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OHIO
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DEPARTMENT OF
COMPUTER SCIENCE
AND ENGINEERING



This year's front cover was designed by **WILLIAM DAZEY**, a senior from Canton, Ohio. William's focus within CSE is application development and programming languages. He plans to graduate in Spring 2013 and hopes to find a position in his area of interest or "an IT position that allows me to think critically and write programs (of some significance) would be a nice starting point."

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LETTER FROM THE CHAIR

Dear Colleagues, Alumni, Friends, and Parents,

Welcome to the 2011-2012 Department of Computer Science and Engineering Annual Report. Besides many stories of faculty, students, and alumni accomplishments, the annual report also provides current and historical data charts reflecting the steady growth of the department and its increasingly high contributions of human talents to the society. The department strongly promotes faculty scholarship and leadership in teaching and research and excellence in students. I would like to highlight some of this year's best achievements.

- *The CSE department successfully passed with high marks the National Accreditation Evaluation by the both engineering committee and computing committee. We would particularly like to thank Professor Neelam Soundarajan for his tireless efforts to prepare and host the evaluation.*
- *Due to rapid growth of the department in both teaching and research, we have been authorized to hire five tenure-track faculty of open ranks next year.*
- *CSE faculty Paul Sivilotti is a recipient of 2012 Alumni Award for Distinguished Teaching. This is the highest teaching award for Ohio State Professors.*
- *Ph.D. student Joshua Eckroth is a recipient of 2012 Graduate Associate Teaching Award, which is the highest recognition to a graduate student teaching at Ohio State.*
- *Marc Khoury, a CSE undergraduate of class 2012 is a recipient of a 2012 Churchill Scholar Fellowship and a National Science Foundation Graduate Fellowship. Both awards are highly competitive and prestigious.*
- *The number of grants received by CSE faculty last year is a record high, a total amount about \$11 millions. This is 25% more than the previous year.*
- *I would like to congratulate Raghu Machiraju and Han-Wei Shen for their promotions to the rank of full professor.*

Please keep us informed about your progress and accomplishments. We look forward to another exciting report next year.

*Cordially yours,
Xiaodong Zhang*





AWARDS & HIGHLIGHTS

SIVILOTTI RECEIVES TEACHING AWARD

In a surprise classroom visit, OSU President E. Gordon Gee awarded CSE Associate Professor **PAUL SIVILOTTI**, a 2012 Alumni Award for Distinguished Teaching. This award is given annually to a highly selective professor group at Ohio State for their teaching excellence. Only five professors were selected after rigorous reviews and evaluation this year.

CSE has long known and appreciated the teaching talents of Dr. Sivilotti. He is a three time winner of the Department Outstanding Teaching Award. He participated in the 2010 Frontiers of Education Symposium where he presented a collection of learning activities designed around kinesthetic learning.

Paul joined CSE in 1998 after receiving his Ph.D. in Computer Science from the California Institute of Technology where he also attained a Master's of Science. Originally from Canada, he earned his B.Sc.H. in Computing Science, Mathematics and Biochemistry at the Queen's University in Ontario. His research area is Software Engineering with foci in Distributed Systems and Tool-based Support for Testing Component Implementations.

Sivilotti is the second CSE faculty member to achieve this award. Dr. Tim Long was given it in 1990. In 2004, Dr. Scott Pike, a mentee of Paul's, received the Distinguished Graduate Student award.



University President, E. Gordon Gee congratulates Paul Sivilotti.

ECKROTH RECEIVES OSU HIGHEST GRAD TEACHING AWARD

Also receiving University recognition for teaching, **JOSHUA ECKROTH**, Ph.D. candidate, was given a Graduate Associate Teaching Award (GATA). This award is the highest recognition The Ohio State University bestows on graduate students. This very selective award is given to only ten students a year out of potentially over 10,000 students.

Joshua began his career at Humboldt State University where, in 2008, he was named Computing Sciences Department Student of the Year. At OSU-CSE, he works in Artificial



Josh Eckroth (center, holding the red certificate) surrounded by his students in class.

Intelligence with Dr. John R. Josephson, advisor, and Prof. B. Chandrasekaran. He is minoring in Cognitive Science and Mathematical Logic under the tutelage of Prof. Neil Tennant (Cognitive Science) and Prof. Harvey Friedman (Mathematical Logic). His research aims to develop strategies that improve the ability of an intelligent agent (such as a robot) to perform challenging reasoning tasks even when the agent's knowledge about the world is significantly limited or the sensors that provide information about its domain (e.g., video cameras, and microphones) are sometimes inaccurate, misreporting, or otherwise malfunctioning.

UGRAD WINS PRESTIGIOUS FELLOWSHIP

New CSE graduate **MARC KHOURY** was awarded a 2012 Churchill Scholar Fellowship from the Winston Churchill Foundation. Annually only fourteen scholarships are given to graduating



seniors and recent graduates demonstrating exceptional academic talent, outstanding personal qualities, and a capacity to contribute to the advancement of knowledge in the sciences, engineering, or mathematics. The scholarship supports one year of graduate study in a relevant field at the University of Cambridge in the United Kingdom. Marc is only the third OSU student to attain this recognition and the first from CSE.



Marc was an exceptional student with a drive to achieve an outstanding career in academia. He was a member of the Honors Collegium and began conducting research as a freshman under the guidance of Dr. Rephael Wenger, studying isosurface meshes, a tool for data visualization. During his sophomore year, this work resulted in his first publication and a national presentation at the leading conference in computer visualization. Marc has also gained experience with mathematics research, studying topology through a National Science Foundation Research Experiences for Undergraduates (NSF REU) at Ohio Wesleyan University in 2010.

In summer 2011, Marc undertook a high profile internship in New Jersey with AT&T Labs in their information visualization group, working on new techniques for generating large graph layouts. Following this, he spent the fall quarter with Amazon.com in Seattle as a software development engineering intern in their fraud department. All of these research and industry experiences combine to give Marc a diverse tool set to use in approaching complex topics in computational geometry.

Marc will pursue an M.Phil. in Advanced Computer Science at Cambridge, where he will conduct research in geometric modeling under Dr. Neil Dodgson. Upon completion of his degree, he plans to return to the United States to begin a Ph.D. program in Computer Science at University of California, Berkeley or Stanford. Marc's ultimate goal is to become a professor at a major university, teaching students and developing provably good meshing techniques to provide researchers in computational science with an array of high quality meshing tools so that they can easily pursue their research.

MVAPICH SUPPORTING STAMPEDE

Software developed by Dr. **D. K. PANDA** and his team, MVAPICH, will be used in the National Science Foundation's powerful new supercomputer, "Stampede," being built at the Texas Advanced Computing Center at The University of Texas at Austin. Upon completion in 2013, Stampede will be one of the world's most powerful supercomputers. At its initial peak performance, it will process at 10 petaflops, contain 272 terabytes (272,000 gigabytes) of total memory, and handle 14 petabytes (14 million gigabytes) of disk storage. Eventually, Intel will be adding new generations of MIC processors which will then allow Stampede to clock at 15 petaflops.

MVAPICH/MVAPICH2 (pronounced em-va-pich) software delivers best performance, scalability and fault tolerance for high-end computing systems and servers using InfiniBand, 10GigE/iWARP and RoCE networking technologies. All components of Stampede will be integrated with InfiniBand FDR 56G/bs network. MVAPICH improves the processing by connecting traditional supercomputing software with innovative networking technologies and protocols, thus increasing the data flow speed in a significant manner.

CSE RESEARCHERS UPDATE REAL WORLD "BIG DATA" SYSTEMS

Dr. Xiaodong Zhang and his research team, working with Facebook engineers, have developed a data placement structure, called RCFile (Record Columnar File), to efficiently store



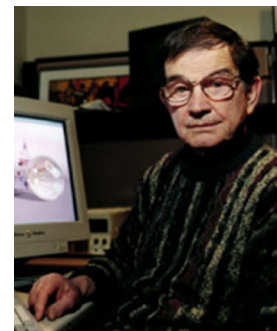
increasingly big data sets using a large and distributed data warehouse in a scalable way. This data placement problem is challenging to big data management and users, such as social networks, Web service providers, and online stores. RCFile and its open source implementation were documented in a paper presented in the 27th International Conference on Data Engineering (ICDE 2011). RCFile has been widely used in real-world systems. For example, It has become the default data placement structure in Facebook's production data warehouse, which is so far the largest Hadoop data warehouse in the world. RCFile is also adopted in two open source data analytic systems, Apache Hive and Apache Pig, which are being used in major Internet services, including Facebook, LinkedIn, Taobao, Twitter, and Yahoo.

Another big data related project of Dr. Zhang's team is to address the low efficiency of automatic translating SQL to MapReduce programs in existing big data processing systems, such as Hadoop and Hive. They have developed YSmart, a correlation-aware SQL-to-MapReduce translator that applies a set of rigorous rules to generate a minimum number of MapReduce jobs to execute multiple correlated operations in a complex query. YSmart has significantly reduce redundant computations, unnecessary I/O operations and network transfers compared to existing translators in Hive developed by Facebook and in Pig Latin developed by Yahoo!. This work received the Best Paper Award in the International Conference of Distributed Computing Systems (ICDCS 2011). After collaborative efforts of one year with Facebook engineers, YSmart has been merged into the Hive data warehouse, a production system in Facebook, and in many other large organizations. An independent and open source version of YSmart (<http://ysmart.cse.ohio-state.edu>) has been widely used in the academic and research community.

Besides Dr. Zhang, the big data research team includes Research Scientist Rubao Lee, and CSE Ph.D. students Yin Hua, Tian Luo, and Yuan Yuan.

EMERITUS FACULTY RECEIVES LIFETIME ACHIEVEMENT RECOGNITION

CHARLES CSURI, CSE Professor Emeritus and a founder of the Advanced Center for Computing Art and Design, received the Award for Lifetime Achievement in Digital Art from ACM SIGGRAPH, the Association for Computing Machinery's Special Interest Group on Computer Graphics and Interactive Techniques, for his "visionary and creative merging of art and technology." This highly prestigious award is presented annually to an artist who has created a substantial and important body of work that significantly advances aesthetic content in the field of digital art.



Often called the Father of Digital Art, 'Chuck' Csuri is internationally recognized and admired. He began his career as a painter, but in 1964 he began using keystrokes to translate his brush strokes. Very soon, he was winning awards and notoriety as he also began working with animation in the cyber realm. Owing to his heightened aesthetic, he was uniquely qualified to open doors and introduce the worlds of art and computers to one another and find an exciting new field.

While a professor in the Arts at The Ohio State University, he proposed the creation of a new and very special group, the Computer Graphics Research Group (CGRG). This group would include faculty and graduate students from Art, Industrial Design, Photography and Cinema, Computer and Information Science (now CSE), and Mathematics and would teach and research practical applications of computer animation. This group evolved into the Advanced Computing Center for the Arts and Design (ACCAD).

Csuri is one of the rare non-science oriented researchers to receive grants from the National Science Foundation. Indeed, with support from NSF, the US Navy and the Air Force Office of



Scientific Research, Csuri directed research on computer graphics for over 22 years at CGRG and then later ACCAD. The results of these studies have been applied to flight simulators, computer-aided design, architecture, magnetic resonance imaging, visualization of scientific phenomena and special effects for TV and film. Charles Csuri is also an OSU alumnus having received both a BA and an MFA.

COLLEGE OF ENGINEERING RECOGNIZES TWO FOR RESEARCH

Drs. **JAMES W. DAVIS** and **RAGHU MACHIRAJU** were each awarded Lumley Research Awards from the Ohio State College of Engineering. These awards are given in recognition of research contributions.

James Davis works in the area of Computer Vision specifically developing advanced video surveillance systems that use computers equipped with video cameras to not only detect the presence of people and track them, but also to identify their activities.

With primary interests are in imaging and visualization, Raghu Machiraju searches for the ways to apply them to topics in biology, medicine and engineering.

PROMOTIONS

Beginning in the 2012-2013 academic year, CSE will have two more Full Professors: Drs. **RAGHU MACHIRAJU** and **HAN-WEI SHEN**. Both gentlemen work in the graphics area.

GRAPHICS BEST PAPER

Oleg Mishchenko, Ph.D. candidate, and Associate Professor **ROGER CRAWFIS** achieved a Best Paper Award in Slovakia at the Spring Conference on Computer Graphics 2012. The paper, titled "Effective Texture Models for Three Dimensional Flow Visualization," describes their approach to solving the problem of the clutter and occlusion in visualizing three dimensional flow with geometry primitives. Using semi-transparency, however, can make the visualization blurry and vague. They investigate perceptual limits and find specific guidelines on using semi-transparency for three dimensional flow visualization. The researchers base their results on the user study that they conducted. The users were shown multiple semi-transparent overlapping layers of flow and were asked how many different flow directions they were able to discern. The team utilized textured lines as geometric primitives; two general texture models were used to control opacity and create animation. They found that the number of high scoring textures is small compared to the total number of textures within our models. To test their findings, they utilized the high scoring textures to create visualizations of a variety of datasets.

VISUALIZATION TEAM AWARDED BEST PAPER

Professor **HAN-WEI SHEN** and his student, Abon Chaudhuri, co-wrote the paper "A Self-adaptive Technique for Visualizing Geospatial Data in 3D with Minimum Occlusion" that won a Best Paper Award at the Conference on Visualization and Data Analysis (VDA 2012) in San Francisco. The conference is part of the IS&T/SPIE Symposium on Electronic Imaging 2012.

This paper shows how to minimize the problem of occlusion when visualizing geospatial data in 3D. This work can help improve interactive 3D visualization of geospatial and similar data..

Chaudhuri is a Ph.D. candidate supervised by Professor Shen. He came to Ohio State in 2006. He works with fellow members of the GRAVITY research group on various problems related



to flow visualization, high-performance visualization of large scientific data and information visualization. Before coming to Ohio State, Abon completed his undergraduate studies at Jadavpur University in Kolkata, India and interned at Oak Ridge National Laboratory and Argonne National Laboratory.

BEST PAPER EARNED AT TACC

Sreeram Potluri, Ph.D. candidate, and his coauthors received a Best Paper recognition at the Texas Advanced Computing Center (TACC)-Intel Highly Parallel Computing Symposium. This symposium was targeted to explore new designs with upcoming Intel-MIC (Many Integrated Core) architecture which will be a significant component in the upcoming NSF-TACC 'Stampede' 10-15 PetaFlop system.

Sreeram Potluri, Devendar Bureddy, Karen Tomko and **DHABALESWAR K. (D. K.) PANDA** wrote "Intra-MIC MPI Communication using MVAPICH2: Early Experience." This paper describes the team's early experience using MVAPICH2, a popular open-source implementation of MPI, for communication within a KNF coprocessor. They present different versions of MVAPICH2 that are enhanced and tuned for the new architecture. The work compares the point-to-point and collective communication performance of these versions with an out-of-the-box version of MVAPICH2 to highlight the importance of these designs on the MIC architecture. Many Integrated Core (MIC) architecture announced by Intel is expected to be a critical component in their solution for exascale computing. Knights Ferry (KNF) is the first instantiation of the MIC architecture. It is a development platform which enables scientific application and library developers to prepare for the upcoming products based on the MIC architecture.

Sreeram Potluri is a Ph.D. student in the Department of Computer Science and Engineering at The Ohio State University. He is a member of the Network-Based Computing Laboratory lead by Prof. D. K. Panda. His research interests include parallel programming models, high speed interconnects, heterogeneous architectures and high-end applications. His current focus is on the design of a scalable high-performance MPI library for clusters with NVIDIA GPU accelerators and Intel MIC coprocessors. Sreeram is involved in the design and development of MVAPICH, a high-performance open-source implementation of MPI over InfiniBand, 10GigE/iWARP and RoCE interconnects. This software is currently used by over 1,800 organizations in 66 countries.

IEEE NAMES ALUMNI FELLOW

DR. YU-CHEE TSENG (Ph.D., '94) received an Institute of Electrical and Electronics Engineers (IEEE) Fellow recognition. IEEE bestows this title on those "IEEE members whose extraordinary accomplishments in any of the IEEE fields of interest are deemed fitting of this prestigious grade elevation." Specifically for Dr. Tseng, he was recognized for "fundamental contributions to wireless and mobile networks."

Yu-Chee's most distinct contribution is the discovery of the "Broadcast Storm Problem" in mobile ad hoc networks and the related solutions.

The significance and impact of these contributions can be proved in the over 3,000 articles referencing his work. These results have been taken up by many other researchers since these solutions are applicable to many kinds of wireless networks, such as sensor networks, mesh networks, and vehicular networks. Yu-Chee also has original contributions to the field of wireless sensor networks.

Currently serving as Chair Professor and Dean of the College of Computer Science of the



National Chiao-Tung University in Taiwan, Dr. Tseng has received many awards for his achievements in research, education, and service. In 2005 he was named an OSU College of Engineering Distinguished Alumnus. He has received an impressive three Outstanding Research Awards as awarded annually to the top 3% of researchers by the National Science Council, Taiwan. Yu-Chee has also attained the Best Paper Award (Int'l Conf. on Parallel Processing, 2003), the Elite I. T. Award (2004), and the Y. Z. Hsu Scientific Paper Award (2009).

His research interests include mobile computing, wireless communication, and parallel and distributed computing. His service to the field can also be seen in the editorial boards on which he has served, including IEEE Transactions on Vehicular Technology (2005-2009), IEEE Transactions on Mobile Computing (2006-2011), and IEEE Transactions on Parallel and Distributed Systems (2008-present).

Professor Tseng is the tenth (10th) CSE Alum to be named an IEEE Fellow.

STEVE MAY NAMED DISTINGUISHED ALUMNI



The Ohio State College of Engineering named **STEVE MAY**, MS '92 and PhD '98, a 2011 Distinguished Alumni. This 47 year old annual award is given "to recognize distinguished achievement in one's profession by reason of significant inventions, important research or design, administrative leadership, or genius in production."

Upon leaving OSU-CSE (then CIS), Dr. May went to work for Pixar Animation Studios where he still creates. He began his tenure at Pixar Animation Studios as the shading and modeling technical director on *Toy Story 2*, working on the characters of Wheezy and Buster. On the film, *Monsters, Inc.*, May worked as the simulation and effects sequence supervisor and helped pioneer the fur technology and overall look for the character Sully. That technology was recently fully re-engineered for the lead character's hair in *Brave*. Following *Monsters, Inc.*, Steve then worked on the Academy Award-winning feature *Finding Nemo*, as the computer graphics supervisor for the shark characters and Sydney Harbor environment.

May was the effects supervisor on Golden Globewinner *Cars*, overseeing all of the film's visual effects. His next role was as the supervising technical director for Disney Pixar's Academy Award-winning feature film, *Up*. That title set the note for what came next in Steve's life because in 2010, he was promoted to Chief Technology Officer at Pixar, where he oversees the development of visual effects tools and processes for the entire studio.

BEST PAPER WIN FOR CSE ALUMNUS

CSE alumnus **GABE BROWN**, BS '06, coauthored an experience paper, "Scrum and Engineering Practices: Experiences of Three Microsoft Teams" and won an IEEE award for Best Experience Paper and the Empirical Software Engineering and Measurement (ESEM) Best Industry Paper Award. The paper's results show that the three teams were able to improve quality, productivity and estimation accuracy through the combination of Scrum and nine engineering practices.

"The paper established empirical benefits that contribute to making Scrum effective for quality software. Many teams claim that Scrum alone is enough to make a quality product however,



teams that do not couple objective measures of quality into their product end up with “flaccid scrum” which the team is producing results but cutting corners,” Brown said. “This paper shows that teams can double quality with only taking 15-20% longer than teams that do not leverage quality gates.”

Brown is now the Engineering Manager for Disney Interactive in Bellevue, WA, making Playdom Facebook games. He had previously worked at Microsoft, producing projects from Microsoft Research for the support organization. In his spare time, he enjoys teaching Applied Agile Development at the University of Washington.

FULLBRIGHT SCHOLAR

JOSEPH HOLLINGSWORTH, PhD '92, was named a 2012 - 2013 Fulbright Scholar.

Hollingsworth received the Fulbright Scholar grant to lecture and do research at the University of San Francisco, Quito, Ecuador (USFQ). His projects will include work on his National Science Foundation grant covering how to use math and logic to prove the correctness of new software, teaching a computing course, and work related to teaching & learning including peer review of faculty, learning outcomes, and class & program assessment.

Dr. Hollingsworth currently serves as a Professor at Indiana University, Southeast. However, he remains in close contact with the researchers in Software Engineering and Programming Languages in OSU-CSE. On his webpage he refers to himself as a “distributed” member of the Resolve/Reusable Software Research Group (RSRG), part of the SE/PL area.



Dr. Gagan Agrawal (above) discusses the Graduate Studies with the new students.



At the 2011 Graduate Student Orientation, (right) Dr. Paul Sivilotti greets the incoming Graduate Students



The new students are all smiles for the upcoming year.

HONORING THE FOUNDERS

As part of this year's banquet celebrations, the Department of Computer Science and Engineering took a moment to look back to its beginnings.

Three of the computer scientists who were integral in the evolution of Computer Science and Engineering (then Computer and Information Science) from a division of College of Arts and Sciences to a full Department within the College of Engineering were invited back and honored for their contributions. This was the first in what is planned to be an annual recognition of those who have worked towards CSE's growth and development.

The first honorees were **DR. CLINT FOULK**, **DR. TED HILDEBRANDT** and **DR. JAMES RANGLES**.

- It was the United States Air Force that set Dr. Clint Foulk on his path to becoming a computer scientist. After he enlisted in 1952, he was sent to the Digital Computer Laboratory of Wright-Patterson AFB to learn and become a computer programmer. When his tour of duty ended in 1956, he attended University of Illinois where he received a Ph.D. in mathematics. In 1963, he accepted a position at The Ohio State University as half-time Assistant Professor of Mathematics and half-time employee of the Computer Center. When the Division of Computer Science was established in 1966, Clint became a full-time Assistant Professor of Computer Science. Dr. Foulk retired from CIS in 1991 and now lives in Florida.
- Once OSU-CIS was established as a department, Dr. Ted Hildebrandt moved on for more challenges. First, he became the Director of the Academic Computer Center at Kansas State University, Manhattan, KS. Shortly thereafter he spent some time at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado, eventually becoming the Director of the Computing Facility. In 1975, Ted resigned from NCAR and began a search for a new position, accepting one at the University of North Carolina, Greensboro, as Professor of Mathematics and Computer Science. He retired from UNCG in 1992 and currently resides in Colorado with his children and grandchildren.
- Dr. James "Jim" Randles also did some of his early work through the Air Force doing projects at the Wright Field Computer Center. After his active duty, in 1957, Jim entered the mathematics program at Ohio State University and worked at the university's computer center. He briefly left OSU to work for the computer center at Space Technology Labs in Los Angeles. Returning in 1961, Jim accepted a job as Research Associate in the computer center, and starting work on a doctor's degree in mathematics. When he completed his Ph. D. in March 1965, he accepted a dual position as Assistant Professor in Mathematics and Math Analyst in the computer center. In 1967, he left the Mathematics Department to help form the academic program which ultimately became the Computer and Information Science Department. He held several academic, administrative and technical support positions during his tenure at the university. In January 1989 he retired from OSU as an Associate Professor Emeritus.

*From Left to Right:
Dr. Clint Foulk, Dr. Ted Hildebrandt and Dr. James Randles.*



2012 DEPARTMENTAL AWARDS & SCHOLARSHIPS

Scholarships

Central Ohio Chapter of Association
of Computing Machinery {ACM}

[Zachary Boerger](#)

Cisco Systems, Inc.

[Tiffany Bogantz](#)

Crowe Horwath, LLP

[Andrew Buelow](#)

Harris Corporation

[Christopher Powers](#)

Ernest William Leggett, Jr. Scholarship

The Leggett Family Award

[David Albert](#)

[Joshua Glick](#)

[Michelle Rush](#)

[Carrie Scono](#)

Matt J. Desch & Ann M. Murphy Award

[Nathaniel Diekman](#)

[Albert Kyle](#)

The O'Connell Family Award

[Jay Hines](#)

Steve R. and Sarah O'Donnell

Computer and Information Science Fund

[Evan deLaubenfels](#)

[Simeon Georgiev](#)

[Richard Hutcheson](#)

[Kevin Landers](#)

[Ryan McGowan](#)

Raytheon Corporation

[Brad Hartshorn](#)

[Jeremy LeDonne](#)

CSE Undergraduate Scholarships

[Joseph Pedicini](#)

[Anthony Zuccarelli](#)

Department Founders Scholarship

[Rachel McIlrath](#)

Department Awards

Outstanding Teaching Award

[Wayne Heym](#)

[Rephael Wenger](#)

B. Chandrasekaran & Sandra Mamrak
Graduate Fellowship

[John Woodruff](#)

Mike Liu Graduate Fellowship Award

[Vignesh Trichy Ravi](#)

[Timothy Normand Miller](#)

Eleanor Quinlan Memorial Awards

[Joshua Eckroth](#)

Outstanding Service Award

[Neelam Soundarajan](#)

[Nikola \(Nikki\) Strader](#)

[David Kneisly](#)

The Department of
Computer Science & Engineering
Undergraduate Research Award

[Chirantan Ekbote](#)

Founders Recognitions

[Clint Foulk](#)

[Theodore Hildebrandt](#)

[James Randels](#)



Ryan McGowan and his parents, Constance and Paul wait for the banquet to begin.

Lorraine Cherry of Raytheon (right) presents award certificates to Brad Hartshorn (left) and Jeremy LeDonne (center).



Jonathan Woodruff (below, left) receives his award from his advisor, Dr. Leon Wang.



The Pedicini Family is all smiles in pride of Joseph's Undergraduate Scholarship.



Carrie Ann Scono and her father, Thomas.



In something of a role reversal, Marc Khoury presents an award to his mentor and advisor, Rafe Wenger. Marc was thrilled to have the chance to speak of someone who has meant so much to him in his career and his life.



Dr. Xiaodong Zhang (above, left) and Dr. Hildebrandt (above, right), found a common link in their lives. Dr. Zhang's first US mentor was Dr. Ralph Slutz with whom Dr. Hildebrandt had worked with in 1947 at the Institute for Advanced Study in Princeton, NJ. Xiaodong shared a photo (right) of Drs. Hildebrandt (2nd from right) and Slutz (2nd from left) carolling outside Einstein's house with a group of colleagues.



AUTOMATED SOFTWARE VERIFICATION¹

Who hasn't used a computer program that crashed at an inopportune moment? Wouldn't it be great if that would never happen again? Many people believe this is a pipe dream. They claim that it is literally impossible to rid non-trivial software of all errors, and that even if reliable and defect-free software were possible in principle it would be too expensive to produce in practice. Fred Brooks claims that "software entities are more complex for their size than perhaps any other human construct". If other engineers cannot guarantee that their artifacts will always work, then why should we expect software engineers to be able to make such guarantees for software?

For the last 25 years, **BRUCE W. WEIDE** and the Resolve/Reusable Software Research Group (RSRG) have been pursuing the long-term vision of a future in which no production software is considered properly engineered unless it has been fully specified and automatically verified as satisfying these specifications. This work directly tackles Tony Hoare's "verifying compiler grand challenge." Of course, even when this vision is realized it will not imply that verified application software will always operate perfectly. However, full behavioral specification plus modular verification that software meets its specification will imply a clear separation of concerns. For verified software, residual errors will be limited to whether the specification captures the requirements and to whether the supporting software and underlying hardware behave as advertised. Questions about the correctness of verified software components relative to their specifications will be effectively moot. As formal verification is applied to more and more software, more and more bugs will be squeezed out of computer systems.

Underlying software verification is a syntax-driven translation process from specifications and code into pure mathematics. One starts with a formal statement of what a piece of software is supposed to do, known as its behavioral specification (assertions written in the formal language of mathematics and mathematical logic); a formal statement of how it achieves that behavior (code written in another formal language, i.e., a programming language); and behavioral specifications of—but, crucially, not code for—all the software components that the above code relies upon to do its job. In a process very much like compiling source code into object code, one then combines the artifacts above into a set of verification conditions (VCs): mathematical assertions that establish the code is correct if and only if they are all valid. Finally, one tries to prove the VCs. If all of them can be proved, then one knows that the code when executed complies with its behavioral specification. If even one VC cannot be proved, then it points directly to the place(s) in the code that should be examined for errors.

There are two distinct flavors of automated software verification. Both involve the use of automated theorem-provers: computer programs that at a minimum can fully

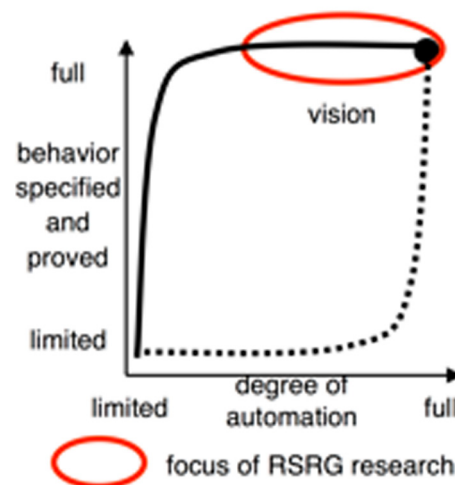
1. Some passages in this highlight are excerpted from Weide, B.W., "Software Verification with Towers of Abstractions", in Neil Tennant, ed., *Foundational Adventures: Essays in Honor of Harvey M. Friedman*, Templeton Press (Online) and College Publications, London, 2011. Continuing support of RSRG from the National Science Foundation over the past 25 years is gratefully acknowledged.



check putative mathematical proofs of mathematical theorems provided by humans, and at best can discover such mathematical proofs by themselves. The first flavor has been demonstrated rather spectacularly in the last five years. Both simple compilers and operating system kernels have been verified “mechanically” in the sense that VCs have been generated as described above and the proofs of those VCs—proofs largely discovered by humans—have been checked by automated theorem-provers. Of course, each of these efforts has been accomplished at great expense in terms of human discovery of the proofs of VCs and their interactive presentation for checking. Yet a big investment of time and effort is reasonably easy to justify in order to establish correctness of software that is used as much as an operating system kernel or a compiler.

What about garden-variety software? This is where the other flavor of automated software verification comes in. Here, the goal is a push-button process in which a software developer simply clicks on a button labeled, say, “verify”, and the VCs are not only generated but also proved fully automatically—without the need for a human to discover proofs of any of the VCs. Though transition of research results to practice will take time, the foundations for a verifying compiler that does this are now close enough to completion that RSRG work is focused on the end-game for this second flavor of automated software verification: automatically proving VCs that are “obvious” to mathematicians, and devising styles of writing behavioral specifications and supporting mathematics that lead to VCs that are also “obvious” to automated theorem-provers. This research combines the interdisciplinary expertise of a group of investigators in software engineering (CS faculty and students at Ohio State, Clemson, and other locations) and in mathematical logic (Harvey M. Friedman of Ohio State’s Mathematics, Philosophy, and CSE Departments) to support a paradigm shift toward verified software.

This basic goal is being approached via research along the top path in the accompanying figure by about a dozen projects worldwide (many of them European). There is noteworthy convergence among these research groups on many key points, e.g.: software specialists will write formal annotations, i.e., specifications of behavior and justificational annotations such as loop invariants and progress metrics; mathematical logic specialists will develop definitions for use in specifications and annotations, and establish reusable results (i.e., lemmas and theorems) on which correctness justifications are based.



Fortunately, there has been considerable progress on the practical front in the past 10-15 years, partly as a result of improvements in automated theorem-proving technology and partly as a result of the availability of faster computers. How have faster computers (faster by a mere factor of perhaps 100) been able to make a serious difference in the ability to find proofs of mathematical statements, a problem

considered computationally intractable under the best of circumstances? The situation is analogous to that facing chess-playing programs until fairly recently. It was long considered impossible that a computer could defeat a human chess champion, but chess-playing programs underwent some improvements and the computers running them became faster, even as the difficulty of playing championship chess remained essentially fixed. Similarly over the years, the mathematical statements that one needs to prove in order to establish software correctness have not grown fundamentally more difficult, yet the tools to prove them have advanced and the computers that run those tools have become substantially more powerful.

A major contribution of RSRG research has been to show how interference between components that results from aliasing across “abstraction boundaries” can be mitigated by a careful design discipline and/or by rather minor programming-language improvements. There is now evidence that (1) programs without cross-boundary interference can be specified with considerably lower annotation overhead than in other languages, and that (2) the resulting VCs can be proved fully automatically at least as effectively—and far more quickly—than for other approaches in comparable situations. The last and purportedly hardest problem in a 2010 software verification competition involved implementing a queue with good amortized performance by representing it using two lists, one containing some of the queue elements in reverse order. The RSRG solution in the Resolve language included fewer than 40 tokens of “annotation overhead”: a loop invariant, a progress metric to show termination of a loop, and an abstraction function. For the component’s constructor and four other operations, the OSU Resolve tools generated 13 VCs that required any mathematical knowledge at all in order to be discharged. All 13 were proved automatically by OSU’s automated theorem-prover in a total of under 100 mS. Automatically proving the VCs for just a partial solution to the same problem using a similar tool from Microsoft Research took about 9 seconds, showing a substantial additional cost for handling VCs that have to deal with potential aliasing.

The conclusion is that automated software verification no longer can be dismissed as a real possibility for practical use in the near future.

February 21, 2012

OSU student Joanna Fedeli, asks John and Annie Glenn about their life and times together during the celebration dinner on the 50th anniversary of John Glenn’s historic flight.



ISOSURFACE & FRACTAL DIMENSIONS

Numerous applications, such as medical imaging and computational fluid dynamics, generate volumetric data. This data consists of numerical measurements such as density or temperature associated with locations in 3-D space. One way of visualizing this data is to construct geometric surface models representing points with the same values. Such surfaces are called isosurfaces.

For the past twelve years, **DR. REPHAEL WENGER** has been studying the problems associated with isosurface reconstruction. With his colleagues and students, Dr. Wenger worked on generalizing isosurface reconstruction algorithms from three to four dimensions. Isosurfaces in 4-D model geometric surfaces in time varying sets, where time is the fourth dimension. Isosurfaces in 4-D can also track geometric surfaces as they vary in time. Projections of isosurfaces from 4-D to 3-D can also be used to efficiently model and tetrahedralize the region between surfaces in 3-D.

Isosurface construction algorithms generate numerous long, thin triangles. Such ill-shaped triangles create visual artifacts and are ill-suited for physical simulation such as modeling heat flow along the isosurface. Dr. Wenger and students worked on methods for constructing isosurfaces with well-shaped triangles with guaranteed lower bounds on the minimum angle of any isosurface triangle. The elimination of long, thin triangles has an added benefit of reducing the number of triangles representing the isosurface by factors of two or three.

The fractal dimension of a surface represents its geometric complexity. Smooth surfaces have fractal dimension of two while space filling surfaces have fractal dimension three. Fractal surfaces have dimension between two and three. Fractal dimension can be used to detect and filter noise in volumetric data sets.

Marc Khoury, an OSU undergraduate student, worked with Dr. Wenger on analyzing the fractal dimension of isosurfaces. Marc's work appeared as a paper in the 2010 IEEE Visualization conference. For his undergraduate research work, Marc received a TechTomorrow scholarship from TechColumbus, the 2011 Undergraduate Research Award from the OSU CSE department, and an honorable mention from the CRA Outstanding Undergraduate Research Award. He also won a Churchill Scholarship to the University of Cambridge and an NSF graduate research fellowship.

Industrial CT (computed tomography) scanning uses X-rays to produce volumetric data sets of industrial components such as machine parts or engines. Such objects typically have sharp edges and corners. Isosurface reconstruction algorithms implicitly smooth the reconstructed surfaces, creating beveled edges and corners. Dr. Wenger is currently working on algorithms for generating isosurfaces with accurate representations of their sharp edges and corners.

Dr. Wenger is completing a book on isosurfaces, entitled "Isosurfaces: Geometry, Topology and Algorithms" which will be published by Peters Publishing, a subsidiary of CRC Press. The book describes isosurface reconstruction algorithms in three and four dimensions, multiresolution isosurfaces, data structures for faster isosurface reconstruction, metrics for measuring and comparing isosurfaces, and graph representations of isosurface structure.



2011 - 2012 RESEARCH FUNDING

NEW GRANTS ESTABLISHED

Funding Source
Grant Title
Primary Investigator - CSE RESEARCHERS
Co-Investigators
Date Amount

Air Force Office of Scientific Research (AFOSR)

Human-Machine Systems to Support Robust Decision Making: Risk versus Opportunity

B. CHANDRASEKARAN
8/18/11 – 12/17/11 \$81,192

Speech Segregation Based on Binary Classification

DELIANG WANG
5/1/12 – 4/30/16 \$932,284

Army Research Office: Multidisciplinary University Research Initiative

Multivariate Heavy-Tail Phenomena: Modeling and Diagnostics

NESS SHROFF
6/1/12 – 5/31/17 \$600,000

Dept. of Energy (DOE)

Scalable Data-Management, Analysis, And Visualization (SDAV) Institute

HAN-WEI SHEN
02/15/12 – 02/14/17 \$750,000

Dept. of Energy Small Business Technology Transfer (DOE STTR) phase ii (with Rnet technologies)

HPC Application Energy Measurement and Optimization

D. K. Panda
02/15/12 – 08/14/12 \$325,000

Honda

Contextual Resolution of Locational References in Human-Computer Dialogue

ERIC FOSLER-LUSSIER
01/01/12 – 06/30/12 \$33,624

International Computer Science Institute (ICSI) { Intelligence Advanced Research Projects Activity (IARPA) subcontract}

SWORDFISH: Spoken Wordsearch with Rapid Development and Frugal Variant Subword Hierarchies

ERIC FOSLER-LUSSIER
03/05/12 – 06/30/14 \$819,764

JP Morgan Chase

Enterprise Systems Research

RAJIV RAMNATH
09/01/11 – 06/30/12 \$32,000

Kitware, Inc. {Dept. of Energy Small Business Innovation Research (DOE SBIR)}

Cloud Computing and Visualization Tools for KBase

Kun Huang
Co-PI: RAGHU MACHIRAJU
2/1/12 – 10/31/12 \$49,532

Kuzer Co. (Air Force Office of Scientific Research Small Business Technology Transfer (AFOSR STTR))

An Auditory Scene Analysis Approach to Speech Segregation

DELIANG WANG
01/01/12 – 12/31/13 \$300,000

Mellanox Technologies, Inc.

Research on High Performance and Scalable MPI over InfiniBand.

D. K. PANDA
4/4/04-3/31/11 \$176,835

National Science Foundation (NSF)

EXP: GeoGames – A Virtual Simulation Workbench for Teaching and Learning Through a Real-world Spatial Perspective

Karl Ola Ahlqvist (OSU – Geography)
Co-PIs: RAJIV RAMNATH, Kathryn Plank (OSU-University Center for the Advancement of Teaching)
10/01/11 – 09/30/13 \$374,772



National Science Foundation (NSF)

PC3: Collaborative Research: Wireless Sensor Networks for Protecting Wildlife and Humans

ANISH ARORA

10/01/11 – 09/30/13 \$178,209

RI: Small: Algebraic and Spectral Structure of Data in High Dimension

MIKHAIL BELKIN

7/1/11 – 06/30/14 \$450,000

AF: Medium: Collaborative Research: Optimality in Homology – Algorithms and Applications

TAMAL DEY

08/01/11 – 07/31/15 \$352,896

AF: Small: Analyzing Spaces and Scalar Fields via Point Clouds

TAMAL DEY

Co-PI: YUSU WANG

08/01/11 – 07/31/14 \$499,761

CI-P: Collaborative Research: The Speech Recognition Virtual Kitchen

ERIC FOSLER-LUSSIER

6/1/12 – 05/31/13 \$48,608

RI: Small: Hard Clustering via Bayesian Nonparameters

BRIAN KULIS

6/1/12 – 5/31/15 \$439,689

Collaborative Research: Serious Play in Synthetic Worlds: Social Media Enhanced Organized Sensemaking in Emergency Response

SRINIVASAN PARTHASARATHY

09/01/11 – 08/31/14 \$270,000

EAGER: Towards New Scalable Stochastic Flow Algorithms

SRINIVASAN PARTHASARATHY

08/01/11 – 07/31/12 \$150,000

Nets: Medium: Collaborative Research: Enabling Cellular Services Over Unplanned Femto-Cell Deployments: From Theory To Implementation

PRASUN SINHA

06/01/12 – 05/31/15 \$380,000

U.S.- China Workshop on Environmental Monitoring for Public Health and Disaster Recovery

DONG XUAN

5/15/12 – 04/30/13 \$60,558

SI2-SSE: A Unified Software Environment to Best Utilize Cache and Memory Systems on Multicores

XIAODONG ZHANG

06/01/12 – 05/31/15 \$500,000

Travel support for the 32nd IEEE International Conference on Distributed Computing Systems

XIAODONG ZHANG

04/01/12 – 03/31/13 \$10,000

National Science Foundation (NSF): SI2-SSI: Collaborative Research:

A Comprehensive Performance Tuning Framework for the MPI Stack

D. K. PANDA

Co-PI: Karen Tomko (Ohio Supercomputer Center)

4/15/12 – 04/14/15 \$1,251,374

National Science Foundation (NSF): Software and Hardware Foundations (SHF):

Small: GOALI: Addressing the Challenges of Parameter Variation in the Design of Ultra-low Power Chip Multiprocessors Using Near-threshold Technology

RADU TEODORESCU

Co-PI: Waleed Khalil (OSU - Electrical & Computer Engineering)

7/1/11 – 06/30/14 \$400,000

NVIDIA Corporation

High-Performance MPI Design for InfiniBand Clusters with GPUs

D. K. PANDA

07/01/11 – 03/31/13 \$115,237

Raytheon BBN Technologies

GENI Educational Kits for Wireless Sensor Networks

ANISH ARORA

Co-PI: RAJIV RAMNATH

10/01/11 – 09/30/14 \$204,884

RNET Technologies (AFOSR STRR Subaward)

Highly-Scalable Computational-Based Engineering Algorithms for Emerging Parallel Machine Architectures

P. SADAYAPPAN

Co-PI: Sandip Mazumder (OSU- Mechanical & Aerospace Engineering)

01/01/12 – 09/30/12 \$47,097

RNET Technologies (DOE STTR Subaward)

*Catalytic Converter Modeling on Emerging
Personal Computers and Small Clusters*

Sandip Mazumder (OSU- Mechanical &
Aerospace Engineering)

Co-PI: **P. SADAYAPPAN**

2/20/12 – 11/19/12 \$46,428

Uniformed Services University Health Sciences Tri-Service Nursing: –

*Effectiveness and Benefit of Two STI Prevention
Delivery Methods for Military Women*

Nancy Ryan-Wenger (OSU- College of Nursing)

Co-PI: Elizabeth Barker (OSU- College of
Nursing), Maria Palazzi (ACCAD), **RAJIV RAMNATH**,
Victoria Von Sadowsky Barker (OSU- College of
Nursing)

8/1/11 – 7/31/12 \$660,959

Xerox Corporation

*Customization and Individualization of Reading
Materials for an Individual or Group*

ERIC FOSLER-LUSSIER

7/1/11 – 08/31/12 \$19,468

GRANTS ESTABLISHED PRIOR TO JULY 1, 2011

Air Force Office of Scientific Research (AFOSR)

*Internet Attack Traceback-Cross-Validation and
Pebble-Trace*

TEN-HWANG (STEVE) LAI

4/1/09 – 11/30/12 \$500,000

Air Force Office of Scientific Research

Network of Memories

Simon Dennis (OSU-Dept. of Psychology)

Co-PI: **MIKHAIL BELKIN**

4/1/09-7/14/12 \$478,426

*Sequential Organization and Room Reverberation
in Speech Segregation*

DELIANG (LEON) WANG

2/1/08 – 11/30/11 \$874,369

Air Force Research Laboratory

*Center for Automatic Target Research (CATR)
Task 0006*

ANISH ARORA

11/16/10 – 11/19/12 \$125,000

Center for Automatic Target Research (CATR) Task 0002

JAMES DAVIS

5/1/10 – 9/30/12 \$44,000

*Center for Automatic Target Research (CATR)
Task 0006*

JAMES DAVIS

11/16/10 – 11/19/12 \$293,000

Aquilent, Inc. (National Library of Medicine subaward)

*A Comprehensive Workflow for Robust
Characterization of Microstructure for Cancer
Studies*

RAGHU MACHIRAJU

Co-PI: Kun Huang (OSU-Biomedical Informatics)

4/1/11 – 9/24/12 \$150,000

Army Research Office: Multidisciplinary University Research Initiative

*Stochastic Control of Multi-Scale Networks:
Modeling, Analysis and Algorithms*

NESS SHROFF

5/1/08 – 11/28/12 \$6,456,625

BBNT Solutions, LLC

*Genifying and Federating Autonomous Kansei
Wireless Sensor Networks*

ANISH ARORA

Co-PI: **RAJIV RAMNATH**

9/1/08 – 8/31/11 \$500,000

Capstone Partners

Capstone Partnerships

RAJIV RAMNATH

1/1/11 – 12/31/12 \$15,000

CETI IUCRC Memberships

JAY RAMANATHAN

Co-PI: **RAJIV RAMNATH**

10/1/06 – 04/30/12 \$567,604.31



DARPA (Rice University Subaward)

A Platform-Aware Compilation Environment

P. SADAYAPPAN

Co-PI: ATANAS ROUNTEV

4/1/09 – 11/30/11 \$820,004

Dept. of Energy (DOE) STTR Phase II (with RNET Technologies)

Creating Petascale

D. K. PANDA

9/15/09 – 06/30/12 \$275,000

Dept. of Energy (DOE)

Coordinated Fault Tolerance for High Performance Computing

D. K. PANDA

9/15/06-9/15/11 \$1,000,000

Programming Models For Scalable Parallel Computing

D. K. PANDA

9/15/06-09/15/12 \$1,000,000

A Fault-Oblivious Extreme Scale Execution Environment

P. SADAYAPPAN

9/1/10 – 8/31/13 \$469,254

A Polyhedral Transformation Framework for Compiler Optimization

P. SADAYAPPAN

Co-PI: ATANAS ROUNTEV

9/1/10 – 8/31/13 \$399,842

Programming Models for Scalable Parallel Computing

P. SADAYAPPAN

9/15/06-8/31/12 \$500,000

Scalable Fault Tolerant Runtime Technology for Petascale Computers

P. SADAYAPPAN

8/1/08 - 7/31/12 \$375,820

An Information Framework for Enabling Extreme-scale Science Discovery

HAN-WEI SHEN

9/1/10 – 8/31/13 \$462,095

SciDAC Institute for Ultrascale Visualization

HAN-WEI SHEN

9/26/07-12/14/12 \$750,000

Very Large 3D Flow Field Visual Analysis

HAN-WEI SHEN

10/28/10 – 9/30/13 \$461,074

Hewlett Packard

Energy and Labor Efficient Sensor Networking for Underground Data Acquisition

NESS SHROFF

Co-PI: Can Emre Koksall (OSU-Dept. Electrical and Computer Engineering)

09/01/12 – 08/31/15 \$300,000

Kuzer Co. (Air Force Office of Scientific Research (AFOSR STTR))

An Auditory Scene Analysis Approach to Speech Segregation

DELIANG (LEON) WANG

7/1/10 – 09/30/12 \$40,000

Los Alamos National Labs

IRWIN Research in Wireless

JAMES DAVIS

7/1/10 – 9/30/11 \$170,392

Mellanox Technologies, Inc

Research on High Performance and Scalable MPI over InfiniBand.

D. K. PANDA

4/4/04-3/31/11 \$765,122

National Center for Research Resources (OSU CCTS)

CCTS NCTMP Pilot

RAGHU MACHIRAJU

Co-PI: Rebecca Jackson (OSU- Dept. of Physical Medicine and Rehabilitation)

7/1/10 – 12/31/11 \$149,424

National Library of Medicine

A Comprehensive Workflow for Large Histology Segmentation and Visualization

RAGHU MACHIRAJU

Co-PIs: Kun Huang (OSU-Biomedical Informatics) and Lisa Lee (OSU- SBS-Division of Anatomy)

6/25/10 – 6/24/12 \$150,000

National Science Foundation (NSF)

A Language Independent Framework For Compiling Data-Intensive Applications on Highly Parallel Systems

GAGAN AGRAWAL

9/1/08 – 08/31/12 \$502,000

DC: Small: Data Intensive Computing Solutions for Neuroimage Analysis

GAGAN AGRAWAL

Co-PI: RAGHU MACHIRAJU

9/15/09-8/31/12 \$488,000

CPS: Small: Collaborative Research: Localization and System Services for Spatiotemporal Actions in Cyber-Physical Systems

ANISH ARORA

9/15/09-8/31/12 \$200,001

DHB/Collaborative Research: Using Machine Learning to Model the Interplay of Production Dynamics and Perception Dynamics in Phonological Acquisition

Mary Beckman (OSU – Dept. of Linguistics)

Co-PI: ERIC FOSLER-LUSSIER

1/15/08 – 12/31/11 \$273,284

CAREER: Geometry and High-Dimensional Inference

MIKHAIL BELKIN

10/01/07 – 12/31/12 \$498,972

Inferring Topology and Geometry for Dynamic Shapes

TAMAL DEY

9/1/08 – 8/31/11 \$220,000

MCS: Reconstructing and Inferring Topology and Geometry From Point to Point Cloud Data

TAMAL DEY

Co-PI: Dan Burghelea (OSU-Dept. of Mathematics)

9/1/09-8/31/12 \$462,000

Collaborative Research: RI: Medium: Explicit Articulatory Models of Spoken Language, with Application to Automatic Speech Recognition

ERIC FOSLER-LUSSIER

7/1/09-6/30/13 \$334,469

CAREER: Breaking the Phonetic Code: Novel Acoustic-Lexical Modeling Techniques for Robust Automatic Speech Recognition

ERIC FOSLER-LUSSIER

12/15/06-11/30/12 \$502,952

CPATH T: NEWPATH: Nurturing, Through Entrepreneurship, IT World Leaders

DAVID LEE

Co-PIs: BRUCE WEIDE, RAJIV RAMNATH, NEELAM SOUNDARAJAN, DONG XUAN, HAN-WEI SHEN,

Waleed Ali Muhanna (Fisher College of Business), Eylem Ekici (Dept. of Electrical and Computer Engineering), Stephan Camp (Center for Entrepreneurship)

7/1/07 – 6/30/13 \$622,822

G&V: Medium: Collaborative Research: Large Data Visualization Using an Interactive Machine Learning Framework

RAGHU MACHIRAJU

Co-PI: HAN-WEI SHEN

6/1/11 – 5/31/14 \$542,002

CPS: Medium: Autonomous Driving in Mixed-traffic Urban Environments

Ümit Özgüner (OSU-Dept. Electrical and Computer Engineering)

Co-PI: BRUCE WEIDE, PAUL SIVILOTTI, Ashok Krishnamurthy (OSU-Dept. Electrical and Computer Engineering), Füsün Özgüner (OSU-Dept. Electrical and Computer Engineering)

9/1/09-8/31/13 \$1,296,683

Applicability of Object-based Storage Devices in Parallel File Systems

D. K. PANDA

09/01/06 – 08/31/11 \$520,000

Collaborative Research: Dynamic Staging Architecture for Accelerating I/O Pipelines

D. K. PANDA

5/1/10 – 4/30/13 \$90,000

Topology-Aware MPI Collectives and Scheduling for Petascale Systems with InfiniBand

D. K. PANDA

09/15/06-09/30/12 \$920,000

Global Graphs: A Middleware for Data Intensive Computing

SRINIVASAN PARTHASARATHY

Co-PI: P. SADAYAPPAN

9/1/09-8/31/12 \$515,997

CAREER: Building Immunity to Memory Management Bugs During Production Runs

FENG QIN

3/1/10-2/28/15 \$420,000



Center for Experimental Research in Computer Systems- Research Site

JAY RAMANATHAN

Co-PI: RAJIV RAMNATH

5/1/08 – 4/30/13 \$190,000

Curriculum for Accelerated Services Engineering (CASE)

RAJIV RAMNATH

Co-PIs: JAY RAMANATHAN, NEELAM SOUNDARAJAN, Jerome D'Agostino (OSU-CoEHE, Quantative Research, Evaluation and Measurement)

9/1/09 – 8/31/12 \$149,981

CAREER: Dataflow Analysis for Modern Software Systems

ATANAS ROUNTEV

9/15/06-8/14/12 \$407,000

SHF: Small: Algorithms for Dynamic Analysis of Run-time Bloat

ATANAS ROUNTEV

9/15/10 – 8/31/13 \$356,531

Collaborative Research: An Environment for High-Productivity High-Performancy Computing using GPUs/accelerators

P. SADAYAPPAN

9/15/09-8/31/13 \$468,492

Collaborative Research: Petascale Simulations of Quantum Systems by Stochastic Methods

P. SADAYAPPAN

9/1/09-8/31/13 \$639,952

Customizable Domain-specific Computing

P. SADAYAPPAN

9/1/09-8/31/14 \$749,998

Collaborative Research: CPA-CPL-T: An Effective Automatic Parallelization Framework for Multi-Core Architectures

P. SADAYAPPAN

Co-PI: ATANAS ROUNTEV

8/1/08 – 7/31/11 \$500,000

GV: Small: Collaborative Research: An Information Theoretic Framework for Large-Scale Data Analysis And Visualization

HAN-WEI SHEN

9/1/10 – 8/31/13 \$292,147

NeTS-NECO: A New Resource Management Paradigm for Sensor Networks With Energy Replenishment

NESS SHROFF

Co-PI: PRASUN SINHA and Can Emre Koksall (OSU-Dept. Electrical and Computer Engineering)

9/1/08 – 8/31/12 \$500,000

CAREER: On-the-Fly Protocols for Data Dissemination in Wireless Mesh Networks

PRASUN SINHA

1/15/06-12/31/11 \$412,000

Collaborative Proposal: NOSS: Doing more with less: Tracking Movements Using a Sparse Sensor Network

PRASUN SINHA

9/1/07 – 8/31/12 \$216,017

NeTS-NOSS: Collaborative research: Energy-Efficient Distributed Sensor Network Control: Theory to Implementation

PRASUN SINHA

Co-PI: NESS SHROFF

9/1/07 – 8/31/11 \$491,661

AF: EAGER: Collaborative Research: Integration of Computational Geometry and Statistical Learning for Modern Data Analysis

YUSU WANG

Co-PI: MIKHAIL BELKIN

09/01/10 - 08/31/12 \$196,000

CAREER: Geometric and Topological Methods in Shape Analysis, with Applications in Molecular Biology

YUSU WANG

2/1/08 – 1/31/13 \$420,000

Similarity-based Indexing and Integration of Protein Sequence and Structure Databases DBI

YUSU WANG

Co-PI: Chenglong Li (OSU- Div. of Medicinal Chemistry and Pharmacognosy)

8/15/08 – 12/31/11 \$498,117

Automated Support for Developing Logical Reasoning Skills in Discrete Mathematics Courses

BRUCE WEIDE

Co-PIs: Harvey Friedman (OSU-Dept. of Mathematics), Dennis Pearl (OSU-Dept. of Statistics)

3/1/10-8/31/12 \$199,775

NeTS: Small: Connected Coverage of Wireless Sensor Networks in Theoretical and Practical Settings

DONG XUAN

Co-PI: TEN-HWANG LAI

9/1/09-8/31/12 \$400,000

Basic Research for Developing SSD-based Caching and Hybrid Storage Systems

XIAODONG ZHANG

8/1/09-7/31/13 \$400,000

Collaborative research: CSR-PSCE, TM: Effective Resource Sharing and Coordination Inside Multicore Processors For High Throughput Computing

XIAODONG ZHANG

9/1/08 – 8/31/12 \$330,000

National Science Foundation (NSF) CAREER:

Algorithm Design for Optimization Problems In Network Over-Provisioning

DONG XUAN

12/15/05-11/30/11 \$400,060

National Science Foundation (NSF) SHF:

Small: Designing QoS-aware MPI and File Systems Protocols for InfiniBand Clusters

D. K. PANDA

09/01/09 – 09/30/13 \$491,570

National Science Foundation (NSF): CPA-SEL:

Collaborative Research: Continuing Progress Toward Verified Software

BRUCE WEIDE

Co-PI: Harvey Friedman (OSU-Dept. of Mathematics)

9/1/08 – 02/28/13 \$279,107 / \$232,591

National Science Foundation (NSF): CT-ISG:

Collaborative Research: Router Models and Downscaling Tools for Scalable Security Experiments

NESS SHROFF

10/1/08 – 9/30/12 \$125,000

National Science Foundation (NSF): NeTS:

Large: Collaborative Research: Foundations for Network Cooperation at Signal Scale

NESS SHROFF

07/01/2010 – 06/30/2015 \$330,000

National Science Foundation (NSF): NeTS:

Medium: Collaborative Research: Mobile Content Sharing Networks: Theory to Implementation

NESS SHROFF

Co-PI: DONG XUAN

07/01/11 – 06/30/15 \$628,946

National Science Foundation (NSF): NeTS-Medium:

Collaborative Research: Unifying Network Coding and Cross-Layer Optimization for Wireless Mesh Networks: From Theory to Distributed Algorithms to Implementation

NESS SHROFF

09/01/09 – 08/31/13 \$350,000

Nile University

Educational Support for Nile University in the Area of Wireless Communications

NESS SHROFF

3/1/10 – 8/31/12 \$15,000

Ohio Department of Development (University of Dayton subaward)

Wright Center of Innovation, Institute for the Development and Commercialization of Advanced Sensor Technology (IDCAST)

Randy Moses (OSU-College of Engineering / Electrical and Computer Engineering)

Co-PI: JAMES DAVIS

2/26/07 – 7/31/11 \$190,000

Pennsylvania State University (ARO MURI Subaward)

Design of Urban Sensor Networks

NESS SHROFF

6/15/07 – 02/05/13 \$300,000

RNET Technologies (Dept. of Energy Small Business Technology Transfer (DOE STTR))

Accelerating Parallel Numerical Libraries to Petascale and Beyond

P. SADAYAPPAN

8/15/10 – 8/15/12 \$245,000



Sandia Labs

Scalability and Fault-tolerance Properties of InfiniBand Subnet Management

D. K. PANDA

5/10/10 – 9/30/11 \$115,885

University of Texas at Austin (National Science Foundation (NSF) subaward)

World-Class Science Through World Leadership in HPC

D. K. PANDA

10/1/10 – 9/30/13 \$172,616

Xerox Corporation

Customization and Individualization of Reading Materials for an Individual or Group

ERIC FOSLER-LUSSIER

1/1/10-08/31/12 \$79,000

Yale University (NIH Subaward)

Acute Coronary Syndrome and Care-seeking Delay: A Web Based Behavioral Study

RAJIV RAMNATH

Co-PI: Curtis Haugtvedt (OSU-Dept. of Marketing and Logistics)

9/1/07 – 4/30/12 \$197,579

GIFTS

NEC – Cluster Level GPU Virtualization

GAGAN AGRAWAL

\$25,000

2012 IBM Open Collaborative Faculty Award

D. K. PANDA

\$100,000

Ideal Group

RAJIV RAMNATH

\$5,000



It was a sad day in June, when CSE wished Bon Voyage to one of its members - Dr. Rick Parent retired. Rick Parent is renown for his work in animation and many Hollywood animators benefited from his tutelage.

Above: Rick (left) poses with Wayne Carlson. The two started graduate school together and became faculty at the same time as well. Wayne is now the Vice Provost for Undergraduate Studies and Dean of Undergraduate Education.



ARTIFICIAL INTELLIGENCE

- M. Belkin, Q. Que, Y. Wang and X. Zhou. "Toward Understanding Complex Spaces: Graph Laplacians On Manifolds With Singularities And Boundaries." *Proceedings of the 25th Conference on Learning Theory* (COLT 2012); Edinburgh, Scotland; June 25–June 27, 2012; pp. 36.1-36.26
- X. Ge, I. Safa, M. Belkin and Y. Wang. "Data Skeletonization via Reeb Graphs." *Proceedings of the 25th Annual Conference on Neural Information Processing Systems* (NIPS) Granada, Spain; Dec. 12-15, 2011; pp. 837-845
- X. Zhou, M. Belkin and N. Srebro "An Iterated Graph Laplacian Approach for Ranking on Manifolds." *Proceedings of the 17th ACM SIGKDD Conference on Knowledge Discovery and Data Mining* (KDD 2011); San Diego, California, USA; Aug. 21-24, 2011; pp. 877-885
- M. Keck and J. Davis. "Recovery and Reasoning about Occlusions in 3-D using Few Cameras with Applications to 3-D Tracking." *International Journal of Computer Vision*, Dec. 2011; Vol. 95, no. 3: pp. 240-264
- M. Nedrich and J. Davis "Detecting Behavioral Zones in Local and Global Camera Views." *Machine Vision and Applications*, Mar. 2012; Vol. 23
- J. Chu-Carroll, E. Fosler-Lussier, E. Riloff, and S. Bangalore, ed. "Proceedings of the 2012 Annual Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies Conference." *Association for Computational Linguistics*, Montréal, Québec, Canada; 2012
- W. Hartmann and E. Fosler-Lussier. "ASR-Driven Top-Down Binary Mask Estimation Using Spectral Priors." *Proceedings of the 37th International Conference on Acoustics, Speech, and Signal Processing* (ICASSP 2012). Kyoto, Japan; March 25 - 30, 2012
- E. Iosif, M. Giannoudaki, E. Fosler-Lussier and A. Potamianos. "Associative and Semantic Features Extracted From Web-Harvested Corpora." *Proceedings of the 8th International Conference on Language Resources and Evaluation* (LREC 2012). ELRA. (2012); Istanbul, Turkey; May 23-25 2012
- Y. Ma, E. Fosler-Lussier, and R. Lofthus. "Ranking-Based Readability Assessment for Early Primary Children's Literature." *Proceedings of the North American Association for Computational Linguistics Annual Meeting - Human Language Technologies Conference* (NAACL HLT 2012); Montréal, Québec, Canada; June 3-8, 2012; pp. 548 – 552
- P. Raghavan, E. Fosler-Lussier, C. Brew and A. Lai. "Medical Event Coreference Resolution using the UMLS Metathesaurus and Temporal Reasoning." *Proceedings of the 2012 ACM SIGHIT International Health Informatics Symposium* (IHI 2012); Miami, Florida, USA; Jan. 28-30, 2012; pp. 465 - 472
- P. Raghavan, E. Fosler-Lussier and A. Lai. "Exploring Semi-Supervised Coreference Resolution of Medical Concepts using Semantic and Temporal Features." *Proceedings of the North American Association for Computational Linguistics Annual Meeting – Human Language Technologies Conference* (NAACL HLT 2012); Montréal, Québec, Canada; June 3-8, 2012; pp. 731-741
- P. Raghavan, E. Fosler-Lussier, and A. Lai. "Exploring Semi-Supervised Coreference Resolution of Medical Concepts using Semantic and Temporal Features." *Proceedings of the North American Association for Computational Linguistics Annual Meeting - Human Language Technologies Conference* (NAACL HLT 2012); Montréal, Québec, Canada; June 8, 2012; pp. 731-742
- K. Han and D. L. Wang. "On Generalization of Classification Based Speech Separation." *Proceedings of 37th International Conference on Acoustics, Speech, and Signal Processing* (ICASSP-12); Kyoto, Japan; Mar. 25-30, 2012; pp. 4541-4544
- Z. Jin and D. L. Wang. "Reverberant Speech Segregation Based on Multipitch Tracking and Classification." *IEEE Transactions on Audio, Speech, and Language Processing*, 2011; Vol. 19, iss. 8; pp. 2328-2337

K. Hu and **D. L. Wang**. "SVM-Based Separation of Unvoiced-Voiced Speech in Cochannel Conditions." *Proceedings of 37th International Conference on Acoustics, Speech, and Signal Processing (ICASSP-12)*; Kyoto, Japan; Mar. 25-30, 2012; pp. 4545-4548

K. Hu and **D. L. Wang**. "Unvoiced Speech Segregation from Non-speech Interference Via CASA and Spectral Subtraction." *IEEE Transactions on Audio, Speech, and Language Processing*, 2011; Vol. 19, iss. 6, pp. 1600-1609

J. Woodruff and **D. L. Wang**. "Binaural Speech Segregation Based on Pitch and Azimuth Tracking." *Proceedings of 37th International Conference on Acoustics, Speech, and Signal Processing (ICASSP-12)*; Kyoto, Japan; Mar. 25-30, 2012; pp. 241-244

J. Yuan, **D. L. Wang**, B. Wu, L. Yan and R. Li. "Legion-Based Automatic Road Extraction from Satellite Imagery." *IEEE Transactions on Geoscience and Remote Sensing 2011*. Vol. 49, iss. 11, pt. 2; pp. 4528-4538

J. Yuan, **D. L. Wang**, and R. Li. "Image Segmentation Using Local Spectral Histograms and Linear Regression." *Pattern Recognition Letters*. April 2012; Vol. 33, No. 5; pp. 615-622

J. Yuan, **D. L. Wang**, and R. Li. "Image Segmentation Based On Local Spectral Histograms and Linear Regression." *Proceedings of 2011 International Joint Conference on Neural Networks (IJCNN-11)* San Jose, California, USA; July 31 – Aug. 5, 2011; pp. 482-488

GRAPHICS

O. Mishchenko and **R. Crawfis**. "Effective Texture Models for Three Dimensional Flow Visualization." *Proceedings of the Spring Conference on Computer Graphics 2012 (SCCG 2012)*; Smolenice Castle, Slovakia; May 2-4, 2012; pp. 45-52 BEST PAPER AWARD

T. K. Dey, J. Sun, and **Y. Wang**. "Approximating Cycles in a Shortest Bases of the First Homology Group from Point Data." *Inverse Problems*, Dec. 2011; Vol. 27, no. 12

T. K. Dey, P. Ranjan, and **Y. Wang**. "Eigen Deformation of 3-D Models." *Proceedings of Computer Graphics International (CGI)* 2012; 2012

T. K. Dey and A. G. Slatton. "Localized Delaunay Refinement for Volumes." *Computer Graphics Forum*, Aug. 2011; Vol. 30, no. 5, pp. 1417 – 1426

T. K. Dey, F. Janoos and J. Levine. "Meshing Interfaces of Multi-Label Data with Delaunay Refinement." *Engineering with Computers*; Jan. 2012; Vol. 28, no. 1, pp. 71-82

T. K. Dey, A. N. Hirani, and B. Krishnamoorthy. "Optimal Homologous Cycles, Total Unimodularity, and Linear Programming." *SIAM Journal on Computing*, 2011; Vol. 40, no. 4; pp. 1026 – 1044

C.-M. Chen, L. Xu, T.-Y. Lee and **H.-W. Shen**. "A Flow-Guided File Layout for Out-of-Core Streamline Computation." *Proceedings of the IEEE Large Data Analysis and Visualization (LDAV 2012)*; Seattle, Washington, USA; Oct. 14-15, 2012; pp. 115 – 116

C.-M. Chen, L. Xu, T.-Y. Lee and **H.-W. Shen**. "A Flow Guided Layout for Out-of-Core Streamline Computation." *Proceedings of the 5th IEEE Pacific Visualization Symposium (PacificVis 2012)* Songdo, Korea; Feb. 28 – Mar. 2, 2012; pp. 145-152

A. Chaudhuri and **H.-W. Shen**. "A Self-Adaptive Technique for Visualizing Geospatial Data in 3-D with Minimum Occlusion." *Proceedings of the Conference on Visualization and Data Analysis (VDA 2012)* in conjunction with 24th annual Symposium on Electronic Imaging (ISE 2012); Burlingame, California, USA; Jan. 22-26, 2012; Vol. 8294-15

S. Martin and **H.-W. Shen**. "Histogram Spectra for Multivariate Time-Varying Volume LOD Selection." *Proceedings of IEEE Large Data Analysis and Visualization (LDAV 2012)*; Seattle, Washington, USA; Oct. 14-15, 2012; pp. 39-46

B. Nouanesengsey, T.-Y. Lee and **H.-W. Shen**. "Load Balanced Parallel Streamline Generation on Large Scale Vector Fields." *IEEE Transactions on Visualization and Computer Graphics*; Dec. 2011; Vol. 17, no. 12, pp. 1785-1794



- T. Peterka, R. Ross, W. Kendall, A. Gyulassy, V. Pascucci, **H.-W. Shen**, T.-Y. Lee, A. Chaudhuri. "Scalable Parallel Building Blocks for Custom Data Analysis." *Proceedings of IEEE Large Data Analysis and Visualization* (LDV 2012); Seattle, Washington, USA; Oct. 14-15, 2012; pp. 105-112
- T. Kerwin, D. Stredney, G. Wiet and **H.-W. Shen**. "Virtual Mastoidectomy Performance Evaluation Through Multi-Volume Analysis." *Proceedings of Computer Assisted Radiology 26th International Congress and Exhibition* (CARS 2012) Pisa, Italy; June 27-30
- Y. Zhang, **H. Wang**, S. Wang, Y. Tong and K. Zhou. "A Deformable Surface Model for Real-Time Water Drop Animation;" *IEEE Transactions on Visualization and Computer Graphics*; Aug. 2012; Vol. 18, No. 8, pp. 1281 – 1289
- W. Hua, X. Zeng, R. Wang, Y. Tang, **H. Wang** and H. Bao. "Compressing Repeated Content within Large-scale Remote Sensing Images." *The Visual Computer* Apr. 2012; Vol. 28, No. 6-8, pp. 755-764
- H. Wang**, R. Ramamoorthi and J. O'Brien. "Data-Driven Elastic Models for Cloth: Modeling and Measurement." *ACM Transactions on Graphics* (SIGGRAPH) July 2011; Vol. 30, No. 4, Article 71:1-11
- H. Sun, A. Sacan, H. Ferhatosmanoglu and **Y. Wang**. "Smolign: A Spatial Motifs-Based Protein Multiple Structural Alignment Method." *IEEE-ACM Transactions On Computational Biology And Bioinformatics* 2012; Vol. 9, no. 1, pp. 249-261
- C. Luo, I. Safa and **Y. Wang**. "Feature-aware Streamline Generation of Planar Vector Fields via Topological Meths." *Computer and Graphics*; Oct. 2012; Vol. 36, Iss. 6, pp. 754-766

NETWORKING

- T. Kwon, E. Ertin and **A. Arora**. "Performance Repeatability of Low Power Wireless Sensor Network Protocols: A Multi-Testbed Study." *Proceedings of the 14th ACM International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems* (MSWIM 2011) Miami Beach, Florida, USA; Oct. 31 – Nov. 4, 2011; pp. 393-400
- V. Kulathumani, **A. Arora** and S. Ramagiri. "Pursuit Control over Wireless Sensor Networks using Distance Sensitivity Properties." *IEEE Transactions on Automatic Control*; Oct. 2011; Vol. 56, no. 10, pp. 2473-2478
- T. Kwon, E. Ertin and **A. Arora**. "Reproducing Consistent Wireless Protocol Performance Across Environments." *Ad Hoc Networks*, June 2012; Vol. 10, no. 4, pp. 696-708.
- I. Ramzy and **A. Arora**. "Using Zero Knowledge to Share a Little Knowledge: Bootstrapping Trust in Device Networks." *Proceedings of the 13th International Symposium on Stabilization, Safety, and Security of Distributed Systems* (SSS 2011) Grenoble, France; October 10-12, 2011; pp. 371-385
- J. Li, J. Chen and **T. H. Lai**. "Energy-Efficient Intrusion Detection with a Barrier of Probabilistic Sensors." *Proceedings of the 31st Annual IEEE International Conference on Computer Communications* (IEEE INFOCOM 2012); Orlando, Florida, USA; Mar. 25 – 30, 2012; pp. 118-126
- S. Chen, **P. Sinha**, **N. Shroff** and C. Joo. "A Simple Asymptotically Optimal Energy Allocation and Routing Scheme in Rechargeable Sensor." *Proceedings of the 1st Annual IEEE International Conference on Computer Communications* (IEEE INFOCOM 2012); Orlando, FL, USA; Mar. 25-30, 2012; pp. 379 – 387
- M. Jain, J. II Choi, T. M. Kim, D. Bharadia, **K. Srinivasan**, P. Levis, S. Katti, **P. Sinha** and S. Seth. "Practical, Real-time Full Duplex Wireless." *Proceedings of the The 17th Annual International Conference on Mobile Computing and Networking* (ACM MOBICOM '11); Las Vegas, Nevada, USA; Sept. 19-23, 2011; pp. 301-312
- S. Hariharan and **N. B. Shroff**. "Maximizing Aggregated Information in Sensor Networks under Deadline Constraints," *IEEE Transactions on Automatic Control*/special issue on Wireless Sensor and Actuator Networks; October 2011, Vol. 56, iss. 10, pp. 2369 - 2380
- S. Hariharan and **N. B. Shroff**. "On Sample Path Optimal Dynamic Scheduling for Sum-Queue Minimization in Trees under the K-Hop Interference Model," *Proceedings of The 31st Annual IEEE International Conference on Computer Communications* (IEEE INFOCOM 2012); Orlando, Florida, USA; March 2012, pp. 999-1007



MHR Khouzani, S. Eshghi, S. Sarkar, S. S Venkatesh, and **N. B. Shroff**. "Optimal Energy-Aware Epidemic Routing in DTNs," *Proceedings of the ACM International Symposium on Mobile Ad Hoc Networking and Computing 2012* (ACM Mobihoc); Hilton Head Island, South Carolina, USA; June 2012, pp. 175-182

D. Koutsonikolas, C.-C. Wang, Y.-C. Hu, and **N. B. Shroff**. "FEC-Based AP Downlink Transmission Schemes For Multiple Flows: Combining The Reliability and Through-put Enhancement of Intra- and Inter-flow Coding," *Elsevier Performance Evaluation* (PEVA), November 2011, Vol. 68, no. 11, pp. 1118-1135

S. Li, Z. Zhan, E. Ekici, and **N. B. Shroff**. "Maximizing System Throughput by Cooperative Sensing in Cognitive Radio Networks," *Proceedings of The 31st Annual IEEE International Conference on Computer Communications* (IEEE INFOCOM 2012), Orlando, Florida, USA; March 2012, pp. 1575-1583

W. Ouyang, A. Eryilmaz, and **N. B. Shroff**. "Asymptotically Optimal Downlink Scheduling over Markovian Fading Channels," *Proceedings of The 31st Annual IEEE International Conference on Computer Communications* (IEEE INFOCOM 2012), Orlando, Florida, USA; March 2012, pp. 1224-1232

Y. Yang and **N. B. Shroff**. "Throughput of Rateless Codes over Broadcast Erasure Channels," *Proceedings of the ACM International Symposium on Mobile Ad Hoc Networking and Computing 2012* (ACM Mobihoc); Hilton Head Island, South Carolina, USA; June 2012, pp. 125-134

K. Miller, A. Sanne, **K. Srinivasan** and S. Vishwanath. "Enabling Real-Time Interference Alignment: Promises and Challenges," *Proceedings of the 13th ACM International Symposium on Mobile Ad Hoc Networking and Computing* (ACM MobiHoc 2012); Hilton Head Island, South Carolina, USA; June 11-14, 2012; pp. 55-64

J. Teng, J. Zhu, B. Zhang, **D. Xuan** and Y. F. Zheng "E-V: Efficient Visual Surveillance with Electronic Footprints," *Proceedings of the 31st Annual IEEE International Conference on Computer Communications* (IEEE INFOCOM 2012); Orlando, Florida, USA; Mar. 25-30, 2012; pp. 109-117

B. Zhang, J. Teng, J. Zhu, X. Li, **D. Xuan** and Y. F. Zheng "EV-Loc: Integrating Electronic and Visual Signals for Accurate Localization," *Proceedings of the ACM 13th International Symposium on Mobile Ad Hoc Networking and Computing* (MobiHoc 2012); Hilton Head, South Carolina, USA; June 2012; pp. 25-34

N. Xu, F. Zhang, Y. Luo, W. Jia, **D. Xuan** and J. Teng. "Stealthy Video Capturer: An Opened Eye on You." *IEEE Vehicular Technology Magazine*, Dec. 2011; Vol. 6, No. 4, pp. 49-59

X. Li, J. Teng, B. Zhang, A. Champion and **D. Xuan** "TurfCast: A Service for Controlling Information Dissemination in Wireless Networks," *Proceedings of the 31st Annual IEEE International Conference on Computer Communications* (IEEE INFOCOM 2012); Orlando, Florida, USA; Mar. 25-30, 2012; pp. 298-306

SE/PL

L. Rademacher. "On the Monotonicity of the Expected Volume of a Random Simplex." *Mathematika*, Jan. 2012; Vol. 58, no. 1, pp. 71-76.

C. Wei, C. Wang; **R. Ramnath** and **J. Ramanathan**. "Examining the Practical Challenges of an Augmented Reality Cyber-Infrastructure Framework," *Proceedings of the 27th Symposium On Applied Computing*, Riva del Garda (Trento), Italy, Mar. 26-30, 2012; pp. 531-536

O. Ahlqvist, T. Loffing, **J. Ramanathan** and A. Kocher. "Geospatial Human-Environment Simulation Through Integration Of Massive Multi-Player On-Line Games and Geographic Information Systems." *Transactions in GIS*, June 2012; Vol. 16, Iss. 3, pp. 331-350

C. Shivade F. Mukri, R. **Ramnath** and **J. Ramanathan**. "Method for Continuous Generation of Component Business Model Heat Map using Execution Data for a Complex Service Enterprise." *Proceedings of the 6th IEEE International Symposium on Service-Oriented System Engineering*, Irvine, CA, USA; Dec. 12-14, 2011; pp.

Y. Xu, **J. Ramanathan**, **R. Ramnath**, N. Singh, and S. Deshpande "Reuse by Placement: A Paradigm for Cross-Domain Software Reuse with High Level of Granularity." *12th International Conference on Software Reuse*, Pohang, Korea; June 2011; pp. 69-77

V. Khuc, C. Shivade, **R. Ramnath**, and **J. Ramanathan**. "Towards Building Large-Scale Distributed Systems for Twitter Sentiment Analysis." *Proceedings of the 27th Symposium On Applied Computing*, Riva del Garda (Trento), Italy, Mar. 26-30, 2012; pp. 459-464

R. Ramnath, **Roger Crawfis** and **Paul Sivilotti**. *Android SDK 3 Programming for Dummies*. Wiley Publishing, October 2011

P. Calyam, P. Chandrasekaran, G. Trueb, N. Howes, **R. Ramnath**, D. Yu, Y. Liu, L. Xiong and D. Yang, "Multi-Resolution Multimedia QoE Models for IPTV Applications." *International Journal of Digital Multimedia Broadcasting*, September 2011; Vol. 2012, Article ID 904072, 13 pages

P. Calyam, R. Patali, A. Berryman, A. M. Lai, and **R. Ramnath**. "Utility-Directed Resource Allocation in Virtual Desktop Clouds." *The International Journal of Computer and Telecommunications Networking (COMNET)*; Dec. 2011; Vol. 55, Iss. 18, pp. 4112-4130

J. Sawin and **A. Rountev**. "Assumption Hierarchy for a CHA Call Graph Construction Algorithm." *Proceedings of the IEEE International Working Conference on Source Code Analysis and Manipulation (SCAM'11)*; Williamsburg, Virginia, USA; Sept. 25 -26, 2011; pp. 35-44

D. Yan, G. Xu. and **A. Rountev**. "Demand-Driven Context-Sensitive Alias Analysis for Java." *Proceedings of the International Symposium on Software Testing and Analysis (ISSTA'11)*; Toronto, ON, Canada; July 17 - 21, 2011; pp. 155-165

S. Tavarageri, L.-N. Pouchet, J. Ramanujam, **A. Rountev**, and **P. Sadayappan**. "Dynamic Selection of Tile Sizes." *Proceedings of the IEEE International Conference on High Performance Computing (HiPC'11)* Bengaluru, India; December 18-21, 2011; pp. 1-10

J. Holewinski, R. Ramamurthi, M. Ravishankan, N. Fauzia, L.-N. Pouchet, **A. Rountev** and **P. Sadayappan**. "Dynamic Trace-Based Analysis of Vectorization Potential of Applications." *Proceedings of the ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'12)*; Beijing, China; June 11 - 16, 2012; pp. 371-382

D. Yan, G. Xu and **A. Rountev**. "Uncovering Performance Problems in Java Applications with Reference Propagation Profiling." *International Conference on Software Engineering (ICSE'12)*; Zurich, Switzerland; June 2-9, 2012; pp. 134-144

N. Soundarajan, R Khatchadourian and D Bronish. "Formalizing Reusable Aspect-Oriented Concurrency Control." *Proceedings of the 23rd International Conference on Software Engineering & Knowledge Engineering (SEKE'2011)*; Miami Beach, USA, July 7-9, 2011; pp. 111-114

SYSTEMS

A. Nagavaram **G. Agrawal**, M. A. Freitas, K. H. Telu, G. Mehta, R. Mayani and E. Deelman. "A Cloud-based Dynamic Workflow for Mass Spectrometry Data Analysis." *Proceedings of 7th IEEE e-Science Conference*, Stockholm, Sweden; Dec. 5 - 8, 2011; pp. 47-54

V. T. Ravi and **G. Agrawal**. "A Dynamic Scheduling Framework for Emerging Heterogeneous Systems." *Proceedings of 18th International Conference on High Performance Computing (HiPC 2011)*; Bangalore, India; Dec. 18 - 21, 2011; digital - 10.1109/HiPC.2011.6152724

T. Bicer, D. Chiu and **G. Agrawal**. "A Framework for Data-Intensive Computing with Cloud Bursting." *Proceedings of 2011 IEEE International Conference on Cluster Computing*, Austin, Texas, USA; Sept. 26-30, 2011; pp 169 - 177

D. Chiu, T. Hall, F. Kabir, A. Shetty, and **G. Agrawal**. "Analyzing Costs and Optimizations for an Elastic Key-Value Store on Amazon Web Services." *International Journal of Next Generation Computing*, July 2011; Vol. 2, issue 2

V. T. Ravi, W. Ma, D. Chiu, and **G. Agrawal**. "Compiler and Runtime Support for Enabling Reduction Computations on Heterogeneous Systems." *Concurrency and Computation: Practice and Experience*, May 2012; Vol. 24, Issue 5, pp. 463-480



- B. Ren and **G. Agrawal**. "Compiling Dynamic Data Structures in Python to Enable the Use of Multi-Core and Many-core Libraries" *Proceedings of 20th International Conference on Parallel Architectures and Compilation Techniques* (PACT); Galveston Island, Texas, USA; Oct. 10-14, 2011; pp. 68-77
- F. Wang and **G. Agrawal**. "Effective Stratification for Low Selectivity Queries on Deep Web Data Sources." *Proceedings of ACM Conference on Information and Knowledge Management* (CIKM); Glasgow, Scotland, United Kingdom; October 24 – 28, 2011; pp. 1455-1464
- W. Jiang and **G. Agrawal**. "MATE-CG: A MapReduce-Like Framework for Accelerating Data-Intensive Computations on Heterogeneous Clusters." *Proceedings of 27th IEEE International Parallel & Distributed Processing Symposium* (IPDPS '12); Boston, Massachusetts, USA; May 20-24, 2012
- L. Chen and **G. Agrawal**. "Optimizing MapReduce for GPUs with Effective Shared Memory Usage." *Proceedings of 21st International ACM Symposium on High-Performance Parallel and Distributed Computing*, Delft, the Netherlands; June 18-22, 2012
- X. Huo, V. T. Ravi and **G. Agrawal**. "Porting Irregular Reductions on Heterogeneous Systems." *Proceedings of 18th International Conference on High Performance Computing* (HiPC 2011); Bangalore, India; Dec. 18 – 21, 2011; digital - 10.1109/HiPC.2011.6152715
- V. T. Ravi M. Becchi, W. Jiang, **G. Agrawal** and S. Chakradhar. "Scheduling Concurrent Applications on a Clusters of CPU-GPU Nodes." *Proceedings of 12th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing*, Ottawa, Canada; May 13-16, 2012; pp. 140-147 BEST STUDENT PAPER AWARD
- T. Liu and **G. Agrawal**. "Stratification Based Hierarchical Clustering Over a Deep Web Data Source." *Proceedings of SIAM International Conference on Data Mining*, Anaheim, California, USA; Apr. 26-28; pp. 70-81
- M. Singh, **A. Nandi** and H. V. Jagadish. "Skimmer: Rapid Scrolling of Relational Query Results." *Proceedings of the 2012 ACM SIGMOD International Conference on Management of Data*, Scottsdale, Arizona, USA; May 20-24, 2012
- M. Luo, **D. K. Panda**, C. Iancu and K. Z. Ibrahim. "Congestion Avoidance on Manycore High Performance Computing Systems." *Proceedings of the 26th International Conference on Supercomputing* (ICS); San Servolo Island, Venice, Italy; June 25-29, 2012
- S. Sur, S. Potluri, K. Kandalla, H. Subramoni, **D. K. Panda** and K. Tomko. "Codesign for InfiniBand Clusters." *IEEE Computer*, Nov. 2011; Vol. 44, No. 11; pp. 31-36
- X. Ouyang, R. Rajachandrasekhar, X. Besseron, H. Wang, J. Huang and **D. K. Panda**. "CRFS: A Lightweight User-Level Filesystem for Generic Checkpoint/Restart." *Proceedings of the International Conference on Parallel Processing* (ICPP '11) Taipei, Taiwan; Sept. 13-16, 2011; pp. 375-384
- H. Subramoni, K. Kandalla, J. Vienne, S. Sur, B. Barth, K. Tomko, R. McLay, K. Schulz and **D. K. Panda**. "Design and Evaluation of Network Topology -/- Speed Aware Broadcast Algorithms for InfiniBand Clusters." *2011 IEEE International Conference on Cluster Computing*, Austin, Texas, USA; Sept. 26, 2011; pp. 317 – 325
- K. Kandalla U. Yang, J. Keasler, T. Kolev, A. Moody, H. Subramoni, K. Tomko, J. Vienne and **D. K. Panda**. "Designing Non-blocking Allreduce with Collective Offload on InfiniBand Clusters: A Case Study with Conjugate Gradient Solvers." *Proceedings of 27th IEEE International Parallel & Distributed Processing Symposium* (IPDPS '12); Boston, Massachusetts, USA; May 20-24, 2012
- K. Kandalla, H. Subramoni, J. Vienne, K. Tomko, S. Sur and **D. K. Panda**. "Designing Non-blocking Broadcast with Collective Offload on InfiniBand Clusters: A Case Study with HPL." *Proceedings of the 19th Annual Symposium on High-Performance Interconnects*, Santa Clara, California, USA; Aug. 24-25, 2011
- J. Huang, X. Ouyang, J. Jose, M. Wasi-ur-Rahman, H. Wang, M. Luo, H. Subramani, C. Murthy and **D. K. Panda**. "High-Performance Design of HBase with RDMA over InfiniBand." *Proceedings of 27th IEEE International Parallel & Distributed Processing Symposium* (IPDPS '12); Boston, Massachusetts, USA; May 20-24, 2012

- S. Potluri, K. Tomko, D. Bureddy, and **D. K. Panda**. "Intra-MIC MPI Communication using MVAPICH2: Early Experience." *Proceedings of the TACC-Intel Highly Parallel Computing Symposium*, Austin, Texas, USA; April 1-11, 2012; BEST STUDENT PAPER
- J. Jose, H. Subramoni, M. Luo, M. Zhang, J. Huang, M. W. Rahman, N. S. Islam, X. Ouyang, S. Sur and **D. K. Panda**. "Memcached Design on High Performance RDMA Capable Interconnects." *Proceedings of the International Conference on Parallel Processing (ICPP '11)*; Taipei, Taiwan; Sept. 13-16, 2011; pp. 743-752
- M Luo, J. Jose, S. Sur and **D. K. Panda**. "Multi-threaded UPC Runtime with Network Endpoints: Design Alternatives and Evaluation on Multi-core Architectures." *Proceedings of 18th International Conference on High Performance Computing (HiPC 2011)*; Bangalore, India; Dec. 18 – 21, 2011; digital: 10.1109/HiPC.2011.6152734
- H. Wang, S. Potluri, M. Luo, A. Singh, X. Ouyang, S. Sur and **D. K. Panda**. "Optimized Non-contiguous MPI Datatype Communication for GPU Clusters: Design, Implementation and Evaluation with MVAPICH2." *Proceedings of the 2011 IEEE International Conference on Cluster Computing*, Austin, Texas, USA; Sept. 26, 2011; pp. 308-316
- M. Luo, H. Wang, J. Vienne and **D. K. Panda**. "Redesigning MPI Shared Memory Communication for Large Multi-Core Architecture." *Proceedings of the 26th International Conference on Supercomputing (ICS)*; San Servolo Island, Venice, Italy; June 25-29, 2012
- M. Wasi-ur-Rahman, J. Huang, J. Jose, X. Ouyang, H. Wang, N. S. Islam, H. Subramoni, C. Murthy and **D. K. Panda**. "Understanding the Communication Characteristics in HBase: What are the Fundamental Bottlenecks?" *Proceedings of the 2012 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS '12)* New Brunswick, New Jersey, USA; April 1-3, 2012; pp. 122-123
- V. Satuluri and **S. Parthasarathy**. "Bayesian Locality Sensitive Hashing for Fast Similarity Search." *Proceedings of the Very Large Databases (VLDB) Endowment*, January 2012; Vol. 5, No. 5, pp. 430-441
- Y. Zhang and **S. Parthasarathy**. "Extracting, Analyzing, and Visualizing Triangle K-Core Motifs within Networks." *Proceedings of the 28th IEEE International Conference on Data Engineering (ICDE)* (ICDE); Washington, DC, USA; April 1-5, 2012; pp. 1049 – 1060
- X. Yang, **S. Parthasarathy** and **P. Sadayappan**. "Fast Sparse Matrix-Vector Multiplication on GPUs: Implications for Graph Mining." *Proceedings of the 37th International Conference on Very Large Data Bases 2011*, Aug. 29 – Sept. 3; Vol. 4, No. 4, pp. 231-242
- D. Fuhry, Y. Ruan and **S. Parthasarathy**. "Local vs Global Term Analysis for Understanding Community Differences in Social Networks." *ACM Web Science 2012 Conference Proceedings*, June 22-24, 2012; pp. 147-152
- M. D. Twa, **S. Parthasarathy**, C. A. Johnson and M. A. Bullimore. "Morphometric Analysis and Classification of Glaucomatous Optic Neuropathy Using Radial Polynomials." *Journal of Glaucoma*, June 7, 2012; (5):302-12
- Y. Ruan, H. Purohit, D. Fuhry, **S. Parthasarathy**, and A. Sheth. "Prediction of Topic Volume on Twitter." *ACM Web Science 2012 Conference Proceedings*, June 22-24, 2012; pp. 397-402
- Y.-K. Shih and **S. Parthasarathy**. "Scalable Global Alignment for Multiple Biological Networks." *Proceedings of the ACM International Conference on Bioinformatics, Computational Biology and Biomedicine*, Chicago, IL, USA; July 31 – Aug. 03, 2011; pp. 96-105
- Y.-K. Shih and **S. Parthasarathy**. "Scalable Global Alignment for Multiple Biological Networks." *BMC Bioinformatics*, Mar. 21, 2012; 13 Suppl. 3:S11
- Z. Chen X. Li, J.-Y. Chen, H. Zhong, and **F. Qin**. "SyncChecker: Detecting Synchronization Errors Between MPI Applications and Libraries." *Proceedings of the 26th IEEE International Parallel & Distributed Processing Symposium (IPDPS 2012)*; Shanghai, China; May 21-24, 2012
- N. Deng, **C. Stewart**, D. Gmach and M. Arlitt. "Policy and Mechanism for Carbon-Aware Cloud Applications." *Proceedings of the IEEE Network Operations and Management Symposium (NOMS 2012)* Maui, Hawaii, USA; Apr. 16-20, 2012; pp. 590-594



- T. N. Miller, X. Pan, R. Thomas, N. Sedaghati and **R. Teodorescu**. "Booster: Reactive Core Acceleration for Mitigating the Effects of Process Variation and Application Imbalance in Low-Voltage Chips." *Proceedings of the 18th IEEE International Symposium on High Performance Computer Architecture* (HPCA 2012); New Orleans, Louisiana, USA; February 25-29, 2012; pp. 27-38
- T. N. Miller, R. Thomas and **R. Teodorescu**. "Mitigating the Effects of Process Variation in Ultra-low Voltage Chip Multiprocessors using Dual Supply Voltages and Half-Speed Units." *IEEE Computer Architecture Letters* (CAL); Dec. 2011
- T. N. Miller, N. Surapaneni and **R. Teodorescu**. "Runtime Failure Rate Targeting for Energy-Efficient Reliability in Chip Multiprocessors." *Concurrency and Computation: Practice and Experience* - Special Issue of the Best Papers of SBAC-PAD 2010 June 2012
- N. Sedaghati, N. R. Thomas; L.-N. Pouchet, **R. Teodorescu** and **P. SADAYAPPAN**. "StVEC: A Vector Instruction Extension for High Performance Stencil Computation." *Proceedings of the 11th International Conference Parallel Architectures and Compilation Techniques* (PACT 2011); Kazan, Russia; Sept. 19-23, 2011; pp. 276-287
- T. N. Miller, R. Thomas, X. Pan and **R. Teodorescu**. "VRSync: Characterizing and Eliminating Synchronization-Induced Voltage Emergencies in Many-core Processors." *Proceedings of the 39th International Symposium on Computer Architecture* (ISCA 2012); Portland, Oregon, USA; June 9-13, 2012; pp. 249-260
- X. Ding, K. Wang, P. B. Gibbons and **X. Zhang**. "BWS: Balanced Work Stealing for Time-sharing Multicores." *Proceedings of the ACM European Conference on Computer Systems*, (EuroSys '12) Bern, Switzerland; Apr. 10-13, 2012; pp. 365-378
- Y. Huai, R. Lee, C. H. Xia, S. Zhang and **X. Zhang**. "DOT: a Matrix model for Analyzing, Optimizing and Deploying Software for Big Data Analytics in Distributed Systems." *Proceedings of 2nd ACM Symposium on Cloud Computing* (SOCC 2011); Cascais, Portugal; Oct. 27-28, 2011; article 4; doi>10.1145/2038916.2038920
- S. Chen, L. Guo, E. Tan, **X. Zhang** and Y. Zhao. "Spam Behavior Analysis and Detection in User Generated Content on Social Networks." *Proceedings of 32nd International Conference on Distributed Computing Systems* (ICDCS 2012); Macau, China; June 18-21, 2012

*D. K. Panda and 3 of his students strike the O*H*I*O pose at the IPDPS conference.*



FACULTY SERVICE

GAGAN AGRAWAL

International Journal of Next Generation Computing (IJNGC) – Associate Editor

ANISH ARORA

New Generation Computing – Editorial Board
Present Real Time Systems – Associate Editor

MIKHAIL BELKIN

IEEE Pattern Analysis and Machine Intelligence (PAMI) - Associate Editor
Journal of Machine Learning Research (JMLR)
- Action Editor
25th Annual Conference on Neural Information Processing Systems (NIPS 2011) - Area Chair

JAMES W. DAVIS

International Conference on Advanced Video and Signal based Surveillance - Area Chair
International Conference on Advanced Video and Signal based Surveillance - Area Chair
IEEE Conference on Computer Vision and Pattern Recognition - Chair of Workshops

TAMAL K. DEY

Discrete & Computational Geometry – Editorial Board
Journal of Computational Geometry – Editorial Board
Graphical Models – Associate Editor

TEN-HWANG LAI

ACM/Springer Wireless Networks - Editor
International Journal of Ad Hoc and Ubiquitous Computing - Editor
International Journal of Sensor Networks - Editor

ERIC FOSLER-LUSSIER

Journal of Experimental Linguistics – Editorial Board
ACM Transactions on Speech and Language Processing – Associate Editor
Transactions of the Association for Computational Linguistics – Associate Editor
IEEE Automatic Speech Recognition and Understanding Workshop - Finance chair
IEEE International Conference on Acoustics,

Speech, and Signal Processing - Area Chair
North American Association for Computational Linguistics: Human Language Technologies Conference (NAACL HLT) - Program Chair

D. K. PANDA

IEEE Transactions on Computers – Associate Editor
Journal of Parallel and Distributed Computing – Subject Area Editor
International Symposium on High Performance Computing (HiPC) 2012 – Program Chair
International Symposium on Cluster, Cloud, and Grid Computing (CCGrid) 2012 – Vice Chair (Architecture)
International Parallel and Distributed Processing Symposium (IPDPS) 2012 – Session Chair
Workshop on Communication and Architecture (CAC) – Steering Committee

SRINIVASAN PARTHASARATHY

ACM Transactions on Knowledge Discovery and Data Mining – Associate Editor
Data Mining and Knowledge Discovery: An International Journal - Editor
Distributed and Parallel Databases – Editorial Board
Journal of Parallel and Distributed Computing – Associate Editor
IEEE Transactions on Knowledge and Data Engineering – Associate Editor
SIGKDD Newsletter Explorations – Associate Editor
18th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, KDD 2012 – Senior Programming Committee
IEEE International Conference on Data Mining series (ICDM) 2011 – Vice Chair on Programming Committee
2012 SIAM International Conference on Data Mining – Steering Committee

RAJIV RAMNATH

I/S: A Journal of Law and Policy for the Information Society – Editorial Board
ACM Symposium for Applied Computing (SAC) 2011 – Co-Chair Cloud Computing Track



ATANAS ROUNTEV

Journal of Information and Software Technology
– Editorial Board
Journal of Object Technology – Editorial Board

HAN-WEI SHEN

IEEE Transactions on Visualization and Computer Graphics: Special Issue on PacificVis
– Guest Editor
IEEE Computer Graphics and Applications
(Special Issue on UltraScale Visualization – Guest Editor
IEEE Computer Graphics and Applications
(Special Issue on Pacific Visualization). – Guest Editor
IEEE Computer Graphics and Applications,
Special Issue on Extreme Scale Visual Analytics
– Guest Editor

PRASUN SINHA

IEEE Transactions on Mobile Computing –
Editorial Board

NEELAM SOUNDARAJAN

Computing Accreditation Commission - Active
Member

CHRISTOPHER STEWART

IEEE Sustainable Computing Register - Chief
Editor

DELIANG WANG

Neural Networks - Co-Editor-in-Chief
Cognitive Neurodynamics – Editorial Board
EURASIP Journal on Audio, Speech, & Music Processing – Associate Editor
Neurocomputing –
Neural Computing & Applications -
IEEE Transactions on Audio, Speech, and Language Processing – Associate Editor
International Neural Network Society Governing
Board - Elected Member
IEEE Signal Processing Society Speech and
Language Processing Technical Committee -
Elected Member
International Conference on Intelligent
Computing – General Co-Chair

DONG XUAN

IEEE Transactions on Parallel and Distributed Systems (TPDS) - Associate Editor
Ad Hoc & Sensor Wireless Networks - Associate
Editor

XIAODONG ZHANG

Journal of Computer Science and Technology -
Executive Editor,
IEEE Micro - Associate Editor
Journal of Parallel and Distributed Computing
– Subject Area Editor in Distributed Systems,
Journal of Parallel and Distributed Computing
International Conference of Distributed Computing Systems - Steering Committee
Chair



Dr. Bruce Weide (left) is smiles after hooding his student, Derek Bronish.

INVITED GUEST PRESENTATIONS

DISTINGUISHED GUEST LECTURES

RAVI KANNAN

Microsoft Research Labs

k-MEANS REVISITED

KAI LI

Princeton University

The Dual of Research and Innovation

TOMASO POGGIO

Massachusetts Institute of Technology

The Computational Magic of the Ventral Stream

DOUG ROBLE

Digital Domain

VFX Case Studies: 2012, Benjamin Button, Tron, Real Steal Behind The Scenes From a Software & Math Perspective

STEPHEN SMALE

University of California, Berkeley

Joint CSE/Math Talk

Geometry of Data and New Vaccines

XIAN-HE SUN

Illinois Institute of Technology

Memory System for Extreme-Scale Computing

JIE WU

Temple University

Some Routing Challenges in Dynamic Networks

GUEST SPEAKERS

RICARDO BIANCHINI

Rutgers University

Leveraging Renewable Energy in Data Centers: Present and Future

THEODOROS (THEO) DAMOULAS

Cornell University

Probabilistic Machine Learning in Biology and Computational Sustainability

QUNFENG DONG

University of Science and Technology of China

Accommodating Two Genies Into One Jar --- How Can Packet Inspection Become Both Fast and Scalable?

DR. CHANDRA KRINTZ

University of California, Santa Barbara

AppScale: Open-source Platform-as-a-Service for Cloud Computing Research and Engineering

STEVE OUDOT

INRIA Saclay - Paris

A Few Concrete Applications of Topological Persistence Theory

DR. JAMES REHG

Georgia Institute of Technology

Behavior Imaging and the Study of Autism

LORENZO ROSASCO

Massachusetts Institute of Technology

Learning Multiple Categories with Simplex Coding

MIN-TE (PETER) SUN

National Central University, Taiwan

Dynamic Bit Encoding for Privacy Protection Against Correlation Attacks in RFID Backward Channel



ALEJANDRO TORIELLO

University of Southern California

Optimal Toll Design: A Lower Bound Framework for the Traveling Salesman Problem

S V N VISHWANATHAN

Purdue University

Optimizing Linear Support Vector Machines via Dual Cache Loops

ERIN WOLF CHAMBERS

Saint Louis University

Flows in 1-Crossing-Minor-Free Graphs

HYUN-WOOK JIN

Konkuk University, Seoul, Korea

OS Support for High-Performance Networking over Multi-Core Processors

YUAN YAO

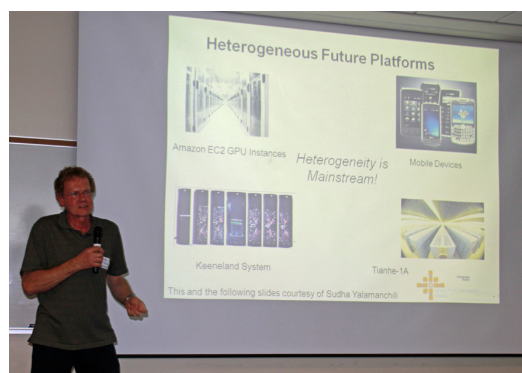
Peking University

Combinatorial Hodge Theory and Applications

JUN (JIM) XU

Georgia Institute of Technology

Worst-Case Large Deviation, Theory and Applications



CERCS for Enterprise Transformation and Innovation (CETI) combined its annual Industry Day and the capstone courses poster event. Local industry representatives were able to talk with students, view their project posters and learn about new research.

Top: Karsten Schwan of Georgia Tech explains the work he is doing. Karsten is a CETI collaborator.

Above: One of the "Best Project" winning teams is presented with certificates. Their instructor, Naeem Shareef is on the far left

STUDENTS

STATISTICAL HISTORICAL VIEW

	AU 2001	AU 2002	AU 2003	AU 2004	AU 2005	AU 2006	AU 2007	AU 2008	AU 2009	AU 2010	AU 2011
Faculty	30	29	31	31	32	33	35	35	35	36	36
Course Enrollment/ Autumn Qtr.	4,103	4,076	3,650	3,125	3,187	3,238	3,386	3,702	3,943	4,075	4,609
	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12
Students Taught	14,006	13,878	12,208	10,623	10,844	10,641	11,185	12,209	12,689	13,744	14,523

GRADUATE PROGRAM

The CSE Graduate Program continues to expand. The Department becomes more international with each bringing in students from Europe, Asia and South America. More women are appearing within our halls with the Masters program hitting nearly 22% female population.

The Graduate Studies Committee has faced a great challenge converting to semesters, but the process has allowed for some healthy updating and redesign of some class structures.

	AU 2001	AU 2002	AU 2003	AU 2004	AU 2005	AU 2006	AU 2007	AU 2008	AU 2009	AU 2010	AU 2011
Graduate Students Enrolled	159	164	174	169	188	184	235	239	303	304	339
	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12
Graduate Student Applications	1,542	1,508	712	589	694	619	705	677	817	1,031	1,190
Graduate Students Supported	175	156	149	158	163	135	135	132	182	218	209
M.S. Degrees Awarded	19	30	31	27	21	33	37	39	64	40	37
Ph.D. Degrees Awarded	4	7	7	11	18	17	32	26	19	20	15
Ph.D. Degrees (cumulative)	318	325	332	343	361	378	410	37436	455	475	490

DOCTORATE RECIPIENTS

GRADUATE

Vita
Destination
Dissertation Title

Advisor

Home

JOE WILLIAM BOLINGER Dr. Jayashree Ramanathan Columbus, Ohio, USA
B.A., M.S., The Ohio State University, Columbus, Ohio, USA
GE Global Research
Micro-Modeling: A Visual Design Framework for Collaborative Tools in Complex Service Organizations

DEREK A. BRONISH Dr. Bruce Weide Westlake, Ohio, USA
B.S., The Ohio State University, M.S., The Ohio State University
Space X, Hawthorne, California, USA
Abstraction as the Key to Programming with Issues for Software Verification in Functional Languages

WILLIAM LOUIS HARTMANN Dr. Eric Fosler-Lussier Cincinnati, Ohio, USA
B.S., Northern Kentucky University, M.S., The Ohio State University
LIMSI, Research Organization, Paris, France
ASR - Driven Binary Mask Estimation for Robust Automatic Speech Recognition

YATING HSU Dr. David Lee Taipei, Taiwan, ROC
B.S., National Taiwan University; M.S., The Ohio State University
Amazon, Seattle, Washington, USA
Formal Analysis of Network Protocol Security

TENG-YOK LEE Dr. Han-Wei Shen Taipei, Taiwan, ROC
B.S., M.S., National Chiao Tung University
The Ohio State University
Data Triage and Visual Analytics for Scientific Visualization

TIMOTHY NORMAND MILLER Dr. Mircea-Radu Teodorescu Columbus, Ohio, USA
B.S., University of South Florida, M.S., The Ohio State University
Binghamton University, Vestal, New York, USA
Architectural Solutions for Low-Power, Low-Voltage, and Unreliable Silicon Devices

XIANGYONG OUYANG Dr. Dhabaleswar Panda Beijing, China
Bachelor's, Mechanical Engineering, Tsinghua University
Google, Mountainview, California, USA
Efficient Storage Middleware Design in InfiniBand Clusters for High End Computing

VIGNESH TRICHY RAVI Dr. Gagan Agrawal Columbus, Ohio, USA
B.Engr., Anna University
Advanced Micro Devices (AMD), Austin, Texas, USA
Runtime Systems and Scheduling Support for High-End CPU-GPU Architectures

ISSAM SAFA

Dr. Yusu Wang

Columbus, Ohio, USA

B.S., Lebanese American University; M.S., Ohio University
The Ohio State University
Towards Topological Methods for Complex Scalar Data

KARTHIK SANKARANARAYANAN

Dr. James Davis

Pune, India

B.Engr., University of Pune; M.S., The Ohio State University
IBM Research, India
A Multiple Instance Learning Framework for Localization and Tracking of Persistent Targets

venu M. SATULURI

Dr. Srinivasan Parthasarathy

Columbus, Ohio, USA

B.Engr., National Institutes of Technology
Twitter, San Francisco, California, USA
Scalable Clustering of Modern Networks

HONG SUN

Drs. Yusu Wang and Hakan Ferhatosmanoglu

Cary, North Carolina, USA

B.A., University of Science and Technology, Beijing, China; M.S., The Ohio State University
SRA International, Durham, North Carolina, USA
Detecting Multiple Protein Folding Trajectories and Structural Alignment

JOHN F. WOODRUFF

Dr. DeLiang (Leon) Wang

Columbus, Ohio, USA

B.A., B.S., University of Michigan, Ann Arbor, M.S., Northwestern University
Kuzer, Columbus, Ohio, USA
Integrating Monaural and Binaural Cues for Sound Localization and Segregation in Reverberant Environments

BOYING ZHANG

Dr. Dong Xuan

Columbus, Ohio, USA

B.Engr., University of Science and Technology of China, M.S., Chinese Academy of Science, M.S., The Ohio State University
Large Scale Message Dissemination in Mobile Opportunistic



New doctorate Karthik Sankaranarayanan celebrates with family and friends.



Venu Satuluri receives congratulations from his advisor, Srinivasan Parthasarathy.

MASTERS GRADUATES

Varadharajan Chandran

Chennai, India
Bachelor's, Anna University

Arun Chockalingam

Chennai, India
Bachelor's, Anna University

Nishanth Dandapanthula

Hyderabad, India
Bachelor's, Vellore Institute of Technology

Isha Sanjay Deshpande

Mumbai, India
B.Tech., University of Pune

Ryan K. Feather

Eglen, West Virginia, USA
B.S., West Virginia University Institute of Technology

Srinivas Vijaykumar Hegde

Thane, India
B.Engr., University of Mumbai

Yating Hsu

Taipei, Taiwan, ROC
B.S., National Taiwan University

Jing Li

Jinhua, China
B.Engr., Beijing Information Science and Technology University

Timothy Normand Miller

Columbus, Ohio, USA
B.S., University of South Florida, Florida, USA

Sinduja Muralidharan

Chennai, India
Bachelor's, Anna University

Sharada Krishna Patil

Mumbai, India
Bachelor's, National Institutes of Technology, India

Aarthi Raveendran

Tamil Nadu, India
B.Engr., Anna University

Nathan Paul Stohs

Logan, Ohio, USA
B.S., Carnegie Mellon University

Xiaojie Su

Beijing, China
B.S., Beijing University of Technology

Enhau Tan

Jiujian, China
B.Engr., University of Science and Technology of China; Master's, Chinese Academy of Sciences

Sravva Tirukkovalur

Hyderabad, India
B.Tech., Jawaharlal Nehru Technological University

Chiu Ni Wang

West India, India
Bachelor's, West Bengal University of Technology

Dean Zhang

Dayton, Ohio, USA
B.A., Zhengzhou University

Wenbin Zhang

Guangzhou, China
B.Engr., M.S., Zhejiang University

Jiedan Zhu

Guangzhou, China
B.Engr., South China University of Technology

Syed Farooq Ali

Lahore, Pakistan
B.S., National University of Computer and Emerging Sciences; M.S., Lahore University of Management Sciences

Joe William Bolinger

Columbus, Ohio, USA
B.S., The Ohio State University

Boyi Cui

Anshan, China
Bachelor's, Beijing Forestry University

Ravi Prakash Srirama Venkata Naga Darbha

Bangalore, India
Bachelor's, National Institute of Technology

Amrita Ghosh

Jhargram, India
B.Engr., Vidyasagar University; M.S.
(Electrical and Computer Engineering), The
Ohio State University

Preethi Jyothi

Bangalore, India
B.Tech., National Institutes of Technology

Nived Kalappuraikal Sivadas

Chennai, India
Bachelor's, Anna University

Yong Wook Kim

Seoul, Korea
B.S., Hanyang University; M.S., Illinois
Institute of Technology

Abhisek Kundu

Arambagh, India
B.Engr., Jadavpur University

Chang Pil Lee

Seoul, Korea
Bachelor's, Hongik University; B.S., Purdue
University

Wei Liu

Xiangfan, China
B.Engr., Wuhan University

Jacob Emil Mainzer

Burlingame, California, USA
B.S., University of Rochester

Siddhesh Prakash Pai Raikar

Mumbai, India
B.Engr., University of Mumbai

Rohit Prakash Prabhavalkar

Pune, India
B.Engr., University of Pune

Hyunjeong Yoo

Seoul, Korea
B.S., Sookmyung Women's University

Zhe Yuan

Xiangfan, China
B.Engr., Huazhong University of Science and
Technology

Wenjie Zeng

Guangzhou, China
B.Engr., Shanghai Jiao Tong Technology



The fountains at Mirror Lake makes a wonderful backdrop for photos.

Above: Newly minted Dr. Vignesh Ravi

Below: Masters graduate Vilobh Meshram



UNDERGRADUATE PROGRAM

	AU 2001	AU 2002	AU 2003	AU 2004	AU 2005	AU 2006	AU 2007	AU 2008	AU 2009	AU 2010	AU 2011
Undergrad Students Enrolled	1401	1217	990	817	800	795	817	877	871	971	1,102
	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12
B.A., B.S. Degrees Awarded	277	335	274	192	124	140	142	138	127	152	213

These figures have been adjusted to reflect a change in reporting definitions.

The changeover to semesters is even more challenging within the undergraduate program than the graduate program. The lines to the Undergraduate Advising Office have been long, but the advisors have handled the stress with grace and patience.

Due to the high demand for entry into CSE courses, the Department is once again re-introduced course management structures. Effective January, 2013, students will be required to maintain a 2.5 gpa for entrance into the major.

Undergraduate Academic Advising Personnel

PEG STEELE, Coordinator of Academic Advisement. Ms. Steele is active at the local and national levels of academic advising. The National Academic Advising Association awarded her the 2009 NACADA Service to Commission Award for her work on the Engineering & Science Advising Commission. In 2004, NACADA named Ms. Steele "Outstanding Advisor" and twice she received the same recognition from the local OSU chapter. She will be serving on the Board of Directors for the next two years for the National Academic Advising Association.

NIKKI STRADER, Academic Advisor & Staff Assistant. From 2006 through 2008, Nikki served as the President of the Academic Advising Association of Ohio State (ACADAOS), and in May 2007, was named one of two Outstanding Advisors at Ohio State by ACADAOS. She is the primary contact for all freshman pre-CSE students.

MARY JO DEERWESTER, Academic Advisor & Staff Assistant. Mary Jo graduated from OSU in 1971 with a Bachelor of Science degree in Education. (Major: English; Minor: Psychology) She followed that in 1983 with a Master's Degree in Guidance and Counseling. Mary Jo previously worked as an Academic Advisor at Columbus State Community College and as an Academic Advisor/Staff Assistant for the OSU College of Engineering.

KEITH CHIMA, Graduate Advising Assistant. He is working on his Master's degree in Computer Science & Engineering, with a focus on software engineering, and he intends to graduate after Autumn quarter 2011.

BACHELORS DEGREES AWARDED

College of Arts and Sciences

Bachelors of Arts

Alexander Emmett Bartlow

Westerville, Ohio, USA

Jonathan Richard Dailey

Waverly, Ohio, USA

David Jarred Dehne

Fairfield, Ohio, USA

Ryan Christian Edwards

Lima, Ohio USA

Isaac Christopher Hookom

Milford, Ohio, USA

Miguel Angel Ibarra

Lorain, Ohio, USA

Guy L. Jacks III

Columbus, Ohio, USA

Christopher Bryan Myers

Thornville, Ohio, USA

Kenneth Robert Pascoe

Mentor, Ohio, USA

Joel S. Raymond

Gahanna, Ohio, USA

Jeffrey K Stuecher

Upper Arlington, Ohio, USA

Andrew Thompson

Columbus, Ohio, USA

Nicholas Patrick Tyo

Newark, Ohio, USA

Michael Alexander Van Baalen

Sunbury, Ohio, USA

Benjamin Hood Wilkins

Galion, Ohio, USA

College of Arts and Sciences

Bachelors of Science

Parik Arulalan

Cum Laude

Columbus, Ohio, USA

Allen Thomas Aston

Magna Cum Laude

with Honors in the Arts and Sciences

Alexandria, Ohio, USA

Jonathan Charles Barker

Cum Laude

with Honors in the Arts and Sciences Cincinnati, Ohio, USA

Scott Patrick Bennington

Magna Cum Laude

Cleveland, Ohio, USA

Christopher Steven Brainerd

Painesville, Ohio, USA

Joel Burget

Magna Cum Laude

with Honors in the Arts and Sciences

Findlay, Ohio, USA

Jawad Aslam Butt

Columbus, Ohio, USA

Matthew Paul Caimi

Chagrin Falls, Ohio, USA

Vincent Bernard Conley

Columbus, Ohio, USA

Anthony Michael Depassio

Columbus, Ohio, USA

Benjamin Daniel Doughtry

Avon Lake, Ohio, USA

Matthew Dreiss

West Jefferson, Ohio, USA

Chirantan Anand Ekbote

Magna Cum Laude

with Honors in the Arts and Sciences New Albany, Ohio, USA

Tory Kendall Falde

Magna Cum Laude

Crestline, Ohio, USA

Marius Daniel Fekete

Cum Laude

Rocky River, Ohio, USA

Robert Joseph Ferguson
Dayton, Ohio, USA

Kathleen Yahning Gannon
Brecksville, Ohio, USA

Samuel Anthony Glockner
Milford, Ohio, USA

Andrew Patrick Griffin
West Milton, Ohio, USA

Andrew Donovan Groot
Cum Laude
with Honors in the Arts and Sciences
Sandusky, Ohio, USA

Tyler Lee Hess
Summa Cum Laude
Massillon, Ohio, USA

Carl Allan Hinderer
Strongsville, Ohio, USA

Timothy A. James
Garrettsville, Ohio, USA

Karan Kirit Kampani
Mumbai, India

Martin R. Keegan
Cum Laude
with Honors in the Arts and Sciences
Pittsburgh, Pennsylvania, USA

Thomas Joseph Kelley
Westlake, Ohio, USA

Jeffrey W. Klenke
Springfield, Ohio, USA

Bradley Kline
Perrysville, Ohio, USA

Craig Emerson Laparo
Gahanna, Ohio, USA

Kai Li
Magna Cum Laude
Nanjing, China

Nicholas Michael Lister
Hilliard, Ohio, USA

David Lee Mason
Summa Cum Laude
Mentor, Ohio, USA

Jenna Lee McAuley
Summa Cum Laude
Powell, Ohio, USA

Alex Melikian
Tbilisi, Georgia

Allison Tsuruyo Mitsui
Cincinnati, Ohio, USA

Philip Moor
Wichita Falls, Texas, USA

Sandhyarani Natarajan
Dublin, Ohio, USA

Miles Walter Oldenburg
Worthington, Ohio, USA

Michael L. Peters
New Albany, Ohio, USA

Joseph Angelo Pompeani
North Olmsted, Ohio, USA

James Power
Columbus, Ohio, USA

Vladimir Razuvayev
Cum Laude
Delaware, Ohio, USA

Steven Jeffrey Reasor
Canton, Michigan, USA

Matthew Rhodebeck
Mansfield, Ohio, USA

Aaron L. Rietschlin
Upper Sandusky, Ohio, USA

William Andrew Riter
Mayfield, Ohio, USA

Brett Eric Robison
Laura, Ohio, USA

Zachary George Schroeder
Glandorf, Ohio, USA

Bryant Schuck
Kettering, Ohio, USA

Peter Butler Tefft
Cum Laude
North Royalton, Ohio, USA

Jacqueline Telljohann
Summa Cum Laude
Solon, Ohio, USA

Christopher Ryan Theobald
Columbus, Ohio, USA

Guhan Mani Venguswamy
Georgetown, Kentucky, USA

Daniel Joseph Vogel
Steubenville, Ohio, USA

Jason Todd Werrell
Kingwood, Texas, USA

Andrew Whitacre
Plain City, Ohio, USA

Bai Nong Yuan
Whitehall, Ohio, USA

Brian Joseph Block
Cum Laude
North Lawrence, Ohio, USA

Derek Adam Boytim
Powell, Ohio, USA

Taran Singh Brar
Ashland, Ohio, USA

Rachel A. Brickey
Bexley, Ohio, USA

Eric C. Brown
Bryon, Ohio USA

Ronak Akshay Buch
Summa Cum Laude
with Honors in Engineering
West Chester, Ohio, USA

Alexander Michael Bunch
Magna Cum Laude
with Honors in Engineering
Cincinnati, Ohio, USA

Daniel Frederick Burnett
Magnolia, Ohio, USA

Erkan Cetinkaya
Elazig, Turkey

David D. Chuha
Columbus, Ohio, USA

Brian James Claus
Lewis Center, Ohio, USA

Logan Jay Coulson
Amelia, Ohio, USA

Dillon Matthew Courts
Magna Cum Laude
West Chester, Ohio, USA

Chris Lee Crawford
Dayton, Ohio, USA

Kevin S. Daines
Patriot, Ohio, USA

Neil Edward Davis
Grove City, Ohio, USA

James Wilbert Devine
Cum Laude
Worthington, Ohio, USA

Charles W. Dickens
Columbus, Ohio, USA

Jonathan Keith Diekema
West Chester, Ohio, USA

College of Engineering

Anuj D. Agrawal
Columbus, Ohio, USA

Brian M. Alberta
Chillicothe, Ohio, USA

Abdulwahab Abdullah Alkharashi
Riyadh, Saudi Arabia

Adam A. Allen
Marysville, Ohio USA

Kyle Joseph Armstrong
Brook Park, Ohio, USA

James Harrison Austrow
with Honors in Engineering
Cincinnati, Ohio, USA

Praseeda Badami
Cum Laude
with Honors in Engineering
Upper Arlington, Ohio, USA

Travis Brandon Bagley
Medina, Ohio, USA

Andrew Balderas
Magna Cum Laude
El Paso, Texas, USA

Spencer Paul Balogh
Dresden, Ohio, USA

Rita Biala
Chandigarh, India

Zoë Blevins
Cum Laude
Deerfield, Illinois, USA

Michael David Diekema

Magna Cum Laude

West Chester, Ohio, USA

Tyler James Divelbiss

Fredericktown, Ohio USA

Andrew R. Edwards

Rochester, New York, USA

Benjamin Franklin Elliott

Madison, Ohio, USA

Brandon Charles Estle

Hillsboro, Ohio, USA

Christopher Patrick Fahey

Cum Laude

Bexley, Ohio, USA

Craig Andrew Farler

Hamilton, Ohio, USA

Brent William Farwig

Findlay, Ohio, USA

Daniel P. Fischer

Gahanna, Ohio, USA

Jerod Daniel Fritz

Cincinnati, Ohio, USA

Reid Nixon Gifford

Zanesville, Ohio USA

Benjamin James Gilbert

Cum Laude

with Honors in Engineering

Hudson, Ohio, USA

Stephen M. Glancy

Magna Cum Laude

Medina, Ohio, USA

Rajni Gora

Sikar, India

Eric Robert Gottschalk

Cleveland, Ohio, USA

Aaron Forest Grant

Columbus, Ohio, USA

Samuel Joseph Habenschuss

Willowick, Ohio, USA

Michael James Hall

Grove City, Ohio, USA

Maxwell Thomas Hallum

Cum Laude

Mason, Ohio, USA

Stephen Lawrence Halter

North Canton, Ohio, USA

Sean David Hanrahan

Cum Laude

Mentor, Ohio, USA

Stephen Edward Hanson

Mankato, Minnesota, USA

Matthew R. Henderson

Marlboro, Ohio, USA

Randall P. Henderson

Twinsburg, Ohio, USA

Christopher Carl Hofer

Clifton, New York, USA

Alexander Stewart Holmes

Dayton, Ohio, USA

Sandra E. Horwitz

The Dalles, Oregon, USA

Jacob Miles Householder

Swanton, Ohio, USA

Jonathan D. Hsu

Somerset, New Jersey, USA

Jessica Lauren Hummer

Cincinnati, Ohio, USA

John Frederick Hyland

Columbus, Ohio USA

Michael Keith Jewitt

Magna Cum Laude

with Honors in Engineering

Suttonfield, Ohio, USA

Xiaolong Jia

Baoding, China

Amanda Bernyce Kauppila

Beavercreek, Ohio, USA

Rakaan B. Kayali

Kafartkhareem, Syria

James Cody Kendle

Columbus, Ohio, USA

Eric Paul Kerr

Powell, Ohio; USA

Marc Kzhaya Khoury

Summa Cum Laude

with Honors in

Engineering

with Honors Research

Distinction in Computer

Science and Engineering

Strongsville, Ohio, USA



Abraham Kim
Worthington, Ohio, USA

Kwang Yeon Kim
Seoul, Korea

Ethan Perry Klein
Powell, Ohio, USA

David E. Kronk
Minford, Ohio, USA

Michael Robert Kusold
Willoughby Hills, Ohio, USA

Jason Holun Lee
Pickerington, Ohio, USA

Anthony Leonti
Cum Laude
Strongsville, Ohio, USA

Steven Charles Lewis
Hilliard, Ohio, USA

Naiqiao Liang
Shen Yang, China

Chao Lin
Cum Laude
Fuzhou, China

Gregory Young-Jin Loesch
Cum Laude
Mansfield, Ohio, USA

Thomas Loh
Malaysia

Nasser Gabriel Lopez
Valencia, Venezuela

Hao Lu
Cum Laude
Shenzhen, China

Andrea Lynn Machemeh
Westerville, Ohio, USA

Sean Patrick Mahaffey
Hudson, Ohio, USA

Christopher Dean Mayer
Summa Cum Laude
North Canton, Ohio, USA

Scott Lawrence McAlpine
Heath, Ohio, USA

Robert Matthew McCann, Jr.
Springboro, Ohio, USA

Seth David Melke
Paulding, Ohio, USA

Jason Matthew Monroe
Washington Courthouse, Ohio, USA

Sean Allen Moreno
Delaware, Ohio, USA

Mark William Murphy
Stow, Ohio, USA

Timothy Richard Nash
Southbury, Connecticut, USA

Nathan Christopher Newman
Coshocton, Ohio, USA

Daniel Clinton Nye
Middletown, Ohio, USA

Natalie Rose O'Connell
Magna Cum Laude
with Honors in Engineering
Louisville, Kentucky, USA

Matthew Bradley Olinger
Magna Cum Laude
Kettering, Ohio, USA

Eric James Perry
Summa Cum Laude
Mentor, Ohio, USA

Simone Tyler Marie Perry
Cincinnati, Ohio, USA

Ryan Thomas Powers
Beavercreek, Ohio, USA

Zachary Alexander Quinn
Indian Trail, North Carolina, USA

Dorian Naim Rahamim
Magna Cum Laude
with Honors in Engineering
Cleveland, Ohio, USA

James Robert Rockwood
Pickerington, Ohio, USA

Daniel Mark Saunders
Magna Cum Laude
Centerville, Ohio, USA

Robert Joseph Molique Schmidt
Cum Laude
Cincinnati, Ohio, USA

Michael John Schoenberg
Magna Cum Laude
with Honors of Engineering
Upper Arlington, Ohio, USA

Mohammed F. Shareef
Columbus, Ohio, USA

Akash Sharma

Dehradun, India

Eric Ross Shyrock

Summa Cum Laude

with Honors in Engineering

Cincinnati, Ohio, USA

Grant P. Siefker

Ottawa, Ohio, USA

David Paul Skidmore

Jackson Township, Ohio, USA

Marko Skugor

Solon, Ohio, USA

Andrew G. Sliwinski

Magna Cum Laude

Westerville, Ohio, USA

Malory Elyse Spicer

Cum Laude

Bellbrook, Ohio, USA

Alexander Philip Stevens

Harrison, Ohio, USA

Jonathan Michael Stillman

Magna Cum Laude

Defiance, Ohio, USA

Alex N. Street

Westlake, Ohio, USA

Matthew Jordan Stvartak

Toledo, Ohio, USA

Timothy Dean Suffel

Cum Laude

Defiance, Ohio, USA

Brian Alan Swinehart

Kirkland, Ohio, USA

Mitchell Glen Tam

Bryan, Ohio, USA

Preston A. Tamkin

Pataskala, Ohio, USA

Steven Richard Tatz

Magna Cum Laude

with Honors in Engineering

Worthington, Ohio, USA

Andrew Thomas Thayer

Magna Cum Laude

Avon Lake, Ohio, USA

Kenneth Robert Thompson

Columbus, Ohio, USA

Katherine Elysse Tornwall

Summa Cum Laude

Logan, Ohio, USA

Eric Van Peters

Miamisburg, Ohio, USA

Justin Allen Vayda

Toledo, Ohio, USA

Mark Andrew Vlcek

Medina, Ohio, USA

Jeffrey David Walsh

Cum Laude

Columbus, Ohio, USA

Aaron J. Wangugi

Columbus, Ohio, USA

Zacariah McHenry Webber

Galion, Ohio, USA

Jordan Todd Welzbacher

Sylvania, Ohio, USA

Jonathan Andrew Wilber

Magna Cum Laude

Pickerington, Ohio, USA

Daniel Pace Wilson

Springfield, Ohio, USA

Jeffrey Smith Wolfe

Charleston, South Carolina, USA

Naila Rifat Zaman

Columbus, Ohio, USA

Henry Hao Zhang

Kent, Ohio, USA

Jie Zhang

Magna Cum Laude

Xuchang, China

Adam Jeffrey Zink

Magna Cum Laude

Gahanna, Ohio, USA

PARTICIPANTS IN THE 6TH ANNUAL STUDENT RESEARCH POSTER EXHIBITION

The 2012 event was a success with excellent attendance. This year marked the introduction of undergraduate researchers participating. They showed terrific maturity and scholarship. One of the undergraduates placed third, Vahid Rajabian Schwart in the “Best of” competition along with Oleksiy Busaryev, first, and William Hartmann, second.

STUDENT	POSTER TITLE	ADVISOR
HUMAYUN ARAFAT	<i>Resource Sharing Barrier</i>	P. Sadayappan
DEREK BRONISH	<i>Abstraction as the Key to Programming, with Issues for Verification of Functional Languages</i>	Bruce Weide
OLEKSIY BUSARYEV	<i>Animating Bubble Interactions in a Liquid Foam</i>	Tamal Dey
ABON CHAUDHURI, TENG-YOK LEE, HAN-WEI SHEN, MARC KHOURY AND REPHAEL WENGER	<i>Exploring Flow Fields Using Fractal Analysis of Field Lines</i>	Han-Wei Shen
ZHEZHE CHEN	<i>SyncChecker: Detecting Synchronization Errors Between MPI Applications and Libraries</i>	Feng Qin
SETH DARBYSHIRE	<i>iBrutus</i>	Rajiv Ramnath
DAVID FUHRY	<i>Efficient Community Detection in Large Networks using Content and Links</i>	Srinivasan Parthasarathy
WILLIAM HARTMANN	<i>ASR-Driven Top-Down Binary Mask Estimation using Spectral Priors</i>	Eric Fosler-Lussier
WILLIAM HARVEY	<i>Topological Landscapes for Analysis and Visualization of Massive Molecular Dynamics Simulations</i>	Yusu Wang
JUSTIN HOLEWINSKI	<i>High-Performance GPU Code Generation for Stencil Computations</i>	P. Sadayappan
KE HU	<i>Svm-Based Separation Of Unvoiced-Voiced Speech In Cochannel Conditions</i>	DeLiang Wang
YIN HUAI	<i>RSQ: A Framework to Utilize Out-of-band Data Items to Improve Performance and Productivity of a MapReduce System Environment</i>	Xiaodong Zhang
WEI JIANG	<i>A Map-Reduce-Like System for Programming and Optimizing Data-Intensive Computations on Emerging Parallel Architectures</i>	Gagan Agrawal
PREETHI JYOTHI	<i>Lexical access experiments with context-dependent articulatory feature-based models</i>	Eric Fosler-Lussier
ONUR KUCUKTUNC	<i>A Large-Scale Sentiment Analysis for Yahoo! Answers</i>	Hakan Ferhatosmanoglu
JING LI	<i>ThermoNet: Fine-Grain Assessment of Building Comfort and Efficiency</i>	Anish Arora
QIHANG LI	<i>PDE based Interpolation in Diffusion Tensor Imaging Processing</i>	Raghu Machiraju
LUO TIAN	<i>hStorageDB: Heterogeneity-aware Data Management to Exploit the Full Capability of Hybrid Storage Systems</i>	Xiaodong Zhang

NAN MENG	<i>Investigating distribution of Inhibitory Interneurons in Neocortex with Spatial Statistics</i>	Raghu Machiraju
TIMOTHY MILLER	<i>Booster: Reactive Core Acceleration for Mitigating the Effects of Process Variation and Application Imbalance in Low-Voltage Chips</i>	Radu Teodorescu
OLEG MISHCHENKO	<i>Visualization of Three Dimensional Flow Datasets: Dealing with Occlusion</i>	Roger Crawfis
BOONTHANOME NOUANESSENGSY	<i>Load-Balanced Parallel Streamlines</i>	Han-Wei Shen
RAGHURAM ONTI SRINIVASAN	<i>Single Cell analysis for Endothelial cells</i>	Raghu Machiraju
ROHIT PRABHAVALKAR	<i>A Factored Conditional Random Field Model for Articulatory Feature Forced Transcription</i>	Eric Fosler-Lussier
VAHID RAJABIAN SCHWART	<i>SAGA: Automated Validation for Synchronous Reactive Embedded Systems</i>	Paolo Sivilotti
PAWAS RANJAN	<i>Eigen Deformation of 3D Models</i>	Tamal Dey
JIN TENG	<i>Connected Coverage in Wireless Networks with Directional Antennas</i>	Dong Xuan
VIGNESH TRICHYRAVI	<i>Supporting GPU Sharing in Cloud Environments with a Transparent Runtime Consolidation Framework</i>	Gagan Agrawal
KAIBO WANG	<i>SCCG: Accelerating Spatial Cross-Comparisons on CPU/GPU Hybrid Systems</i>	Xiaodong Zhang
JOHN WOODRUFF	<i>Binaural Speech Segregation Based on Pitch and Azimuth Tracking</i>	DeLiang Wang
LJIE XU	<i>Graph Based Modeling and User Interactions for Flow Field Visualization</i>	Han-Wei Shen
XINTIAN YANG	<i>Analysis of Streaming Data from Twitter Social Networks</i>	Srinivasan Parthasarathy
YUAN YUAN	<i>YSmart: An SQL-to-MapReduce Translator</i>	Xiaodong Zhang
BOYING ZHANG	<i>TurfCast: A Service for Controlling Information Dissemination in Wireless Networks</i>	Dong Xuan

FACULTY & STAFF

TENURED & TENURE TRACK FACULTY



GAGAN AGRAWAL *Full Professor*

B.S., Computer Science & Engineering, Indian Institute of Technology, Kanpur, India, 1991; M.S., Computer Science, University of Maryland, College Park, Maryland, 1994; Ph.D., Computer Science, University of Maryland, College Park, Maryland, 1996

Department Research Area: SYSTEMS

Interests: System Software for Parallel and Distributed Environments; Compiler and Runtime Support for Data Intensive Computing, Middleware for Grid and Cloud Environments, Data Integration and Deep web mining.



ANISH ARORA *Full Professor*

B. Tech., Computer Science and Engineering, Indian Institute of Technology, New Delhi, 1986; M.S., Computer Science, University of Texas, Austin, 1988; Ph.D., Computer Science University of Texas, Austin, 1992.

Department Research Area: NETWORKING

Interests: Wireless Sensor Networks; Fault-tolerant, Secure And Timely Computing; Distributed Systems and Networks; Cyberphysical Systems; Component-Based Design; Formal Methods; Concurrency Semantics.



MIKHAIL BELKIN *Associate Professor*

Hon.B.Sc. with High Distinction, Mathematics, University of Toronto, 1995; M.S., Mathematics, University of Chicago, 1997; Ph.D., Mathematics, University of Chicago, 2003.

Department Research Area: ARTIFICIAL INTELLIGENCE

Interests: Machine Learning And Statistical Analysis Of Natural Data; Manifold And Spectral Methods For Machine Learning; Algorithms For Semi-Supervised Learning And Clustering; Understanding The Value Of Unlabeled Data In Pattern Recognition; Theoretical analysis of algorithms, particularly in high dimension; Connections to Human Cognition



MICHAEL BOND *Assistant Professor*

B.S., Computer Science, University of Illinois at Urbana-Champaign, 2002; M.C.S., Computer Science, University of Illinois at Urbana-Champaign, 2003; Ph.D., Computer Sciences, The University of Texas at Austin, 2008

Department Research Area: SOFTWARE ENGINEERING AND PROGRAMMING LANGUAGES

Interests: Research Interests: Developing program analyses and software systems that make complex, concurrent software reliable, scalable, and secure. Programming languages, software systems, runtime systems, program analysis, compilers, security.



ROGER CRAWFIS *Associate Professor*

B.S., Computer Science and Applied Mathematics, Purdue University, 1984; M.S., Computer Science, University of California, Davis, 1989; Ph.D., Computer Science, University of California, Davis, 1995.

Department Research Area: GRAPHICS

Interests: Computer Graphics; Video Game Technology; Scientific Visualizations; Medical Imaging; and Volume Rendering.



JAMES W. DAVIS *Associate Professor*

B.S., Computer Science, University of Central Florida, 1994; M.S., Media Laboratory, Massachusetts Institute of Technology, 1996; Ph.D., Media Laboratory, Massachusetts Institute of Technology, 2000.

Department Research Area: ARTIFICIAL INTELLIGENCE

Interests: Computer Vision; Automatic Visual Surveillance and Monitoring; Human Activity Recognition; Video Understanding; and Human-Computer Interaction.



TAMAL K. DEY *Full Professor*

B.E., Electronics, Jadavpur University, 1985; M.Tech., Computer Science, Indian Institute of Science-Bangalore, 1987; Ph.D., Computer Science, Purdue University, 1991.

Department Research Area: GRAPHICS

Interests: Computational Geometry; Computational Topology; Geometric Modeling; Meshing; Data Analysis.



ERIC FOSLER-LUSSIER *Associate Professor*

B.A., Linguistics, University of Pennsylvania, 1993; B.A.S., Computer and Cognitive Science, University of Pennsylvania; 1993; Ph.D., Computer Science, University of California, Berkeley, 1999

Department Research Area: ARTIFICIAL INTELLIGENCE

Interests: Automatic Speech Recognition; Computational Linguistics; Machine Learning



BRIAN KULIS *Assistant Professor*

B.A., Computer Science and Mathematics, Cornell University; Ph.D., Computer Science University of Texas at Austin, 2008.

Department Research Area: ARTIFICIAL INTELLIGENCE

Interests: Machine Learning, Data Mining, Large-Scale Data Analysis, Numerical Optimization, Applications to Computer Vision Machine Learning, Data Mining, Large-Scale Data Analysis, Numerical Optimization, Applications to Computer Vision and Other Domains and Other Domains

TEN-HWANG (STEVE) LAI *Full Professor*

B.S., Mathematics, Fu-Jen University, Taiwan, 1972; M.S., Mathematics, Fordham University, 1976; Ph.D., Computer Science, University of Minnesota, 1982.

Department Research Area: NETWORKING

Interests: Cryptography; Network Security; and Parallel and Distributed Computing.

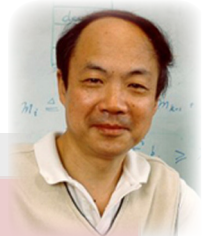


DAVID LEE *Full Professor*

M. A., Mathematics, Hunter College, City University of New York, 1982; M. S. and Ph.D., Computer Sciences, Columbia University, 1985

Department Research Area: NETWORKING

Interests: Communications and Network Protocol Security and Reliability



RAGHU MACHIRAJU *Full Professor*

B.Sc., Electrical Engineering, Delhi University, 1982; M.S., Automation, Indian Institute of Science, Bangalore, 1984; Ph.D., Computer Science, The Ohio State University, 1996.

Department Research Area: GRAPHICS

Interests: Scientific and Information Visualization; Imaging; Bioinformatics; Computational Biology



ARNAB NANDI *Assistant Professor*

Bachelors in Information Science, University of Delhi, India, 2005; M.S., University of Michigan, Ann Arbor, 2007; Ph.D., University of Michigan, Ann Arbor, 2011.

Department Research Area: SYSTEMS

Interests: Structured Search and Large-scale Data Analysis Efficient Interaction with Databases and the Management of Large, Diverse Data Collections..



DHABALESWAR K. (D. K.) PANDA *Full Professor*

B.S., Electrical Engineering, Indian Institute of Technology, Kanpur, India, 1984; M.S., Electrical and Computing Engineering, Indian Institute of Science, Bangalore, India, 1986; Ph.D., Computer Engineering, University of Southern California, Los Angeles, 1991.

Department Research Area: SYSTEMS

Interests: Parallel Computer Architecture; High Performance Networking; Network-Based Computing; Cluster Computing; High Performance File/Storage Systems; Lan-Wan Interfacing and Communication; and Resource Management.





RICHARD E. PARENT *Full Professor*

B.S., Computer Science and Mathematics, University of Dayton, 1972; M.S., Computer Science, The Ohio State University, 1973; Ph.D., Computer Science, The Ohio State University, 1977.

Department Research Area: GRAPHICS

Interests: Computer Graphics; Computer Animation; Modeling and Animating Human Figure; Tracking Human Figures in Video; Perception of Synthetic Imagery.



SRINIVASAN PARTHASARATHY *Full Professor*

B.E., Electrical Engineering, University of Roorkee, India, 1992; M.S., Electrical Engineering, University of Cincinnati, 1994; M.S., Computer Science, University of Rochester, 1996; Ph.D., Computer Science, University of Rochester, 2000.

Department Research Area: SYSTEMS

Interests: Data Mining; Database Systems; Network Analysis; Bioinformatics; High Performance Computing Systems.



FENG QIN *Assistant Professor*

B.E., University of Science and Technology of China, 1998; M.E., Chinese Academy of Sciences, 2001; Ph.D., the University of Illinois, Urbana-Champaign, 2006.

Department Research Area: SYSTEMS

Interests: Operating Systems; Software Reliability; Security and Distributed Systems



LUIS RADEMACHER *Assistant Professor*

Bachelor in Engineering Sciences, Mathematics, Universidad de Chile; Santiago, Chile, 2002; Mathematical Engineering Title (Masters Equivalent) Universidad de Chile. Santiago, Chile, 2002; Ph.D., Applied Mathematics, Massachusetts Institute of Technology, 2007.

Department Research Area: THEORETICAL COMPUTER SCIENCE

Interests: High dimensional geometry; random structures; matrix approximation; optimization.



NICOLETA ROMAN *Assistant Professor, Lima Campus*

B.S., Computer Science, University of Bucharest, Romania, 1996; M.S., Computer Science, University of Bucharest, Romania, 1997; Ph.D., Computer Science and Engineering, The Ohio State University, Columbus, Ohio, 2005.

Department Research Area: ARTIFICIAL INTELLIGENCE

Research interests: Computational Auditory Scene Analysis; Binaural sound localization and separation; Automatic Speech Recognition; Machine Learning.

ATANAS (NASKO) ROUNTEV *Associate Professor*

B.S., Computer Science & Engineering, Technical University, Sofia, Bulgaria, 1995; M.S., Computer Science, Rutgers University, 1999; Ph.D., Computer Science, Rutgers University, 2002.

Department Research Area: SOFTWARE ENGINEERING AND PROGRAMMING LANGUAGES

Interests: Static and Dynamic Program Analysis; Programming Languages and Compilers; Software Understanding and Evolution; Software Testing; High-Performance Computing



PONNUSWAMY (SADAY) SADAYAPPAN *Full Professor*

B.S., Electrical Engineering, Indian Institute of Technology, Madras, India, 1977; M.S., Electrical Engineering, State of University of New York, Stony Brook, 1978; Ph.D., Electrical Engineering, State of University of New York, Stony Brook, 1983.

Department Research Area: SYSTEMS

Interests: Compiler/Runtime Systems For High-Performance Computing; Performance Optimization; High-Productivity, High-Performance Scientific Computing.



HAN-WEI SHEN *Associate Professor*

B.S., Computer Science, National Taiwan University, 1988; M.S., Computer Science, State University of New York, Stony Brook, 1992; Ph.D., Computer Science, University of Utah, 1998.

Department Research Area: GRAPHICS

Interests: Computer Graphics; Information Visualization; Parallel Visualization Scientific Visualization; Visual Analytics.



NESS B. SHROFF *Ohio Eminent Scholar of Networking and Communications
Endowed Chaired Professor*

B.S., University of Southern California, 1988; M.S.E, University of Pennsylvania, 1990; M.Phil, Columbia University, 1993; Ph.D., Columbia University, 1994.

Department Research Area: NETWORKING

Interests: Wireless Networks; Next Generation Internet; Sensor Networks; Cloud Computing; Network Optimization; Network Design and Dimensioning; Network Security; Information Theoretic Security; Queueing Theory; Dynamic Control; Network Coding; Scaling Laws; Distributed Algorithms; Complexity and Approximability; Game Theory; Pricing.



PRASUN SINHA *Associate Professor*

B. Tech., Computer Science and Engineering, Indian Institute of Technology, Delhi, India, 1995; MS, Computer Science, Michigan State University, 1997; PhD, Computer Science, University of Illinois, Urbana-Champaign, 2001.

Department Research Area: NETWORKING

Interests: Sensor Networking; Ad-hoc Networking; Mobile Computing; Wireless Networking





PAUL A. G. SIVILOTTI *Associate Professor*

B.Sc.H., Computing Science, Mathematics & Biochemistry, Queen's University, Ontario, Canada, 1991; M.S., Computer Science, California Institute of Technology, 1993; Ph.D., Computer Science, California Institute of Technology, 1998.

Department Research Area: SOFTWARE ENGINEERING AND PROGRAMMING LANGUAGES

Interests: Distributed Systems; Software Engineering; and Tool-based Support for Testing Component Implementations.



NEELAM SOUNDARAJAN *Associate Professor*

B.S., Physics, Bombay University, India, 1970; M.S., Physics, Bombay University, India, 1972; Ph.D., Computer Science, Bombay University, India, 1978.

Department Research Area: SOFTWARE ENGINEERING AND PROGRAMMING LANGUAGES

Interests: Software Engineering; Reasoning about Program Behavior; Specification; Verification; Testing; Issues in Engineering Education.



KANNAN SRINIVASAN

B.S., Electronics & Communications Engineering, University of Madras, Chennai, India, 2000; M.S., Electrical & Computer Engineering, Oklahoma State University, 2002; Ph.D., Electrical Engineering, Stanford University, Stanford, CA, USA, 2010

Department Research Area: SYSTEMS

Interests: Wireless Networking, Low Power Wireless Systems, Communication Systems, Smartgrids and Wireless Security.



CHRISTOPHER STEWART *Assistant Professor*

B.S., Computer Science, Morehouse College, 2003; M.S., Computer Science, University of Rochester, 2005; Ph.D., Computer Science, University of Rochester, 2008

Department Research Area: SYSTEMS

Interests: Operating Systems; Distributed Systems; Performance Management; and Power Management.



KENNETH J. SUPOWIT *Associate Professor*

A.B., Linguistics, Cornell University, 1978; Ph.D., Computer Science, University of Illinois, 1981.

Department Research Area: THEORETICAL COMPUTER SCIENCE

Interests: Combinational Algorithms

RADU TEODORESCU *Assistant Professor*

Dipl. Eng. in Computer Science, Technical University of Cluj-Napoca, Romania, 2002; M.S., Computer Science, University of Illinois at Urbana-Champaign, 2005; Ph.D., Computer Science, University of Illinois at Urbana-Champaign, 2008.

Department Research Area: SYSTEMS

Interests: Computer Architecture, Multicore and Parallel Architectures; Support for Software Debugging; Nanoscale Technology; Scaling, Reliability, Variability and Power Management.



DELIANG (LEON) WANG *Full Professor*

B.S., Computer Science, Beijing University, 1983; M.S., Computer Science, Beijing University, 1986; Ph.D., Computer Science, University of Southern California, Los Angeles, 1991.

Department Research Area: ARTIFICIAL INTELLIGENCE

Interests: Machine Perception and Neurodynamics



HUAMIN WANG

B.Eng., Computer Science and Engineering, Zhejiang University Hangzhou, China, 2002; M.S., Computer Science, Stanford University Stanford, CA, USA, 2004; Ph.D. in Computer Science Georgia Institute of Technology Atlanta, GA, USA, 2009

Department Research Area: GRAPHICS

Computer Graphics, GPU programming for high-performance graphics and general-purpose computation, Computer Vision, feature tracking, optical flow, 3D reconstruction, finite element method, numerical integration, model reduction, motion control and design, efficient data structures.



YUSU WANG *Associate Professor*

B.S., Computer Science, Tsinghua University (P. R. China), 1998; M.S., Computer Science, Duke University, 2000; Ph.D., Computer Science, Duke University, 2004.

Department Research Area: GRAPHICS

Interests: Computational Geometry, Algorithms, Computational Biology, Computational Topology, Graphics, Modeling, And Visualization.



BRUCE W. WEIDE *Full Professor and Associate Chairperson*

B.S.E.E., Electrical Engineering, University of Toledo, 1974; Ph.D., Carnegie Mellon University, 1978.

Department Research Area: SOFTWARE ENGINEERING AND PROGRAMMING LANGUAGES

Interests: Component-Based Software; Verified Software.





REPHAEL WENGER *Associate Professor*

B.S.E., Computer Science, Princeton University, 1984; Ph.D., Computer Science, McGill University, 1988.

Department Research Area: GRAPHICS

Interests: Computational Geometry; Computer Visualization; Isosurface Reconstruction; and Image Processing.



DONG XUAN *Associate Professor*

B.S., Electronic Engineering, Shanghai Jiao Tong University, China, 1990; M.S., Electronic Engineering, Shanghai Jiao Tong University, 1993; Ph.D., Computer Engineering, Texas A&M University, 2001.

Department Research Area: NETWORKING

Interests: Distributed Computing, Computer Networks and Cyber Space Security



XIAODONG ZHANG *Chairperson of Computer Science & Engineering
Robert M. Critchfield Professor*

B.S., Electrical Engineering, Beijing University of Technology, 1982; M.S., Computer Science, University of Colorado at Boulder, 1985; Ph.D., Computer Science, University of Colorado at Boulder, 1989.

Department Research Area: SYSTEMS

Interests: Distributed and High Performance Systems

EMERITUS APPOINTMENTS

Professor Emeritus

BALAKRISHNAN CHANDRASEKARAN

CHARLES A. CSURI

MING-TSAN (MIKE) LIU

SANDY MAMRAK

MERVIN E. MULLER

STUART ZWEBEN

Associate Professor Emeritus

CLINTON R. FOULK

DOUGLAS S. KERR

TIMOTHY LONG

WILLIAM F. OGDEN

ANTHONY E. PETRARCA

CLINICAL FACULTY



JAY RAMANATHAN Research Associate Professor

Director of Research of Center for Experimental Research in Computer Systems

B.S., Computer Science, Purdue University, 1970; M.S. in Computer Science, Purdue University, 1972; Ph.D. Computer Science, Rice University, 1977.

Research Interests: Analysis and Engineering of the Complex Adaptive Environments to achieve overall objectives, performance and Business-IT alignment. Related applications include Serious Gaming and technology-mediated collaborative platforms. Tools and methods of interest include knowledge mining, complexity theory, autonomic computing; technologies such as OWL, Middleware, Workflow, Mobile Computing, and Web Services.



RAJIV RAMNATH Associate Professor of Practice

Director, Collaborative for Enterprise Transformation and Innovation (C.E.T.I.)

B.Tech., Indian Institute of Technology, New Delhi, India, 1981; M.S., Computer & Information Science, The Ohio State University, 1983; Ph.D., Computer & Information Science, The Ohio State University, 1988

Research Interests: Foundations of Adaptive Complex Enterprises, Enterprise Architecture and Engineering, Business-IT Alignment, Workflow and Work-Management Systems Enterprise Software Engineering and Computer Science Education, Wireless Sensor Network and Pervasive Computing Enterprise Applications, e-Government.

COURTESY APPOINTMENTS

WAYNE CARLSON

Chair, Industrial Design

HARVEY M. FRIEDMAN

Mathematics

KUN HUANG

Biomedical Informatics

FURRUKH KHAN

Electrical and Computer Engineering

MICHAEL KNOPP

Chair, Radiology

ALBERT M. LAI

Biomedical Informatics

VIRGINIA NIVAR

Davis Heart & Lung Research Institute

ALAN SAALFELD

Geodetic Science

CATHY HONGHUI XIA

Integrated Systems Engineering

TAO SHI

Statistics

ALPER YILMAZ

Civil, Environmental Engineering & Geodetic Science

ADJUNCT FACULTY

KIKUO FUJIMURA

LECTURERS



GOJKO BABIC

B.S., Electric Engineering, University of Sarajevo, 1972; M.S., Computer Science, Florida Institute of Technology, 1975; Ph.D., Computer Science, The Ohio State University, 1978.



BETTINA BAIR

B.S., Business Administration, University of Phoenix, 1987; M.B.A., University of Denver, 1992.



PAOLO BUCCI

Laurea in Scienze Dell' Informazione, Universita' Degli Studi di Milano, Italy, 1986; M.S., Computer & Information Science, The Ohio State University, 1989; Ph.D., Computer & Information Science, The Ohio State University, 1997.



DOREEN CLOSE

B. S., Computer and Information Science, The Ohio State University, 1979; M. S., Computer Science and Engineering, The Ohio State University, 1981



DEBBY GROSS

B.S., Chemical Engineering, Massachusetts Institute of Technology, 1977; M.B.A., University of Chicago, 1979.



WAYNE HEYM

B.Phil., Miami University, 1978; M.S., Cornell University, 1980; M.S., Computer & Information Science, The Ohio State University, 1989; Ph.D., Computer & Information Science, The Ohio State University, 1995.



JEREMY MORRIS

Ph.D., Computer Science and Engineering, The Ohio State University, 2010; M.S., Computer Science and Engineering, The Ohio State University, 2007; M.A., Education, The Ohio State University, 1998; B.S., Mathematics and Computer Science, Bowling Green State University, 1996;



NAEEM SHAREEF

B.S., Applied Mathematics & Computer Science, Carnegie Mellon University, 1990; M.S., Computer & Information Science, The Ohio State University, 1992; Ph.D., Computer Science & Engineering, The Ohio State University, 2005.

RESEARCH SCIENTIST

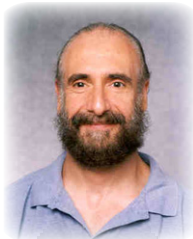


BALAKRISHNAN CHANDRASEKARAN *Professor Emeritus
Senior Research Scientist*

B.E., Electrical Engineering, Madras University, India, 1963; Ph.D., Electrical Engineering, University of Pennsylvania, 1967

Research Interests:

Artificial Intelligence and Cognitive Science, specifically Knowledge Systems, Diagrammatic Reasoning, Cognitive Architecture, and Decision Support Systems.



JOHN JOSEPHSON *Research Scientist*

B.S., Mathematics, The Ohio State University 1968; M.S., Mathematics, The Ohio State University, 1970; Ph.D., Philosophy, The Ohio State University, 1982

Research Interests:

Artificial Intelligence; Computational Epistemology, Abductive Inference, Causal Reasoning, Multiple Criteria Decision Making, Perception, Information Fusion, Diagnosis, Theory Formation, Logic of Investigation and Foundations of Science

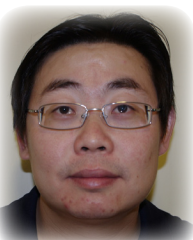


WILLIAM M. LEAL *Research Scientist*

B.A. Mathematics, University of California, Berkeley, 1969; M.S. Computer Science, University of South Alabama, Mobile, 1994; M.S. Computer Science, The Ohio State University, 2001; Ph.D., Computer Science, The Ohio State University, 2001.

Research Interests:

Wireless Sensor Networks, Dynamic Resource Management, Compositional Stabilization



RUBAO LI *Research Scientist*

B.S., Mechatronics, Jingdezhen Ceramic Institute, 2000; M.S., Computer Science, Beijing University of Technology, 2003; Ph.D., Computer Science, Chinese Academy of Sciences, 2008.

Research Interests:

Distributed and Parallel Computing Systems, Database Systems and Data Integration Systems, Computer Architecture and Storage Systems.

POST-DOCTORATE RESEARCHERS

Xavier Besson
Engin Demir
Jihun Hamm
Teng-Yok Lee
Sonya Marcarelli
Theodore Paul Pavlic
Louis Noel Pouchet
Kevin Streib
Jerome Vienne
Hao Wang

PART-TIME LECTURERS

Thomas Bihari
Moez Chaabouni
Michael Compton
Matt Curtin
Charles Giles
Steve Gomori
John Heimaster
Perumal Krishnasamy
Igor Malkiman
Michelle Mallon
William Thomas Martin
Robert Mathis
Steven Romig
Issam Ibrahim Safa
Al Stutz
John Thomas
Annatala Wolf

ADMINISTRATIVE STAFF

Catrena Collins: Human Resources Officer
Tamera Cramer: Public Relations Coordinator.
Don Havard: Fiscal Officer
Z. Lynn Lyons: Graduate Admissions and Graduate Studies Coordinator.
Meg Murnane: Information Associate
Kitty Reeves: Academic Program Administrator
Carrie Stein: Grants Administrator

COMPUTING SERVICES STAFF

Michael Compton -- Director, Computing Services
Aaron Jenkins -- Systems Manager
Bob Joseph-- Systems Developer/Engineer, DBA
Tami King -- Sr. Systems Developer/Engineer
Milan Koppen -- Systems Administrator
Dave Kneisly -- Systems Administrator
Todd Lucal -- Systems Administrator
Shaun Rowland -- Manager, Software Support and Development
Ted Welch -- Systems Administrator
Kat Wenger -- Systems Manager



DEPARTMENT OF
COMPUTER SCIENCE
AND ENGINEERING

The Ohio State University
395 Dreese Labs
2015 Neil Avenue
Columbus, Ohio 43210

(614) 292-5813

www.cse.ohio-state.edu