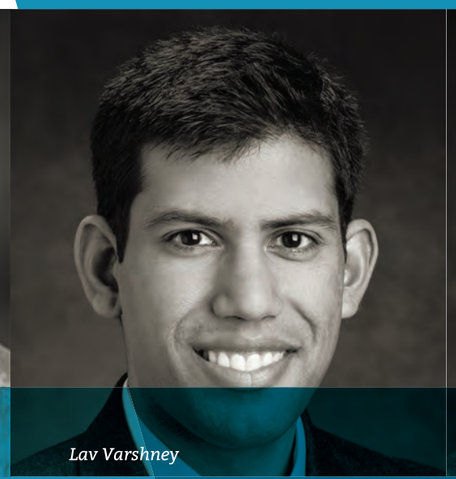
Lav Varshney


Lara Waldrop

Michael Bailey
Michael Bailey joined Illinois as an associate professor of electrical and computer engineering after working as a research associate professor and co-director of the Network and Security Research Group at the University of Michigan. He is a part of CSL's reliable and secure systems research area, as well as a researcher with the Information Trust Institute. His research focuses on the security and availability of complex distributed systems. He received a B.S. in computer science from Illinois, an M.S. in computer science from DePaul University, and a Ph.D. in computer science from the University of Michigan.

Jonathan Freund
Jonathan Freund is a professor in the mechanical science and engineering and aerospace engineering departments. His research focuses on fluid mechanics and computational flow physics, with a recent emphasis on jet noise control and simulation and analysis of aeroacoustic resonances, as well as many other areas. He is a researcher for the Parallel Computing Institute and is actively involved in orchestrating simulations for the Center for Exascale Simulation of Plasma-Coupled Combustion. He received his B.S., M.S., and Ph.D. mechanical engineering degrees from Stanford University and joined Illinois in 2001.

Thenkurussi Kesavadas
Thenkurussi (Kesh) Kesavadas joined CSL in 2014 when he was named the first director of the new Health Care Engineering Systems Center at Illinois. He also has a faculty appointment as a professor in the industrial and enterprise systems engineering department at Illinois. Before coming to Illinois, he was a professor in the mechanical and aerospace engineering department at the University of Buffalo. Kesavadas earned his Ph.D. in industrial engineering from Pennsylvania State University, and he is co-founder of Simulated Surgical Systems LLC.

Alex Olshevsky
Alex Olshevsky is an assistant professor of industrial and enterprise systems engineering who is a part of CSL's decision and control research group. He joined Illinois in 2012, and his research focuses on distributed control and optimization over networks, with a focus on designing policies that allow teams of autonomous agents to cooperate and function reliably in unknown or time-varying environments. He received his Ph.D. in computer science from MIT in 2010.

Lav Varshney
Lav Varshney is a new assistant professor of electrical and computer engineering in CSL's communications research group. Varshney came to Illinois from IBM, where he spent three years at the Thomas J. Watson Research Center in New York. His research focuses on the science and engineering of informational systems involving humans and machines, which is driven by a desire to improve individual and collective intelligence in modern environments. Varshney earned a B.S. in electrical and computer engineering at Cornell and S.M., E.E., and Ph.D. degrees in electrical engineering and computer science from MIT.

Lara Waldrop
Lara Waldrop is new to CSL's remote sensing and space science research group, but isn't new to Illinois, as she previously worked as a research scientist and visiting lecturer in the electrical and computer engineering department, where she is now an assistant professor. Her research is focused on the development of novel ground- and space-based sensing modalities for estimation of key physical parameters of the near-earth space plasma environment. Waldrop received her Ph.D. in astronomy and space physics from Boston University in 2004.

2014 New CSL Staff:
Erica Kennedy – Office Support Associate
Heather Glanzer – Office Support Specialist
Normand Paquin – Associate Director of Research
James Butler – ADSC Associate Director of Finance and Administration
Gavin Flure – IT Specialist
Luca Massa – Research Scientist