The Ohio State University
Department of Computer Science and Engineering

2006 - 2007 Annual Report

Striving toward and achieving excellence throughout the world.

Investigating the questions
Finding the solutions
Leading the current generation
Preparing the next generation
Educating every generation

Contents

Mission Statement

- ***The Department of Computer Science and Engineering will impact the information age as a national leader in computing research and education.***
- ***We will prepare computing graduates who are highly sought after, productive, and well-respected for their work, and who contribute to new developments in computing.***
- ***We will give students in other disciplines an appropriate foundation in computing for their education, research, and experiences after graduation, consistent with computing's increasingly fundamental role in society.***
- ***In our areas of research focus, we will contribute key ideas to the development of the computing basis of the information age, advancing the state of the art for the benefit of society, the State of Ohio, and The Ohio State University.***
- ***We will work with key academic partners within and outside of OSU, and with key industrial partners, in pursuit of our research and educational endeavors.***

Greetings from the Chair's Office

September 1, 2007

Dear Colleagues, Alumni, Friends and Parents,

In my second year as the CSE Chair at Ohio State, I continue to observe the department moving forward with a high standard for academic excellence. We have determined to further improve our department's national reputation that mainly relies on the quality of education and significance and influence of our research. I would like to highlight several accomplishments we have made in the last year.

- *Assistant Professors Eric Fosler-Lussier, Atanas (Nasko) Rountev, and Mikhail Belkin received NSF CAREER Awards; and Yusu Wang received DOE CAREER award. The number of CAREER Awards reached a record high in the calendar year of 2006: a total of seven CSE young faculty received the awards from NSF and DOE. (See page 1)*
- *After a successful faculty recruiting year in 2006, we are welcoming Hui Fang this year as a new assistant professor. Hui has just received her Ph.D. in Computer Science from University of Illinois, and her research interests are in data mining and information retrieval. (see page 3)*
- *One important goal of our research is to make an impact on the advancement of technology and applications not only in our own areas but also in all computing dependent fields. We again select three faculty reports to highlight their research efforts and activities beyond academic publications in the areas of computer systems, computer vision, and visualization. (see page 10)*
- *We have restarted the Industrial Advisory Committee functions. The committee consists of several distinguished CSE alumni who are playing important leadership roles in various computer industries. The committee members have been enthusiastic in making suggestions to improve CSE's research and education programs, and to help with the department's fund-raising activities. (see page 9)*
- *Finally, I would like to give my congratulations to Hakan Ferhatosmanoglu and Dong Xuan for being promoted to the rank of associate professor with tenure; and to Gagan Agrawal and Richard Parent for being promoted to the rank of full professor.*

We will continue to improve our connections with our alumni. Wherever our alumni go, their personal and professional development and success will always inspire us; and I believe Ohio State will always be a very special place in their memory. We are grateful for our alumni's continued support (see page 43)

I hope you enjoy reading this annual report. I look forward to communicating with you in 2008 as we move through another fruitful year.

Xiaodong Zhang

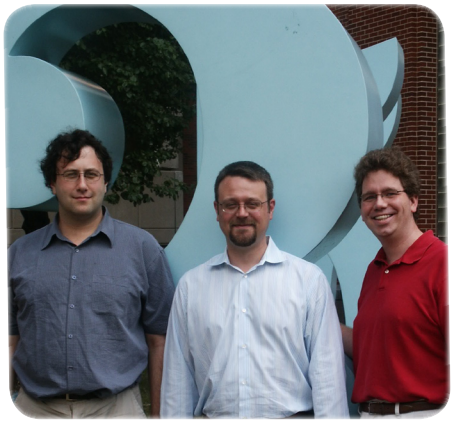
Chair and Robert M. Critchfield Professor
Department of Computer Science and Engineering
The Ohio State University

Highlights & Achievements 2006 - 2007

Faculty

TRIO OF CAREER AWARDS

Three of CSE's faculty members received the highly prestigious National Science Foundation's CAREER Award. The CAREER is the NSF's most prestigious award for junior faculty members. Established in 1995, the CAREER program aims at recognizing and supporting the early career-development activities of those teacher-scholars who are most likely to become the academic leaders of the 21st century. CAREER winners are selected on the basis of creative, career-development plans that effectively integrate research and education within the context of the mission of their institution.



Our Trio of CAREER winners.

(l-r) Mikhail Belkin, Atanas Rountev and Eric Fosler Lussier.

Mikhail Belkin

Dr. Belkin's work is within our Artificial Intelligence group and concentrates on Machine Learning. As technology demands grow and more automated processing is required, the area Machine Learning likewise gains importance. Dr. Belkin's project, *Geometry and High-Dimensional Inference* aims to build a theoretical foundation for a new class of inference algorithms as well as to design new algorithms for high-dimensional inference and to consider its application. A rigorous theoretical understanding of unlabeled data and its use in learning tasks is likely to have a significant impact in algorithms design and in applications of machine learning techniques in practice.

Mikhail, or Misha as he is less formally known, became an OSU-CSE faculty member in Autumn 2005. Before arriving in Columbus, he worked as a Visiting Fellow or Postdoctoral Researcher at a few very prestigious programs; Max Planck Institute for Biological Cybernetics, UC, Berkeley, UCLA and the University of Chicago. Belkin received his PhD in Mathematics at the University of Chicago under the tutelage of Partha Niyogi in 2003 where he also received his Masters in 1997. It was at the University of Toronto in 1995 that he earned his Hon. Bachelors of Science with High Distinction.

Eric Fosler Lussier

Dr. Eric Fosler-Lussier has been awarded a CAREER award from the National Science Foundation. This is the first for CSE in the 2007 NSF budget year, but Eric is the fifth CSE assistant professor recognized as an NSF Career Awardee in 2006.

Dr. Fosler-Lussier's project, *Breaking the Phonetic Code: Novel Acoustic-Lexical Modeling Techniques for Robust Automatic Speech Recognition*, strives to establish a consistent framework that seeks to cope with the conditions that give rise to unacceptable error rates in Automatic Speech Recognition. The primary challenges addressed in this project are modeling different types of variability that arise from spontaneous speech, accented speech and speech in noise. The novel approach to phonetic variability investigated here views the problem as one of phonetic information underspecification: some subset of information that the listener receives will be missing or uncertain. The key to breaking the phonetic code is understanding how, in the absence of particular phonetic cues, one can still perceive language, and how this information can influence statistical models for machine recognition of speech. It's a lot l_ke f_ll_ng in th_ bl_nks -- a task that is easy for humans but not for computers.

Eric Fosler-Lussier joined the CSE department as an assistant professor in 2003, and currently holds a courtesy appointment in the department of Linguistics. His interest in computational linguistics started early in his undergraduate career; in 1993 he received a B.A.S. in Computer and Cognitive Science and a B.A. in Linguistics from the University of Pennsylvania. In graduate school, he focused his attention on spoken language processing: he received his Ph.D. in 1999 from the University of California, Berkeley. His Ph.D. research was conducted at the International Computer Science Institute, where he was also a postdoctoral researcher through 2000. From 2000-2002 he was a Member of Technical Staff in the Dialogue Systems Research Department at Bell Labs, Lucent Technologies, and before coming to OSU, he was a Visiting Researcher in the Department of Electrical Engineering, Columbia University. He is a senior member of the IEEE, and currently serves on the IEEE Signal Processing Society Speech and Language Technical Committee, as well as the executive committee of the Association for Computational Linguistics Special Interest Group in Morphology and Phonology.

Atanas (Nasko) Rountev

Dataflow Analysis for Modern Software Systems is the title of the work Dr. Rountev is doing under this grant. Rountev's project will design and evaluate novel approaches for software analysis of reusable components, distributed software, and run-time-adaptable systems. This effort is a significant step towards building powerful software tools that are truly usable and useful in the software industry. Nasko joined CSE in 2002 after receiving his PhD and a Masters in computer science from Rutgers. His advisor was Barbara Ryder. His undergraduate career was spent at Technical University in Sofia, Bulgaria, culminating in with B.S. in Computer Science & Engineering in 1995.

New "Young Investigator" in CSE

The Department of Energy awarded **Yusu Wang** their highly prized Young Investigator Award. She has entitled her work *Feature Extraction, Characterization, And Visualization For Protein Interaction Via Geometric And Topological Methods*. This research focuses on feature identification issues arisen in molecular structural biology, recasting them in a generic framework and developing novel techniques within this framework to capture and represent features. In particular, features from multiple functions will be investigated. Dr. Wang obtained her M.S. and Ph.D. degrees from Duke University in 2000 and 2004, respectively, where she studied under Professors Pankaj K. Agarwal and Herbert Edelsbrunner. After a year's postdoc working in Stanford's Geometric Computing Lab with Leonidas J. Guibas, she came to Columbus and OSU in Autumn 2005. Her Bachelors degree was earned at Tsinghua University in 1998.

According to the website of the DOE, "the overall objective the ECPI program is to stimulate academic research in scientific areas of interest to the Office of Advanced Scientific Computing Research (ASCR) programs, especially among faculty in the early stages of their academic profession. The specific research areas of interest to ASCR include: applied mathematics, computer science, and high-performance networks."

DOE Trifecta

CSE received funding for three grants from the Department of Energy. Three CSE faculty members have received a Scientific Discovery through Advanced Computing (SciDAC) award and two DOE BASE Program projects, each funded for five years. **Professor Han-Wei Shen** received a Scientific Discovery through Advanced Computing (SciDAC) award entitled SciDAC Institute for Ultrascale Visualization, this is a collaborative effort led by University of California, Davis. This project will assemble the scalable parallel visualization infrastructure needed to enable knowledge discovery at the petascale and instruct application scientists on how to best use these tools.

Professors DK Panda and **P. Sadayappan** also received funding from the DOE BASE Program for the collaborative project entitled *Programming Models for Scalable Parallel Computing*. This five year project, led by Argonne National Laboratory, will focus on research and development in the area of programming models for scalable parallel computing.

Professor DK Panda was awarded the second DOE award from the DOE BASE Program as part of a collaborative effort led by Argonne National Laboratory entitled Coordinated Fault Tolerance for High Performance Computing. Professor Panda's project will design a reference implementation of a fault awareness and notification backplane to provide common uniform event handling and notification mechanisms for fault-aware libraries and middleware; create an interface specification that allows libraries, run-time systems, and applications to connect to and use the fault-tolerant backplane; and extend key libraries and applications to validate the interface choices and to form the critical mass necessary for adoption in the community.

CSE Faculty Receive Three NSF CPA Grants

The National Science Foundation awarded three research grants for the 2007 proposal competition Foundations of Computing Processes and Artifacts (CPA) to CSE faculty D. K. Panda, Srinivasan Parthasarathy and Xiaodong Zhang. The three research projects will address three different fundamental problems in computer systems and architecture.

Professor DK Panda is leading a collaborative project entitled *Designing Next Generation Communication and I/O Subsystems with Multi-core Architecture* with Pavan Balaji at the University of Chicago. His research will investigate issues in designing the following components for next generation HEC systems: Multicore-aware Message Passing Interface (MPI), enhanced MPI with dedicated communication threads, multicore-aware I/O subsystem and reliability and fault tolerance.

The project, led by **Srinivasan Parthasarathy** is entitled *Scalable Data Analysis: An Architecture Conscious Approach*. He seeks to employ an architecture-conscious approach to scalable data analysis on modern cluster systems interconnected through a high speed network. The central thesis of his work is that current day algorithms for data analysis often grossly under-utilize resources provided by such systems. The project seeks to address this limitation in the context of key application drivers drawn from scientific simulations, bioinformatics and homeland security.

Xiaodong Zhang is leading another NSF CPA project entitled *Algorithm Design and Systems Implementation to Improve Buffer Management for Fast I/O Data Accesses*. He and his collaborator, Professor Song Jiang at Wayne State University, will address the increasingly more serious problem of "disk wall" by efficiently improving and enhancing the memory caching management in operating systems.

Xuan Leads ARO Sensor Research Project

Professors Dong Xuan, Anish Arora and **Steve Lai** have received a 3 year grant from the Army Research Office titled *Defending Against Physical Attacks in Sensor Networks*.

The team will study modeling and defense of sensor networks against physical attacks - those attacks that physically destroy sensors with the intention of rendering them permanently inoperable. These attacks will be studied through comprehensive modeling and the design of effective defenses.

NSF Gives Funding for Collaborative Effort

The Ohio State University has been awarded 1.4 million by National Science Foundation (NSF) to develop and evaluate a cyberinfrastructure component for environmental applications. The project is lead by **Prof. Gagan Agrawal**, from Computer Science and Engineering. **Prof. Hakan Ferhatosmanoglu** (CSE), Prof. Keith Bedford (Civil and Environmental Engineering and Geodetic Science) and Prof. Ron Li (CEEGS) are the three co-Principal Investigators.

Ferhatosmanoglu Receives College of Engineering Lumley Award.

The College of Engineering presented **Hakan Ferhatosmanoglu** with a College Lumley Award. This is the 22nd Lumley earned by a CSE faculty member.

The Lumley Research Award, established to promote and enhance research within CoE, is given to a select group of outstanding researchers who have shown exceptional activity and success pursuing knowledge within their fields.

Greg Washington, Associate Dean for Research, (left) and Dean Bud Baeslack, both of the College of Engineering, congratulate Hakan Ferhatosmanoglu (center) on his research success in winning the Lumley Award.

IEEE Computer Society Awards

IEEE Computer Society presented two awards to **Dr. Ming-Tsan (Mike) Liu** for his long term research and service contributions. In July 2006, IEEE Computer Society Technical Committee on Distributed Computing presented the Distinguished Achievement Award to Professor Liu for his research achievements in the field. This honor was followed in March 2007 with a Special Presidential Award when the IEEE Computer Society bestowed a Special Presidential Award for Dr. Liu's long term professional service to the organization.

A New IEEE Fellow in CSE

Ness Shroff, Ohio Eminent Scholar and professor of CSE and ECE, has been elected to the 2007 class IEEE Fellow for his contributions to the modeling, analysis and control of computer communication networks.

New Faculty Hire

CSE very happily welcomes **Dr. Hui Fang** to the Department in October 2007. Dr. Fang is a recent graduate Science University of Illinois at Urbana-Champaign. At UI, as an advisee of Professor ChengXiang Zhai. She was a member of the Information Retrieval and Database and Information Systems Groups. Her future research will be in the areas of Information Retrieval, Text Mining and Bioinformatics.

Promotions Strengthen Senior Faculty Levels

The Board of Regents has approved four faculty member promotions to become effective October 2007. Ascending to the position of Full Professor are **Dr. Gagan Agrawal** of the Systems Group and **Dr. Rick Parent** from the Graphics Area. The Systems and Networking areas gain each gain another tenured Associate Professor; **Hakan Ferhatosmanoglu** in former and **Dong Xuan** in the latter.

Undergrad Advisor's Efforts Recognized

Undergraduate Academic Advisor, **Dr. Nikki Strader**, was voted Outstanding Advisor by the Academic Advising Associate of Ohio State (ACADAOS). The award is jointly sponsored by the Office of Academic Affairs at The Ohio State University. Dr. Strader joined the department in November 2003. She holds music degrees from West Virginia University and Indiana University, and a Ph.D. in Music History/Literature from The Ohio State University. Prior to joining CSE, she worked with pre-majors in nursing and the allied medical professions at OSU. She is involved in professional organizations such as the National Academic Advising Association (NACADA) and the Academic Advising Association of The Ohio State University (ACADAOS). During the (2006-2007) academic year, she served ACADAOS as President and continues in that office through 2007-2008.

This award adds to the previous awards made to the Advising Office for outstanding contributions to OSU Advising and to the profession. ACADAOS, founded in 1991, is a professional organization for academic advisors, announces the 2007 Outstanding Advisor Awards for undergraduate advising. Its mission is to encourage greater interaction and discussion among campus professionals, faculty, and graduate students interested in advising issues at The Ohio State University and is allied with the National Academic Advising Association (NACADA).

New Fiscal Officer Joins Department

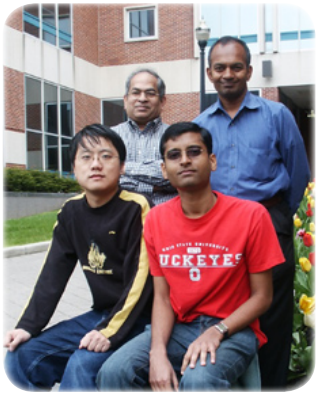
CSE happily welcomes **Don Havard** to the Department. Originally from California, Don comes to this position via a brief stay in Buffalo, New York. Prior to that sojourn, he worked for OSU's School of Communications. Don earned a Bachelor's degree in Finance and Accounting from the University of San Francisco. As well as his professional qualifications, Don brings an easy sense of humor which is highly needed in such strenuous position.

Student Achievements

IBM Recognizes Systems Group Students

Again this year, IBM recognized that CSE graduate students are doing quality work. For the 2007 - 2008 academic year, **Sriram Kristhnamoorthy** will be an IBM Ph.D. Fellow and **Wei Huang** will receive a Ph.D. Scholarship. Both students are members of the Systems group, the same group that received IBM awards in 2006.

Sriram, working under the mentorship of Professor P. Sadayappan in the High-Performance and Parallel Computing lab, is currently focusing on the design and implementation of a runtime environment for efficient execution of the code generated by the tensor contraction expressions engine (TCE), an optimized code generation system for quantum chemistry calculations. Additionally, his recent work on the trade-off between load-balance, start-up cost and computation cost on certain pipelined stencil codes has been accepted for publication at the ACM SIGPLAN Conference on Parallel Language Design and Implementation (PLDI'07). As part of the IBM fellowship, Sriram will be interning at the IBM TJ Watson research lab, continuing his work on a runtime library for the X10 programming language, which focuses on programmer productivity.



D.K. Panda and P. Sadayappan (back, left, right) present their award winning advisees, Wei Huang (front left) and Sriram Kristhnamoorthy (front right).

Huang is currently a PhD student in the Network Based Computing Laboratory (NBCL), led by Professor D.K. Panda. Huang's research topic, High Performance Computing (HPC) with Virtual Machines, is aimed at achieving both high performance and high productivity computing via modern Virtual Machine (VM) technologies. On the MPI front, Huang is also involved in the design of MVAPICH/MVAPICH2 (high performance MPI over modern Interconnects) software, which is being used by more than 470 organizations world-wide.

The IBM Fellowship program is a prestigious and highly competitive international competition which honors exceptional PhD students. Award recipients are selected based on their overall potential for research excellence, the degree to which their technical interests align with those of IBM and their progress to-date.

DMRL Student Wins Microsoft Research Fellowship

Another proud advisor, Srini Partharasarathy (l) with his advisee, Greg Breuhrer (r).

CSE PhD student **Gregory T. Buehrer** (advisor: **Dr. Srinivasan Parthasarathy**) won a prestigious two year Microsoft Research Fellowship (sponsored by Microsoft Live Labs) starting Fall 2007. The Microsoft Research Redmond lab recognizes these fellows who represent the best and the brightest from North America. As noted on the Microsoft website these fellowships also build relationships between Microsoft Research and academic institutions that have a lasting effect. For the 2007 awards 17 winners were selected from among 62 finalists who were interviewed onsite at Microsoft Research Redmond Labs. The 62 finalists were themselves selected from among 190 initial applicants. This award represents the first such award from Microsoft Research to an Ohio State University graduate student in the 10 year history of the fellowship program. A list of all award winners for 2007 can be found at: http://research.microsoft.com/aboutmsr/jobs/fellowships/fellows_us.aspx

Greg is a member of the Data Mining Research Laboratory which is a part of the High End Computing Systems Group . Greg, works in the area of high performance data mining. Together with his advisor, Greg is investigating techniques to improve the efficiency and scalability of data mining algorithms when deployed on emerging commodity architectures. Their most recent work in this area pioneered the design of an adaptive parallel graph mining algorithm for chip multiprocessors (CMPs). As a follow up to this work they are currently examining the performance of key data mining algorithms on the STI Cell Broadband Engine Architecture.

As part of the fellowship Greg will spend the summer of 2007 interning at Microsoft Research Live Labs. The award carries a 20K stipend and a conference allowance. All award winners will also be given a Tablet PC. The award is for two academic years.

CSE Database Research Lab Students Win Awards

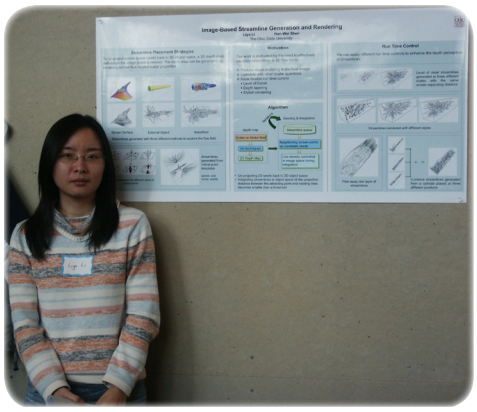
Award winning collaborators, Michael Gibas (l) and Guadalupe Canahuate (r).

Guadalupe Canahuate and **Michael Gibas**, CSE Ph.D candidates, received awards for their research projects at the 4th annual Midwest Database Research Symposium. Guadalupe and Michael are advisees of **Hakan Ferhatosmanoglu** in his Database Research Lab. This pair of awards were chosen from approximately 50 posters presented.

Guadalupe's *Update Conscious Bitmap Indices* poster presentation, co-authored by Michael Gibas and Hakan Ferhatosmanoglu, won the award for the most novel work. Bitmap indexes have been successfully applied towards fast query processing over static data sets. However, their use for dynamic data domains has been limited due to the time required to update the index to reflect changes in the data. This work significantly enhances bitmap indexes by providing a technique to minimally modify the index to accurately reflect appended data.

A General Framework for Modeling and Processing Optimization Queries, Michael's entry, (co-authored by Ning Zheng and Hakan Ferhatosmanoglu) was voted the most promising work. This work provides a methodology to I/O-optimally discover the best points in a database according to some arbitrary convex function while incorporating arbitrary convex problem constraints over arbitrary access structures built on convex partitions. This provides a unified framework to efficiently answer a wide range of ranked queries, which enhances the effectiveness of scientific discovery.

Midwest Database Research Symposium strives strengthen the ties between the database researchers at universities in the region and to encourage future discussions and interactions through poster presentations and networking. This year's symposium was held at Purdue University and included participants from more than 15 universities, including some of the nation's top database research groups. More information regarding the symposium can be found at http://dais.cs.uiuc.edu/mwdbrs/.



Liya Li, with her awarding winning poster, at the CSE Research Poster Exhibition.

Best Poster Award

Liya Li, a Ph.D. student in the department and an advisee of Han-Wei Shen, won the best poster award in the IEEE Visualization Conference, 2006 on the work *Image Based Streamline Generation and Rendering*. This award was selected from a total 29 posters accepted to the conference. The goal of this work is to help scientist understand their three dimensional flow data obtained from numerical simulations.

Undergrad Places in University Research Competition

Adam Champion presented his research work, *Trusted Computing and Digital Rights Management Clearinghouse*, to the Denman Undergraduate Research Forum and was awarded with Fourth Place. The Denman award is given in recognition of quality research at the undergraduate level and is funded by distinguished alumni, Richard J. and Martha D. Denman.

Alumni Awards

Alumnus Named ACM Fellow

OSU CSE alumnus **M. Tamer Ozsu** was elected as a Fellow of the Association for Computing Machinery (ACM). This is the ACM's most prestigious honor, reserved for its distinguished members who have made outstanding contributions in research and information technology. A candidate's accomplishments are expected to place him or her among the top 1% of ACM members.

Tamer received his Ph.D. from our department in 1983 (advisor: Bruce W. Weide). He is well-known for his numerous contributions to the study of databases, and has served as Chair of ACM SIGMOD, the premier professional organization for database research, as longtime Editor-in-Chief of the journal Very Large Databases, and in numerous other leadership roles. He is currently Director of the Database Research Group and University Research Chair Professor of Computer Science at the University of Waterloo in Canada. Recently, he became the Director of the David R. Cheriton School of Computer Science at Waterloo. One more accolade in recognition of his professionalism and success.

College Recognizes Distinguished Alum

At the 2006 Buckeye Reunion Under the Stars, **Conleth O'Connell** was recognized as a Distinguished Alumnus of CSE. Dr. O'Connell is chief technology officer at Vignette Corp., responsible for driving new technology and innovation within the company. O'Connell joined Vignette in 1996 as one of the company's first engineers and helped develop Vignette's initial product offering.

The O'Connell Family. Clockwise from the front, Daniel, Sarah, Curby and Conleth. Since this picture was taken the family has had an addition of another daughter.

O'Connell joined Vignette from HaL computer systems where he led product development efforts and participated in the Davenport Group, a consortium that created an SGML distribution format for online documents called the DocBook DTD. Prior to that, O'Connell spent time as a director of an industrial consortium, where he supervised graduate students who produced integrated software architecture and later co-authored a book on the architectural design of the project.

He holds a master's degree and Ph.D. in Computer Information Systems. O'Connell holds a patent for innovation in content management and delivery, with several more pending. He has continued to be a vital member of CSE. The foundation he and his wife, former staff member Christina "Curby" (Morgan) O'Connell, created the O'Connell Family Awards for Undergraduate Students as well as assisting with endowment of several other awards for which the Department is profoundly grateful.

2007 Computer Science and Engineering Department Awards

Scholarships

Central Ohio Chapter of Association of Computing Machinery {ACM}
Jennifer Rajadhysaksha

Ernest William Leggett, Jr. Scholarship The Leggett Family Award
The Leggett Family established this endowment in memory of Ernest William Leggett, Jr., who received his Ph.D. from the Department in 1977. Dr. Leggett passed away in 1994
Binaebi Akah
John Battagline
Raymond Gerard
Aaron Pikkarainer

Interactive Brokers Group
Pete Bohman
Adam Kunk
Stacey Laugel
Robert Quick
Nathan Schey

Lockheed Martin
Jamall Brown

The O'Connell Family Award
Alumni Conleth O'Connell (Ph.D. 1990) and Christina "Curby" (Morgan) O'Connell, his wife and former Department staffer, have created this endowment for undergraduate students. A portion of the funds have been designated for incoming freshmen and that money is given partially upon arrival to the University and the other half upon entering the major.
Deepak Bal
Thomas Loffing
Adam Schultz
Kelsey Amanda Marlow {incoming first year}

Raytheon Corporation
Bryan Kunk
Junan Pang
Tyler Rausch-Davis

CSE Undergraduate Scholarship
Brian Burkhart
Kyle Hawk
Katherine Watson
David Weinberg

Faculty & Staff Awards

Career Service to Academia Award
Exclusively open to CSE staff members, this award is given in recognition of their long-term and outstanding service contributions to Academia.
Tom Fletcher
Marty Marlatt

Eleanor Quinlan Memorial Award
This fund is an endowment established to honor the memory of Eleanor "Elley" Quinlan, who was both a staff member and graduate of the Department. From 1990 until her passing in January 2001, she was the Academic Program Assistant. The proceeds from this fund are used for the development and recognition of graduate teaching associates in the CSE Department.
Jason Sawin

Outstanding Research Awards
Exclusively open to CSE graduate students, this award is given in recognition of their exceptional research efforts.
Keith Marsolo

Outstanding Teaching Awards
This award is given to a member of the faculty, a lecturer or Teaching Assistant who demonstrates exemplary ability in the classroom and in her/his interaction with students.
Rajiv Ramnath

Outstanding Service Awards
All faculty, staff and students who contribute to the Department's success by working beyond the expected are eligible.
Carrie Casto

We wish to thank the companies, organizations and individuals who contributed award funding and table sponsorship. Without their generous support the scholarships would be fewer and the banquet would not be the quality event it has become.

Industrial Advisory Committee

After a brief hiatus during the change in Chairmen, CSE enthusiastically welcomes the return of the Industrial Advisory Committee (formerly called the External Advisory Board). Established in 1987, the committee was created to provide CSE with valuable input concerning computing trends and making suggestions to enhance the Department's growth.

The current board members are:

Richard Baum, Ph.D '75, is Vice President, Server Technology for the IBM Server Group where he leads strategy, architecture and design efforts for future server systems. He was named an IBM Fellow in 1991.

James Cates, MS '71, is currently CIO of Altera, Corp., the world's pioneer of system-on-a-programmable-chip (SOPC) solutions, and is a keen advocate of converging IT to business goals. Jim draws on more that 30 years of executive leadership in software development, IT deployment and corporate management in leading companies including Brocade, Information Technology Solutions, Synopsys, Silicon Graphics and IBM. He serves on several university advisory boards.

Wayne Clark, BS '73, is currently an architect within the CTO office of the Network Management Technology Group at Cisco Systems. In his current role at Cisco, he is focusing on the next generation network management infrastructure, autonomic computing, and intelligent networking. Prior to his work in network management, he was the founding engineer of the Interworks Business Unit at Cisco which focused on the transformation of traditional IBM corporate enterprise networks into IP-based internetworks. He served as Cisco's SNA Architect from 1991 through 1998 and was one of the leading advocates within Cisco for establishing its east coast headquarters in Research Triangle Park, North Carolina.

David Cohen, Ph.D '77, has over 30 years of experience in software development and systems engineering. He is the co-founder and president of sente.com, Inc. sente deployed a requirements validation toolkit to significantly improve return on software investments (ROI). sente also deployed the validation platform to extend the life cycle of legacy systems. He has authored many publications in the area of database security, distributed database management for new network services, software reliability, software development and operations center productivity. Currently, David is managing investments and exploring planet earth for fun, adventure and photography.

Bruce Flinchbaugh, Ph.D '80, is a TI Fellow and manager of Video & Image Processing R&D in the DSP R&D Center of Texas Instruments. Bruce and his teams develop technology for TI processors in camera, cell phone, HDTV, video surveillance and automotive applications.

Feng Zhao, former CSE faculty member (1992-2000), is a Principal Researcher at Microsoft Research and manages the Networked Embedded Computing Group. His current research focuses on the programming and information processing aspects of networked embedded systems such as sensor networks. He currently also serves as an Affiliate Faculty of Computer Science and Engineering at University of Washington. Previously, he was a Principal Scientist at Xerox PARC and founded PARC's research effort in sensor networks and distributed diagnostics. He received his Ph.D. from MIT in 1992.

On May 7, 2007, the Industrial Advisory Committee met with CSE department faculty and staff.. The four committee members, who traveled from California, North Carolina, and Texas to Columbus, were Richard Baum, James Cates, Wayne Clark and David Cohen. CSE Chair Xiaodong Zhang gave a "State of the Department" presentation focusing on the faculty, graduate program, budget, and proposed fund-raising projects. Associate Chair Bruce Weide introduced the curriculum and undergraduate programs. James Davis, DK. Panda, and Han-Wei Shen impressed all with some of their on-going research projects. College of Engineering Dean Bud Baeslack met the Board members and thanked them for their support. He also briefly introduced a plan of the College and the budget challenges of the college. The meeting was full of active discussions, with a number of extremely constructive suggestions coming from the board members.

RESEARCH

In 1968, the Department of Computer Science and Engineering matriculated from a Center to a Department. At that time, the research in the computing field was bursting forth at an exuberant rate. CSE enthusiastically joined the movement and has not stopped pushing forward since then. Many areas of investigation have been pursued with recently five areas of discovery becoming the focus: Artificial Intelligence, Graphics, Networking, Software Engineering and Systems.

The Artificial Intelligence Cluster, a foci since CSE's inception, remains a healthy and growing area of endeavor. The first official lab established within the Department was **Dr. B. Chandrasekaran's** (now Senior Research Scientist), LAIR (Laboratory for Artificial Intelligence Research). While Chandra, along with **John Josephson**, Research Scientist, continues overseeing students in LAIR, the area has expanded and is now home to five faculty members; Professor **DeLiang (Leon) Wang**, Associate Professor **James Davis**, and Assistant Professors **Mikhail Belkin**, **Donna Byron** and **Eric Fosler-Lussier**. With more than two dozen research assistants, they examine questions in the dimensions of Speech and Language Technologies, Perception and Neurodynamics, Computer Vision and Data Mining research.

The Graphics Area, a source of CSE pride, is one of the most 'visible' of all the areas. Thanks in large part to the efforts of **Professor Emeritus Charles Csuri** at birth of this field, CSE Graphics has been a substantive player in the growth of the field. Currently, ranked in the Top Ten nationally, our faculty and researchers delve into questions within Computational Geometry (**Professor Tamal Dey**, **Associate Professor Raphael Wenger** and **Assistant Professor Yusu Wang**), Computer Graphics and Visualization (**Associate Professors Roger Crawfis**, **Raghu Machiraju** and **Han-Wei Shen**), and Computer Animation (**Professor Rick Parent**).

The Networking Group, started by **Professor Ming-Tsan (Mike) Liu**, has a long and prestigious history, graduating many superior Ph.D. students. It's faculty is strong and has a breadth of research offering many opportunities for graduate students. The addition of Ohio Eminent Scholar Ness Shroff this year brings projects in wireless and wireline communication networks. **Ohio Board of Regents Distinguished Professor David Lee** has strengthened the security research focus. **Professor Anish Arora** leads a large sensor network project. Other faculty working on sensor research include **Professor Ten-Huang (Steve) Lai**, Associate Professor **Dong Xuan, and Assistant Professor Prasun Sinha**. **Professor Xiaodong Zhang**'s research crosses into the Network through his work in Internet and Distributed Systems.

The Software Engineering Group research is a product-oriented view of software which prioritizes process and management, but maintains vigilance to the details so the systems work correctly. A uniquely structured group, a common theme runs through the work: establishing behavioral properties of a software system by reasoning -- modularly -- about the source code of its components. The faculty includes **Professors Bruce W. Weide** and **Stuart Zweben**, **Associate Professors Eitan Gurari**, **Timothy J. Long**, **Neelam Soundarajan** and **Paolo A.G. (Paul) Sivilotti**, **Ken Supowit**, and **Assistant Professor Atanas (Nasko) Rountev**. Also included are **Senior Research Scientist Jay Ramanthan** and **Clinical Assistant Professor Rajiv Ramnath** who oversee CETI, "CERCS for Enterprise Transformation and Innovation". CERCS is the National Science Foundation funded multi-institutional Center for Experimental Research in Computer Systems at Georgia Institute of Technology.

The Systems Group has developed into one of the most dynamic units of CSE. Their experimental research projects, intensively funded by government and industry, range from Core Computer Systems and Architecture, to High-End and Distributed Systems and to Datamining and Databases. Full Professors **Gagan Agrawal**, **D. K. Panda**, **P. Sadayappan** and **Xiaodong Zhang** serve as senior leaders striving to keep ahead of the Associate Professora **Hakan Ferhatosmanoglu** and **Srinivasan Parthasarathy** and Assistant Professor **Feng Qin**. Joining the team in Autumn 2007 is **Dr. Hui Fang** who brings her work in data and information management with a focus on information retrieval and search engine technologies. This group is further enhanced by the work of Professor **Joel Saltz'**s Biomedical Informatics Department at the OSU Medical Center.

Caching Everywhere in Computer, Storage, and Network Systems

In 1965, Maurice Wilkes, a Cambridge University professor and computer pioneer, published the first paper on hardware cache design by describing the"direct-mapped" concept. The first cache implementation was also done in his Laboratory at Cambridge University based on this two-page paper in IEEE Transactions on Computers. Professor Wilkes received the 1967 Turing Award for his pioneer work on designing and building the EDSAC in 1949, the first computer with an internally stored program. Forty years ago, people paid little attention to his pioneer work on caches. However, 20 years after the paper was published, as predicted by Moore's Law, VLSI technology advancement quickly improved the CPU performance and started widening the CPU-memory speed gap. Since then, slow data access has become an increasingly serious bottleneck, and memory performance has been most critical in a system.

Xiaodong Zhang has led a research group to work on memory performance related problems for a decade. The group focuses on fast data accesses and resource sharing with cost-and energy-efficient management at different levels of the memory and storage hierarchies in computer, distributed, and internet systems. Several technical innovations and research results from his group have been adopted or are being developed in commercial products and open source systems with direct impacts to daily computing operations in systems.

One of his research projects was to exploit long-time ignored locality in a small embedded cache in DRAM, which is called a row buffer. He and his former students **Zhao Zhang** (now on faculty at Iowa State University) and **Zhichun Zhu** (now on faculty at University of Illinois at Chicago) discovered that address mapping conflicts at the cache level, including address conflicts and write-back conflicts, will inevitably propagate to the memory address space under a conventional memory interleaving method, thereby causing a significant memory access delay. Their proposed *permutation interleaving technique* effectively solves the conflict problem with a trivial hardware cost. The discovery, the proposed method, and a rigorous correctness proof were presented and published in the Microarchitecture Symposium in 2000. The method has been quickly and systematically adopted in the Sun MicroSystems' UltraSPARC IIIi processor since 2001. It is widely used for many applications in entry level servers, workstations, and desktop products of Sun Micosystems. This important research contribution has been acknowledged by Sun in a formal letter in 2005.

Virtual memory thrashing protection is a hard system problem that has not been solved in practice for many decades. Zhang and his former student **Song Jiang** (now on faculty at Wayne State University) proposed a swapping-token algorithm to effectively and adaptively schedule processes in a multiprogramming environment to avoid memory thrashing. The algorithm and its implementation have been officially adopted in Linux kernels since December 2004 immediately after the paper was published, It is now running on millions of Linux workstations, desktops and servers. This algorithm has also been presented in a section in a widely used operating systems book, *Understanding the Linux Kernel* (3rd Edition), by D. P. Bovet and M. Casati (2005).

Effective page and block replacement in virtual memory and I/O buffer is a fundamental research issue and a critical mechanism in computer and distributed systems. Zhang, Song Jiang, and **Feng Chen** (his current Ph.D. student at Ohio State) published the Clock-pro algorithm and its implementation in the USENIX'05 conference. This research has fundamentally and practically addressed the problems in the Clock algorithm that has dominated most operating systems kernels for about 40 years. Linux kernel and FreeBSD operating system developers have enthusiastically responded to this research by establishing a special forum to discuss its implementation and adoption. Clock-Pro has formally been adopted in FreeBSD since early 2007. The Clock-pro has also been implemented in Apache Derby (an open source relational data base) by a 2006 Google Summer Code project of "Derby Cache Manager". Recently, a Clock-pro patch has also been developed for OpenLDAP, a widely used open source directory search software for many database and data retrieval applications.

Xiaodong Zhang and his group have expanded the memory research to a wide system spectrum. Their projects include dynamic cache partitioning in multicore processors, flash memory caching to save disk energy, buffer caching for networked storage systems, cache consistency in distributed name servers (DNS) on the Internet, proxy caching for streaming media content on the Internet; and segment caching in wireless access points for peer-to-peer streaming.

Xiaodong Zhang (right) introduced his memory system research to Professor Maurice Wilkes (left) during the 2002 International Symposium on Computer Architecture

Ultra Scale Visualization

Scientific visualization, a process of transforming numerical data into images, has played an increasingly important role in many scientific disciplines. In the recent years, new challenges have emerged as the size of data generated from simulations grows from hundreds of terabytes to petabytes. To effectively analyze petascale data sets, many issues need to be addressed simultaneously. For instance, domain-specific features representing important scientific phenomena need to be extracted automatically from the data. To handle multivariate data sets, novels techniques need to be developed to allow the user to discover the correlations among a large number of variables. As computer hardware continues to evolve to enable scalable computation for very large sized problems, classic visualization algorithms need to be re-visited and re-designed to fully take advantage of the emerging technology.

Professor Han-Wei Shen and his research team have developed several multivariate time-varying visualization algorithms to enhance scientists' ability to analyze their large data sets. To enable dynamic level of detail data previewing and detailed rendering, they developed a spatio-temporal multi resolution hierarchical data management framework that is expected to scale to petascale data sets in the near future (Figure 1). They have also developed algorithms and user interfaces to explore vector data generated by computational fluid dynamics applications. For data that are too large to be rendered interactively, they developed methods that can automatically select the best camera views and levels of detail with quantitative measurement of the information content embedded in the visualization output. To allow scientists to query the correlations among different variables, they developed a real time volume shader with a rich set of operators to combine data of different variables with enhanced contextual visual cues in the resulting images. They have also developed automatic feature extraction and tracking algorithms to assist the scientist to isolate features of interest over time to glean insights into large scale time-varying data sets.

While the new methods developed by Prof. Shen and his team have delivered some initial success for data sets at the terabytes level, scaling all the algorithms to petabytes of data still remains a major challenge. To be ready for the petascale applications that will emerge in the next five years, Prof. Shen's research group continues to develop novel visualization algorithms with a focus on knowledge discovery. A complete set of parallel solutions for the problems that are too large to be handled by a single machine is also being developed and evaluated. Prof. Shen's current research is sponsored by DOE, NSF, and NIH.

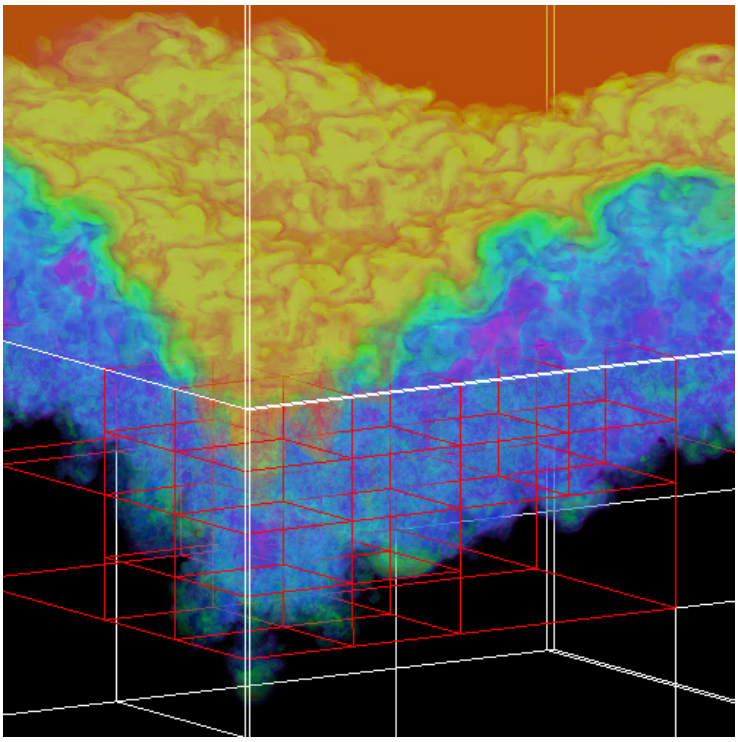


Figure 1

Automatic Video Surveillance Using Computer Vision

The necessity for video surveillance in today's society cannot be overstated. However, the primary use of today's video surveillance systems is the storage of large amounts of video for the purpose of being used as "after the fact" forensic tools. The expectation from future "intelligent" video surveillance systems is for them to have the capability to automatically analyze video to detect and track people in monitored areas and to serve as real-time warning systems by recognizing anomalous/suspicious activities. The Computer Vision Laboratory led by **Professor James W. Davis** has a directed focus of developing such intelligent perceptual programs for use in next-generation video surveillance systems. The overall research goal is to investigate computational methods for video streams from optical and thermal cameras to automatically detect people, consistently track them through the scene, and identify any atypical behaviors that may occur. This research has broad implications for Homeland Security as well as search and rescue, border patrol, and law enforcement applications.

Person Detection, in general, refers to the task of localizing people in images. Traditional person detection algorithms provide information regarding the location and scale of the person in the scene. Though useful, this output lacks any information regarding the shape and appearance of each detected person, cues that are of critical importance for numerous high-level vision tasks. In the Computer Vision Lab, the definition of person detection is extended as the task of localizing people in images and simultaneously recovering from each detected instance, pertinent information such as the scale, shape, and appearance of the person. Person detection algorithms developed in the Computer Vision Lab are designed to simultaneously recover the location, scale, and 2D shape of all pedestrians in the scene, as shown in Fig. 1. Apart from detecting and segmenting people from a single image, these techniques are also capable of effectively utilizing motion information when available. Thus, the person detection algorithms can be used to acquire the location and shape of people in the scene irrespective of whether they are moving or stationary. This information can be utilized for a number of different purposes, such as for initializing a person tracking routine.

Person Tracking is the task of consistently following individuals as they move through the scene. Classic tracking approaches generally employ 2-D methods on images, and thus can be deficient when multiple occlusions or other objects are present in the scene (likely in urban scenarios). Robust methods for tracking under various occlusions (and for multiple grouped objects) are needed. The Computer Vision Lab's research employs multiple cameras with overlapping views that monitor the outdoor scene and combine the information from the different views to construct a course 3-D representation of the people. Multiple cameras afford robustness to the system and can be used to follow people in cases of occlusions, camera failures, complex interactions, etc. In Fig. 2, three camera views are shown, each with the resulting tracking labels assigned to the people as they move into and out of the scene. Additionally, a virtual, synthetic top-down view of the scene (bottom-right quadrant) is shown where the detected people are represented as disks. This tracking of individuals can then be used to identify regular and atypical patterns of activity.

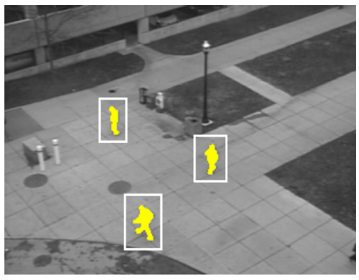


Figure 1: Simultaneous detection and segmentation of pedestrians.

Behavioral Event Detection deals with the recognition of abnormal movements and activities of people as there are tracked through the scene. Behavior analysis from video is an extremely difficult challenge problem and is a new interest in the surveillance and monitoring domain. Many patterns of behavior (e.g., paths, direction flows, times of high traffic) can be automatically learned over time and used to identify abnormal behaviors. Such patterns can be analyzed at an extremely coarse level (e.g., "there is more traffic here at this time of day than usual") or at a much finer level (e.g., "the trajectory of this person looks irregular and suspicious"). Both static (position) and dynamic (motion) information are important to understand such activity patterns.

Figure 2: Multi-camera labeled video and top-down virtual representation (bottom-right).

The primary emphasis of the Computer Vision Lab's research plan is to develop an end-to-end surveillance system for security personnel that uses robust computer algorithms to detect and track people for long periods of time and to intelligently analyze various behaviors and activities. The support for this research (past and present) includes the National Science Foundation (CAREER, ITR), US Air Force Research Laboratory, and US Army Night Vision Laboratory. The research has also appeared in multiple media outlets including local Fox/ABC/NBC/CBS TV new reports and PBS FRONTLINE.

Grants, Award & Gifts

PI
Title
Co-PIs (CSE members underlined)
Sponsor
Dates & Amount

New CSE Awards: 07/01/06-06/30/07

GAGAN AGRAWAL

CEO: P--A Data-Intensive Cyberinfrastructure Component For Coastal Environmental Forecasting And Analysis
Hakan Ferhatosmanoglu
National Science Foundation
10/1/06-9/30/09
$1,400,000

MIKHAIL BELKIN

CAREER: Geometry and High-Dimensional Inference
National Science Foundation
1/1/07-12/31/11
$498,972

Statistical and Applied Mathematical Sciences Institute
University of North Carolina Chapel Hill
12/31/06-03/31/07
$20,000

JAMES DAVIS

Multi-level Detection, Tracking, and Registration Of Anomalous Behavior
Wright Brothers Institute
04/01/07-12/31/07
$100,000

TAMAL DEY

Collaborative Research: Non-smoothness in Meshing and Reconstruction
National Science Foundation
10/1/06-9/30/09
$429,402

HAKAN FERHATOSMANOGLU

CAREER: Exploration of Dynamic Sequences in Scientific Databases
National Science Foundation
07/15/06-07/14/11
$455,000

ERIC FOSLER-LUSSIER

Lexicon Building for Multi-Language Speech Recognition
Dayton Area Graduate Research Institute
06/20/07-06/18/08
$62,329

CAREER: Breaking the Phonetic Code: Novel Acoustic-Lexical Modeling Techniques for Robust Automatic Speech Recognition
National Science Foundation
12/15/06-11/30/11
$502,952

D.K. PANDA

Performance Evaluation of Cluster Networking and I/O Technologies (PECNIT)
Avetec
07/01/06-12/31/08
$749,996

CPA: Designing Next Generation Communication and I/P Subsystems With Multi-Core Architecture
National Science Foundation
07/01/07-06/30/10
$375,000

Accelerator for Offloading Services of Next Generation Data-centers
RNET Technologies
01/01/07-12/31/07
$74,999

CSU: On-site Technical Assistance for Computer Cluster
Central State University
12/15/06-05/31/07
$5,000

Coordinated Fault Tolerance for High Performance Computing
Department of Energy
9/15/06-9/14/11
$1,000,000

Research on High Performance and Scalable MPI Over InfiniBand
Mellanox Technologies, Inc.
04/01/06-03/31/07
$110,346

D.K. PANDA & P. SADAYAPPAN

Programming Models for Scalable Parallel Computing
Department of Energy
9/15/06-9/14/11
$1,500,000

SRINIVASAN PARTHASARATHY

Scalable Data Analysis: an Architecture Conscious Approach
National Science Foundation
06/01/07-05/31/10
$325,000

SHARI SPEER (LINGUISTICS)

Intonation in Spontaneous English & Japanese Dialogue
Donna Byron, Kiwako Ito (Linguistics)
National Institutes of Health
07/01/06-06/30/08
$1,319,267

JAY RAMANATHAN

Collaborative for Enterprise Transformation and Innovation
Rajiv Ramnath
National Science Foundation
08/01/06-07/31/07
$10,000

HAN-WEI SHEN

SciDAC Institute for Ultra Scale Visualization
Department of Energy
8/15/06-9/14/11
$750,000

YUSU WANG

Feature Extraction, Characterization, and Visualization for Protein Interaction Via Geometric and Topological Methods
Department of Energy Young Investigator Award
8/15/06-8/14/09
$300,000

DONG XUAN

Defending Against Physical Attacks in Sensor Networks
Anish Arora, Steve Lai
Army Research Office
03/15/07-03/14/10
$280,000

2008 International Conference on Distributing Computing Systems (ICDCS) Travel Support
National Science Foundation
12/01/06-11/30/07
$35,000

XIAODONG ZHANG

Collaborative Research: Algorithms Design and Systems Implementation to Improve Buffer Management for Fast I/O data Accesses
National Science Foundation
06/01/07-05/31/10
$275,000

International Conference on Parallel Processing (ICPP) 2007
National Science Foundation
09/15/06-12/31/07
$35,000

Collaborative Research: CSR-EHS: System Research on Media Streaming To Heterogeneous Mobile Devices
National Science Foundation
09/15/06-08/300/08
$119,314

Memory Caching and Prefetching to Improve I/O Performance In High-End Systems
National Science Foundation
10/1/06-9/30/08
$93,999

Sign Recognition
Kikuo Fujimura
Honda Research & Development
01/01/07-12/31/07
$53,918

Research in Man-Machine Interaction
Kikuo Fujimura
Honda Research & Development
01/01/07-03/31/08
$54,704

Established Awards: 07/01/06-06/30/07

GAGAN AGRAWAL

ST-CRTS: Enabling Processing of Large-Scale Scientific Data Through Compilers Supported Xml Abstractions
National Science Foundation
1/15/06-12/31/08
$299,997

NGS: An Integrated Middleware and Language/ Compiler Framework for Data Intensive Applications in a Grid Environment.
Umit Catalyurek, Tahsin Kurc, (Biomedical Informatics), Joel Saltz,
National Science Foundation
09/15/02-09/31/06
$467,947

SOFTWARE: High-Level Programming Methodologies for Data Intensive Computations
Joel Saltz
National Science Foundation
02/01/02-01/31/06
$350,981

ANISH ARORA

Collaborative Research: NETS-NOSS State Based Specifications for Controlling and Configuring Sensor Networks
National Science Foundation
09/01/05-08/31/07
$230,000

HDCCSR: Scalable Dependability in Componentized Software Via Self-Stabilization.
National Science Foundation
09/15/03-08/31/07
$480,127

B. CHANDRASEKARAN

Artificial Intelligence Techniques and Advanced Decision Architectures.
David Woods
Micro Analysis & Design
06/01/01-09/30/08
$2,759,422

ROGER CRAWFIS

Visualization: Effective Visualizations for Complex 3- and 4-Dimensional Flow Fields
Raghu Machiraju, Han-Wei Shen
National Science Foundation
10/01/02-09/30/06
$250,060

JAMES DAVIS

Video Registration Via Multi-Resolution Focus-of-Attention
Air Force Research Lab
03/21/06-12/31/06
$99,240

CAREER: Computer recognition of human activity
National Science Foundation
03/01/03-02/29/08
$500,000

TAMAL DEY

Implementation-friendly Geometric Algorithms for Provable Surface and Volume Meshing
National Science Foundation
09/01/04-08/31/07
$180,000

Cocone Software Modification
Shell International Exploration & Production Inc.
01/01/05-10/31/06
$40,000

HAKAN FERHATOSMANOGLU

Scalable Storage And Efficient Retrieval Of Large-Scale, High Dimensional Scientific And Biomedical Data
Department of Energy
09/01/03-08/31/06
$306,300

AVNER FRIEDMAN, (COLLEGE OF MATHEMATICAL AND PHYSICAL SCIENCES)

Pathodynamics of Drug Induces Hepatoxicity
Hakan Ferhatosmanoglu, Srinivasan Parthasarathy
Pfizer Inc.
09/01/03-09/30/06
$310,775.37

ERIC FOSLER-LUSSIER

ITR: Automatic Speech Attribute Transcription (ASAT): A Collaborative Speech Research Paradigm and Cyberinfrastructure with Applications to Automatic Speech Recognition (ASR)
Georgia Institute of Technology (NSF Subcontract)
10/01/04-08/31/08
$461,000

Lexicon Building for Multi-Language Speech Recognition
Dayton Area Graduate Studies Institute
06/19/06-6/18/07
$61,990

EITAN GURARI

ITR: Automatic Translation of Scientific Literature to Braille
National Science Foundation
07/15/03-06/30/07
$359,325

DAVID LEE

ICER Midwest Workshop: Preparing IT Graduates for 2010 and Beyond
Bruce Weide, Stu Zweben
National Science Foundation
9/01/05-08/31/06
$99,584

Formal Cyber-Security Testing Capability (FCSTC)
DOD: Navy
3/31/06-11/30/06
$487,768

RAGHU MACHIRAJU

ITR/NGS: A Framework for Discovery, Exploration and Analysis of Evolutionary Simulation Data (DEAS)
Srinivasan Parthasarathy, John Wilkins, (Physics)
National Science Foundation
09/15/03-08/31/08
$616,600

Software: Framework for Mining Large and Complex Scientific Datasets
Gagan Agrawal, Srinivasan Parthasarathy
National Science Foundation
09/15/03-08/31/06
$373,007

D.K. PANDA

High-end Computing And Networking Research Testbed For Next Generation Data Driven, Interaction Applications
Gagan Agrawal, P. Sadayappan, Joel Saltz, Han-Wei Shen
National Science Foundation
09/15/04-08/31/09
$1,529,997

Research on High Performance and Scalable MPI over InfiniBand
Mellanox Technologies, Inc.
04/01/04-03/30/06
$195,475

Designing High Performance and Scalable Communication Subsystems for Next Generation Clusters with InfiniBand Architecture
National Science Foundation
05/15/03-07/31/06
$150,000

Center for Programming Models for Scalable Parallel Computing
Department of Energy
09/15/01-09/14/06
$750,000

CSR: Designing Next Generation data-Centers with Advanced Communication Protocols and System Services
National Science Foundation
07/01/05-06/30/07
$150,000

RICHARD PARENT

ITR- (NHS)- Multi-level, Active Attention Surveillance
James Davis, Raghu Machiraju, Alan Murray, (Geography), David Woods, (IWSE)
National Science Foundation
10/01/04-09/30/07
$1,300,000

SRINIVASAN PARTHASARATHY

CAREER: A Scalable Framework for Mining Scientific and Biomedical Data
National Science Foundation
01/15/04-12/31/08
$288,082

High Performance Data Mining for Protein Crystallization
Department of Energy
08/15/04-08/14/07
$309,336

NGS: A Services-oriented Framework for next generation data analysis centers
Tahsin Kurc, (Biomedical Informatics), Joel Saltz
National Science Foundation
08/01/04-07/31/08
$300,000

MARK PITT, (LINGUISTICS)

Recognizing Phonological Variants of Spoken Words
Eric Fosler-Lussier
National Institute for Deafness & Other Comm. Disorders
07/01/04-06/30/07
$702,746

JAY RAMANATHAN

3/11/ColumbuStat Independent Validation and Verification

Rajiv Ramnath

City of Columbus
02/01/05-09/01/06
$87,000

Enterprise Architecture

McGraw Hill
05/15/06-7/30/06
$12,517

CRAIGE ROBERTS, (LINGUISTICS)

Presupposition Accommodation Conference and Intensive Course

Donna Byron

National Science Foundation
02/01/06-04/30/07
$26,371

ALAN SAALFELD, (GEOLOGICAL SCIENCES)

Geodetic Surfaces: Understanding Their Geometry and Topology

Tamal Dey

National Science Foundation
05/01/03-10/31/06
$250,000

P. SADAYAPPAN

18th Workshop on Languages and Compilers for Parallel Computing

National Science Foundation
01/01/06-12/31/06
$10,000

Reliable Job Scheduling

Oak Ridge National Lab
07/25/06-10/30/06
$13,431

An Integrated Framework for Compile-Time/Run-Time Support for Multi-Scale Applications on High-End Systems

Atanas Rountev

National Science Foundation
09/01/05-08/31/08
$355,587

ITR/AP: Synthesis of High Performance Algorithms for Electronic Structure Calculations

Gerald Baumgartner & Russell Pitzer, (Chemistry)

National Science Foundation
09/15/01-08/31/07
$1,950,900

Enhancements to Disk Resident Arrays Library

Pacific Northwest National Laboratory
02/03/04-09/30/08
$327,014

NSA Unbalanced Tree Benchmark

University of Maryland
05/05/04-12/31/06
$154,218

MOLAR: Modular Linux and Adaptive Runtime Support For Hec Os/R Research

Department of Energy
02/01/05-01/31/08
$210,991

SOFTWARE: Job Scheduling

Umit Catalyurek, Tahsin Kurc, (Biomedical Informatics), Pete Wyckoff (Ohio Supercomputing Center), Joel Saltz

National Science Foundation
09/15/04-08/31/08
$300,167

JOEL SALTZ

Center for Grid-Enabled Medical Image Analysis

Jessie Au, (Surgery), Umit Catalyurek, Tahsin Kurc & Jyoti Kamal, (Biomedical Informatics), Bradley Clymer, (Electrical & Computer Eng.), Charis Eng, (Cancer Genetics), Avner Friedman, (Mathematics), Michael Knopp, (Radiology), Periannan Kuppusamy, Robert Lee (ECE), Raghu Machiraju, D.K. Panda & Alvin Stutz (CSE), Donald Stredney & Pete Wyckoff, (Ohio Supercomputer Center), Jay Zweier, (Heart & Lung Research Institute)

National Institute in Biomedical Imaging and Bioengineering
08/01/03-07/31/07
$2,084,920

HAN-WEI SHEN

An End-to-End Processing Pipeline for Large Scale Time-Varying Data Visualization

Department of Energy
09/01/03-08/31/06
$299,945

ITR: Gleaning Insight in to Large Time-Varying Scientific and Engineering Data

University of California – Davis
09/15/03-08/31/06
$180,000

CAREER: Toward Effective Visualization of Large Scale Time-Varying Data
National Science Foundation
02/15/04-01/31/08
$217,376

PRASUN SINHA

Katrina SGER: Mapping the Coverage Islands Of Wireless Base-Stations
John Volakis, (Electrical and Computer Engineering)
National Science Foundation
10/01/05-09/30/06
$31,274

CAREER: On-the-Fly Protocols for Data Dissemination In Wireless Mesh Networks
National Science Foundation
0/15/06-12/31/11
$412,000

DONALD STREDNEY (OHIO SUPERCOMPUTER CENTER)

Validation/Dissemination Virtual Temporal Bone Dissection
Bradley Clymer, (Electrical & Computer Eng.), Ashok Krishnamoorthy, (Ohio Supercomputer Center), Petra Schmalbrock, (Radiology), Han-Wei Shen, (CSE), Janet Weisenberger, (Speech & Hearing)
Children's Research Institute Columbus
07/01/06-06/30/07
$135,343

DELIANG WANG

Collaborative Research: Separating Speech from Noise to Improve Intelligibility
National Science Foundation
1/15/06- 12/31/08
$144,914

Study of Speech and Nonspeech Separation In Aging
Veterans Administration
04/01/06-03/31/11
$148,000

Monoaural Speech Segregation By Interating Primitive and Schema-Based Analysis
Air Force Office of Scientific Research
02/15/04-12/31/07
$672,434

BRUCE WEIDE

TWICE Support of TECH CORPS Ohio
Bettina Bair
TECH CORPS Ohio
09/01/05-08/31/07
$3,700

DAVID WOODS (IWSE)

Advanced Decision Architectures: Building Information Superiority In The Army Through User-Centered Decision Support
Gary Allread, Wayne Carlson, B. Chandrasekaran, Emily Patterson, Nadine Sarter, Philip Smith
Micro Analysis & Design
06/01/01-09/30/07
$544,791

DONG XUAN

CAREER: Algorithm Design for Optimization Problems in Network Over-Provisioning
National Science Foundation
12/15/05-11/30/11
$400,060

Visualization: Overlay Network Support for Remote Visualization of Time-Varying Data
Han-Wei Shen
National Science Foundation
09/01/03-08/31/06
$280,000

XIAODONG ZHANG

Modeling and System Support to Balance the Resource Demand and Supply in High Performance Computing
National Science Foundation
11/01/05-8/31/07
$275,468

Memory-centric Resource Management for Data Intensive Workloads on Clusters
National Science Foundation
11/01/05-08/31/06
$206,977

Collaborative Research: Next generation Internet Proxy Systems
National Science Foundation
11/1/05-8/31/08
$130,000

Collaborative Research: Foundations of Solving Large Direct and Inverse Scattering Problems – Algorithms and Systems
National Science Foundation
11/1/05-6/30/08
$132,257

STUART ZWEBEN

Human Pose Estimation for Drive Safety
Honda Research Institute USA, Inc.
10/01/05-12/31/06
$35,000

Wright Center of Innovation in Advanced Data Management and Analysis: Kansei
Anish Arora
Wright State University (subcontract with Ohio Department of Development)
10/01/03-06/30/08
$222,797

Wright Center of Innovation in Advanced Data Management and Analysis: Large-Scale Sensor Network Management and Analysis for Security and Monitory
James Davis
Wright State University (subcontract with Ohio Department of Development)
10/01/03-06/30/08
$7,000

Wright Center of Innovation in Advanced Data Management And Analysis: Audio-Based Analysis And Surveillance
DeLiang Wang
Wright State University (subcontract with Ohio Department of Development)
10/01/03-06/30/08
$18,000

Wright Center of Innovation in Advanced Data Management and Analysis: Large Format Stereoscopic Projection System
Han-Wei Shen
Wright State University (subcontract with Ohio Department of Development)
10/01/03-06/30/08
$122,600

Wright Center of Innovation in Advanced Data Management and Analysis: High Performance and Scalable Data-Centers with Multi-Core Architectures and Emerging Networking Technologies
DK Panda
Wright State University (subcontract with Ohio Department of Development)
10/01/03-06/30/08
$600,000

Gifts: 07/01/06-06/30/07

ANISH ARORA

Equipment Gift
Air Force Research Labs
$360,000

ANISH ARORA, WILLIAM LEAL

Through the Looking Glass: on Human Mobility and Equipment Health
Microsoft Research
$70,000

D.K. PANDA

Advanced Message Passing Algorithms for RDMA-Enabled Interconnects
Sun Microsystems
$150,000

Support of Research &Development of MVAPIC/PSM
QLogic
$50,000

Equipment Gift
Fulcrum Microsystems
$19,000

Equipment Gift
Intel
$20,000

Equipment Gift
Dell
$10,000

Equipment Gift
Mellanox
$5,000

Equipment Gift
QLogic
$5,000

RAJIV RAMNATH

IBM Faculty Innovation Grant
IBM
$40,000

Editorial Boards of Journals and Chairs of Major Conferences

Gagan Agrawal

- IEEE Transactions on Parallel and Distributed Systems

Anish Arora

- ACM Transactions on Sensor Networking
- Journal of Real Time Systems
- Journal of New Generation Computing

James Davis

- Journal of Machine Vision and Appliations
- Journal of Algorithms and Systems Beyond the Visible Spectrum

Tamal Dey

- Journal of Discreate and Computational Geometry

Ten-Hwang (Steve) Lai

- ACM/Springer Journal of Wireless Networks
- Journal of Infomration Science and Engineering
- International Journal of Ad Hoc and Ubiquitous Computing
- International Journal of Sensor Networks
- Encyclopedia of Computer Science and Engineering

David Lee

- IEEE Journal of Selected Areas in Communications (Senior Editor)
- I/S: A Journal of Law and Policy for the Information Society
- Chair of Executive Committee, International Conference of Network Protocols (ICNP)
- Chair of Steering Committee, International Conference of Network Protocols (ICNP)

Ming T. Liu

- International Journal of Communication Systems
- Chair of Steering Committee, International Conference on Distributed Computing Systems (ICDCS)
- Co-Chair, Steering Committee, International Conference on Parallel Computing (ICPP)

Richard Parent

- IEEE Transactions on Visualization on Visualization and Computer Graphics
- The Visual Computer

D. K. Panda

- Journal of Parallel and Distributed Computing
- Co-Chair of Program Committee, IEEE Symposium on Hot Interconnects (HotI15)
- Chair of Program Committee, International Parallel and Distributed Processing Symposium (IPDPS'07)
- General Chair, International Conference of Parallel Processing (ICPP'06)

Han-Wei Shen

- IEEE Transactions on Visualization and Computer Graphics

Srinivasan Parthasarathy

- IEEE Intelligent System
- Journal of Data Mining and Bioinformatics
- Encyclopedia on Geographical Information Sciences
- Data Mining and Knowledge Discovery, an International Journal
- Chair of Program Committee, SIAM International Conference on Data Mining (SIAM ICDM'07)

DeLiang (Leon) Wang

- Journal Cognitive Neurodynamics
- EURASIP Journal on Audio, Speech, and Music Processing
- Journal of Neurocmputing
- Journal of Neural Computing
- IEEE Transactions on Neural Networks
- Co-Chair, Program Committee, International Conference on Neural Information Processing (ICONIP'06)
- President, International Neural Network Society

Xiaodong Zhang

- IEEE Transactions on Parallel and Distributed Systems (Associate Editor-in-Chief)
- IEEE Transactions on Computers
- IEEE Micro
- Journal of Parallel and Distributed Computing
- Journal of Computer and Science and Technology (Executive Editor-in-Chief)

Graduate Program

The Department of Computer Science and Engineering Graduate Program strives to develop researchers, educators and practicing professionals with superior skills in computer science and engineering. Students have the options to obtain either a Master's degree or Doctorate or both. The program admits about fifty new students each year. Masters and Doctorate degrees are offered with an emphasis on specialized research areas, including a dual masters degree in CIS and Biomedical Communications.

Admission to the CSE Graduate Program has always been highly competitive. During the 2005-2006 academic year, we received 694 applications for graduate admissions to the Autumn 2006 quarter. The Department accepted 113 for admission and 40 of those joined the Department; 29 being supported. Graduate student enrollment, new and in process, was 184. Entering graduate students scores on the general graduate record examination averaged as: verbal = XXX; quantitative = XXX; analytical = XX. Their mean grade point average was XX.

	AU 1996	AU 1997	AU 1998	AU 1999	AU 2000	AU 2001	AU 2002	AU 2003	AU 2004	AU 2005	AU 2006
Graduate Students Enrolled	175	155	169	160	157	159	164	174	169	188	184
	96-97	**97-98**	**98-99**	**99-00**	**00-01**	**01-02**	**02-03**	**03-04**	**04-05**	**05-06**	**06-07**
Graduate Student Applications	304	362	536	703	857	940	1,542	1,508	712	589	694
Graduate Students Supported	101	128	119	111	130	175	156	149	158	163	135
M.S. Degrees Awarded	57	56	64	58	36	19	30	31	27	21	33
Ph.D. Degrees Awarded	11	12	10	10	8	4	7	7	11	18	17
Ph.D. Degrees (cumulative)	275	287	297	307	314	318	325	332	343	361	378

Undergraduate Program

The Department offers undergraduate degrees through three colleges: Engineering, Arts and Sciences and Business. Each of these degree programs is carefully tailored to provide the perspective on computing appropriate to the college in which it is offered. Students from any college may also earn a minor in Computer Science and Engineering (CSE).

	AU 1996	AU 1997	AU 1998	AU 1999	AU 2000	AU 2001	AU 2002	AU 2003	AU 2004	AU 2005	AU 2006
Undergrad Students Enrolled	965	1124	1358	1519	1556	1741	1562	1209	958	894	795
	96-97	**97-98**	**98-99**	**99-00**	**00-01**	**01-02**	**02-03**	**03-04**	**04-05**	**05-06**	**06-07**
B.A., B.S. Degrees Awarded	214	227	259	296	297	277	335	274	192	124	140

Doctorates Bestowed

Name — Home
Advisor — Destination
Previous Degrees
Dissertation

Pavan Balaji — Hyderbad, India
Dr. Dhabaleswar K. Panda — Argonne National Labs; Chicago, IL
B.Tech. Indian Institute of Technology, Madras
High Performance Communication Support for Sockets-based Applications over High Speed Networks

Sandip Shriram Bapat — Mumbai, India
Dr. Anish Arora — The Samraksh Co.; Dublin, OH
B.Engr., University of Mumbai
On Reliable and Scalable Management of Wireless Sensor Networks

Liang Chen — Nanchang, P.R.C.
Dr. Gagan Agrawal — Amazon; Seattle, WA
B.Engr., M.S., Beijing University of Aeronautics & Astronautics; M.S., The Ohio State University
A Grid-based Middleware for Processing Distributed Data Streams

Santosh Kumar — Patna, India
Dr. Ten-Hwang Lai — University of Memphis; Memphis, TN
B.Tech., Banaras Hindu University; M.S., The Ohio State University
Foundations of Coverage in Wireless Sensor Networks

Keith Allen Marsolo — Westerville, OH
Dr. Srinivasan Parthasarathy — University of Cincinnati and Children's Hospital Cincinnati; Cincinnati, OH (joint appointment)
B.S.C.S.E., The Ohio State University; M.S., The Ohio State University; M.S., The Ohio State University
A Workflow for the Modeling and Analysis of Biomedical Data

Sameep Mehta — Udaipur, India
Dr. Raghu Machiraju & Dr. Srinivasan Parthasarathy — IBM India Research Laboratory; New Delhi, India
B.S. Honors, University of Delhi; M.S., The Ohio State University
Realizing a Feature-based Framework for Scientific Data Mining

Vinayak Shashikant Naik — Mumbai, India
Dr. Anish Arora — Center for Embedded Networked System, UCLA; Los Angeles, CA
B.Engr., University of Mumbai
Reliable and Secure Data Transport in Large Scale Wireless Networks of Embedded Devices

Matthew Eric Otey — New Market, VA
Dr. Srinivasan Parthasarathy
B.S. University of Virginia; M.S., The Ohio State University
Approaches to Abnormality Detection with Constraints

Tathagata Ray — Calcutta, India
Dr. Tamal Dey — Rensslaer Polytech Institute; Troy, NY
B.S., Jadavpur University; M.S., Indian Institute of Technology, Bombay
*Quality Delaunay Meshing of Polyhedral Volumes and Surface*s

Gerald M. Sabin — Willoughby, Ohio
Dr. P. Sadayappan — Wright Patterson Air Force Base; Dayton, OH
B.S., John Carroll University; M.S., The Ohio State University
Unfairness in Parallel Job Scheduling

Richard Paul Sharp
Dr. Raghu Machiraju & Dr. Robert Lee — St. Lawrence University; Canton, NY
B.S., University of Utah; M.S., The Ohio State University
Computational Approaches for Diffusive Light Transport: Finite-elements, Grid Adaption, and Error Estimation

Chaoli Wang — P.R.C.
Dr. Han-Wei Shen — University of California; Davis, CA
B.Engr., M.S., Fuzhou University
A Multiresolutional Approach for Large Data Visualization

Li Weng — Guiyang, P.R.C.
Dr. Gagan Agrawal — Oracle; Redwoods, CA
B.S., M.S., Beijing Institute of Technology
Automatic And Efficient Data Virtualization System For Scientific Datasets

Hui Yang — Beijing, P.R.C.
Dr. Srinivasan Parthasarathy — San Francisco State University; San Francisco, CA
B.A., Huazhong University of Science and Technology; M.S., The Ohio State University
A General Framework for Mining Spatial and Spatio-Temporal Object Association Patterns in Scientific Data

Weikuan Yu — Xintao, P.R.C.
Dr. Dhabaleswar K. Panda — Oak Ridge National Laboratory; Knoxville, TN
B.S., Wuhan University; M.S., Shanghai Institute of Cellular Biology; M.S., M.S., The Ohio State University
Enhancing MPI with Modern Networking Mechanism in Cluster Interconnects

Hongwei Zhang — Chongqing, P.R.C.
Dr. Anish Arora — Wayne State University; Detroit, MI
B.Engr., Chongquing University; M.S., The Ohio State University
Dependable Messaging in Wireless Sensor Networks

Xuan Zhang — Jingzhou, P.R.C.
Dr. Gagan Agrawal — NCI; Bethesda, MD
B.S., M.S., Tsinghua University; M.S., The Ohio State University
Supporting On-the-Fly Data Integration for Bioinformatics

Dr. Anish Arora graduated three of his Ph.D. students. Above, Dr. Arora (center) proudly smiles with his students Vinayak Naik (left) and Hongwei Zhang (right). Right, Sandip Bapat poses with Dr. Paul Sivilotti, who hooded the new Dr. Bapat when Dr. Arora was out of the country.

Masters Degrees Awarded

Name
Home
Other Degrees

Bonny Banerjee
Calcutta, India
B.Engr., Jadavpur University
M.S., The Ohio State University

Sitha Bhagvat
Karimnagar, India
B.Engr., Osmania University

Eric S. Bosley
Lancaster, OH
B.S., M.A., Miami University, Oxford Campus

Joseph Brian Brinkmeier
Beavercreek, OH
B.S.C.S.E., B.S., The Ohio State University

Gregory T. Buehrer
Columbus, OH
B.S.Ch.E., University of Toledo

Jemin Chang
Seoul, South Korea
B.Engr., Kyung Hee University
B.S.C.S.E., The Ohio State University

Sriram Chellappan
Chennai, India
B.Engr., University of Madras
M.S., The Ohio State University

Liang Chen
Nanchang, P.R.C.
B.Engr., M.S., Beijing University of Aeronautics and Astronautics

Aakash Sureshchandra Dalwani
Ahmedabad, India
B.Engr., Gujurat University

Adem Delibas
Istanbul, Turkey
B.S., Faith University, Istanbul

Krista Marie Dombroviak
Columbus, OH
B.A., Kenyon College
B.S., The Ohio State University

Prachi Gupta
India
B.Tech., Indian Institute of Technology, Roorkee

Andrew Thomas Hess
Salt Lake City, UT
B.S., The Ohio State University

Scott Brian Kagan
Columbus, OH
B.A., University of Michigan, Ann Arbor

Ramakrishnan Kazhiyur-Mannar
Columbus, OH
B.Engr., University of Madras

Sriram Krishnamoorthy
Chennai, India
B.Engr., Anna University

Liya Li
Toledo, OH
B.Engr., M.S., Beijing Institute of Technology

Zhijun Lu
Fuzhou, P.R.C.
B.S., University of Science and Technology of China
M.S., Chinese Academy of Sciences

Thomas Mampilly
Bangalore, India
B.S.C.S.E., The Ohio State University

Alexander Mason Morison
Pittsburgh, PA
B.S. Honors, Case Western Reserve University

Randall Sewell Ridgway
Cincinnati, OH
B.S., University of Cincinnati

Aparna Sathyanarayan
Chennai, India
B.Tech., University of Madras

Mariana Lucia Sharp
Constanta, Romania
B.S., M.S., Universitatea din Bucuresti

Aniruddha Gurunath Shet
Mumbai, India
B.Engr., University of Mumbai, India

Nitin Sivakrishnan
Dubai, United Arab Emirates
B.Tech., Indian Institute of Technology, Madras

Laura Cristina Stoia
Bucharest, Romania
B.S., University of Bucharest

Xun Wang
Weinan, P.R.C.
B.Engr., M.S., East China Normal University

Chao Wang
Wuhan, P.R.C.
B.Engr., Huazhong University of Science and Technology

Yu Wang
Potsdam, NY
B.S., Nankai University, Tianjin
M.S., Clarkson University

Robert Martin Weekley
Columbus, OH
B.S.C.S.E., The Ohio State University

Tianfang Xu
Xiangyin, P.R.C.
B.Engr., B.Engr., Tianjin University

Yanling Yin
Dublin, OH
B.S., M.S., Beijing University of Aeronautics and Astronautics
M.S., The Ohio State University

Xi Zhang
Columbus, OH
B.S., University of Science and Technology of China
M.S., State University of New York at Stony Brook

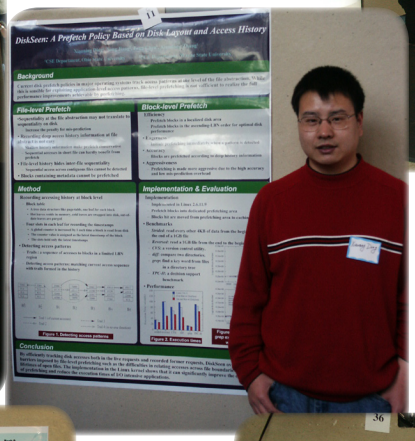
CSE Research Exhibition

This past year, a new event was launched and will hopefully become a new tradition. Thirty-eight doctorate candidates participated in the first bi-annual CSE Research Poster Exhibition. Below are the presenters, their advisor and the poster title with photos of the event shown on the next page.

Bruce M. Adcock	Bruce W. Weide	*Checked Pointers*
Fatih Altiparmak	Hakan Ferhatosmanoglu	*Incremental Maintenance of Online Summaries Over Multiple Streams*
Bonny Banerjee	B. Chandrasekaran	*A Visual problem Solver for Diagrammatic Reasoning*
Greg Buehrer	Srinivasan Parthasarathy	*Scalable Data Mining on Emerging Architectures*
Guadalupe Canahuate	Hakan Ferhatosmanoglu	*A Quantization Based Framework for Scientific Data Management*
Sriram Chellappan	Dong Xuan	*Mobility in Wireless Sensor Networks: Oppurtunities and Vulnerabilites*
Feng Chen	Xiaodong Zhang	*SmartSaver: Turning Flash Drive into a Disk Energy Saver for Mobile Computers*
Yisheng Chen,	Rick Parent, Raghu Machiraju	*Human Activity Reconstruction from Monocular Video*
Xiaoning Ding	Xiaodong Zhang	*DiskSeen: A Prefetch Policy Based on Disk Layout and Access History*
Kai-Wei Fan	Prasun Sinha	*Anycasting for Low Energy Communications in Multi-hop Wireless Sensor Networks*
Amol Ghoting	Srinivasan Parthasarathy	*Cache-and Knowledge-Conscious Data Mining*
Michael Gibas	Hakan Ferhatosmanoglu	*A General Framework for Modeling and Processing Optimization Queries*
Lei Guo	Xiaodong Zhang	*The Failure of Zipf-like Distribution on the Internet Media Traffic*
Scott Kagan	Atanas Rountev	*Static and Dynamic Analyses for Supporting the Reverse Engineering of UML Sequence Diagrams*
Sriram Krishnamoorthy	P. Sadayappan	*Parallel Global Address Space Framework with Multiple Inter-Operable Abstractions*
Unmesh Kurup	B. Chandrasekaran	*A Bimodal Cognitive Architecture: Explorations in Architectural Explanation of Spatial Reasoning*
Matthew Lang	Paul Sivilotti	*The Maximality of Unhygienic Dining Philosophers*
Thang Le	Dong Xuan	*QoS Issues in Integrated Wireless Sensor Networks*
Liya Li	Han-Wei Shen	*Image-Based Streamline Generation and Rendering*
Karen Manukyan	Eitan Gurari	F*oundations of Voice Browsers for Highly Structured Content*
Keith Marsolo	Srinivasan Parthasarathy	*Generalized Methods for the Modeling and Analysis of Biomedical Da*ta
Oleg Mishchenko // Sundaresan Raman	Roger Crawfis	*Layer-based Volume Rendering*
Jeremy Morris	Eric Fosler-Lussier	*Combining Phonetic Attributes Using Conditional Random Fields*
Ozgur (Oscar) Ozturk	Hakan Ferhatosmanoglu	*LFM-Pro: A Tool for Detecting Significant Local Structural Sites in Proteins*
Shansi Ren	Xiaodong Zhang	*ASAP: an AS-Aware Peer-Relay Protocol for High Quality VoIP*
Issam Safa	Yusu Wang	*Correlation Methods Using The Morse-Smale Complex*
Yang Shao	DeLiang Wang	*Incorporating Auditory Feature Uncertainties in Robust Speaker Identification*
Vinay Sharma	Jim Davis	*Extraction of Person Silhouettes from Surveillance Imagery using MRFs*
Mariana Sharp	Atanas Rountev	*Points-to Analysis for Modern Java Applications*
Kaushik Sinha	Mikhail Belkin	*Study of Excess Bayes Risk with Unknown Class Densities*
Laura Stoia	Donna Byron	Noun Phrase Generation in Situated Environments
Jian Sun	Tamal Dey	*Curve-skeletons and Special Loops for Surfaces*
Sayantan Sur	D. K. Panda	*Scalable and High-Performance MPI Design for Very Large InfiniBand Clusters*
Yan Tang	Feng Qin	*Capture and Replay for Regression Test Selection*
Chao Wang	Srinivasan Parthasarathy	*Learning Probabilistic Models for Analyzing Large Structured and Semi-structured Data*
Xun Wang	Dong Xuan	*Widespread Internet Attacks: Evolution and Defense.*
Tianfang Xu	Donna Byron	*Integrated Dialogue and Physical Action Planning*
Qian Zhu // Leo Glimcher	Gagan Agrawal	*Grid Middleware for Data Processing*

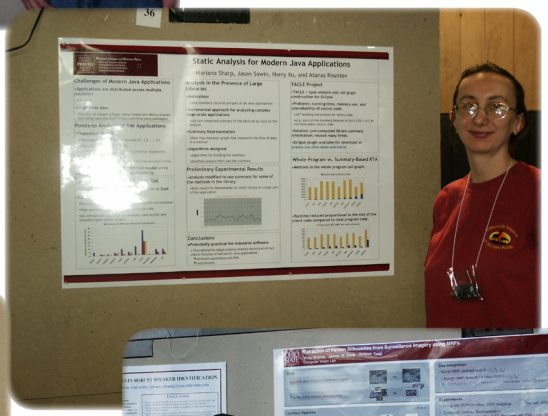
CSE Research Exhibition - Images

Crowds view the posters and discuss the work being done. Below are several of the students posed with their posters.

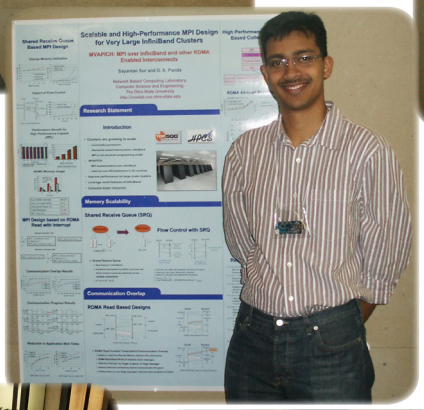


Xiaoning Ding

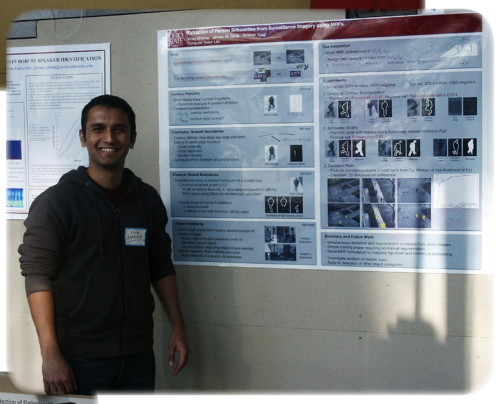
Marianna Sharp

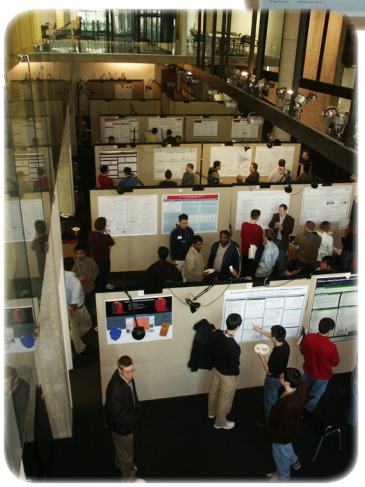


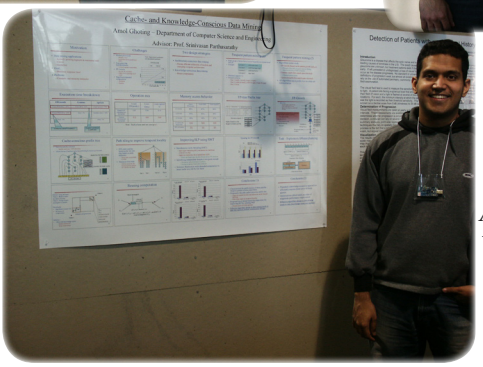
Unmesh Kurup



Sayantan Sur







Vinay Sharma

Amol Ghoting

Undergraduate Studies

While research continues to be a main focus for the Department, providing quality undergraduate education is also vital. Like most other institutions across the nation, we are currently experiencing modest increases in demand for CSE courses following the sharp downturn after the dot-com bust. The latest U.S. Bureau of Labor Statistics estimates of U.S. job openings for the next decade project that there will be more openings just for software engineers (i.e., not including the rest of computing) than in all other engineering fields combined. Moreover, 75% of all projected job openings in engineering and computing occupations will be in computing. Students and parents who consider these data can hardly fail to see the career potential in computing fields. Still, we remain challenged to address the persistent gender imbalance in the field as well as the discouragingly low numbers of minority students in not only computing but in all technical fields.

Two new courses for non-majors or pre-majors have been introduced this year: CSE 203 - "Computational Thinking in Context: Interactive Animation and Games", and CSE 204 - "Computational Thinking in Context: Digital Images and Sound". Both are beginning to build followings among students in the arts and communication. Yet far more needs to be done to attract the attention of students in other majors who do not traditionally take computing courses.

Our several capstone design courses are generating rave reviews, both from students and from industry sponsors of projects that have been arranged through our industry collaboration arm, CETI. Each term, some student teams work on projects submitted by companies, other departments on campus, and non-profit organizations. Students have created diverse applications for their clients such as online entry web sites, a geo-tagging consumer cell-phone application, a real estate mapping program, and an ADA-compliant web site for cardiac outcome follow-up. A new capstone course on game design (team-taught by faculty members from the graphics and AI groups) has been popular, and the games student teams have produced from scratch in a short 10-week quarter have been amazing. Every quarter, students comment that their capstone design experiences are among the most beneficial of their entire academic careers. For example, one student noted reecently that she gained a position over strong competition because of her skills honed in the capstone course. Testimony like this means that despite the effort intensity and the workload, a number of students have been choosing to take multiple capstone courses because of the value added.

Undergraduate Office for Academic Advising

The Undergraduate Office for Academic Advising is a busy area of the Department. The advisors assist computer science students enrolled in the College of Engineering and in the Colleges of the Arts and Sciences. They are the initial contact for every student joining the major. Each student is assigned a faculty advisor who assists students in choosing appropriate technical electives in their technical field and answering questions regarding graduate school and the field of computer science. However, many students continue to lean on the academic advisors for general support throughout their time in CSE.

The office is staffed by three highly professional team members.

- **Peg Steele,** Coordinator of Academic Advisement, has been with the department since early 1998. In 2004 she was named an "Outstanding Advisor" by the National Academic Advising Association and twice received the same recognition from The Ohio State University's chapter of the organization. She currently chairs the NACADA Engineering and Science Commission.
- **Nikki Strader**, Academic Advisor & Staff Assistant, is newer to CSE coming on board in late 2003. Nikki is the President of ACADAOS (through 2008), and in May 2007, she was named one of two Outstanding Advisors at Ohio State by ACADAOS.
- Since 2005, the Graduate Administrative Assistant in Advising is **Shuang Liang**. In addition to her advising duties, she is working toward her Ph.D. degree in the area of computer systems. Her recent research interest is on network filesystem/storage, high performance network protocol and cluster memory management.

Teaching Ten Year Statistical History

	AU 1996	AU 1997	AU 1998	AU 1999	AU 2000	AU 2001	AU 2002	AU 2003	AU 2004	AU 2005	AU 2006
Faculty	31.5	31.5	30	28.5	29	30	29	31	31	32	33
Course Enrollment/ Autumn Qtr.	3,507	3,630	4,124	3,693	3,977	4,103	4,076	3,650	3,125	3,187	3,238
	96-97	**97-98**	**98-99**	**99-00**	**00-01**	**01-02**	**02-03**	**03-04**	**04-05**	**05-06**	**06-07**
Students Taught	12,140	13,098	14,230	14,278	14,278	14,006	13,878	12,208	10,623	10,844	10,641.

Udergraduate Degrees Conferred

Computer Science and Engineering degrees earned from the College of Engineering

Forhad Ahmed
Dongyoung Ahn
Divyanshu Bansal
Edward Beranek
Paul Betts
Rebekah Billing
Ilsa Bolano
Ilya Borodulin
Eric Bretschneider
Peter Brooks
Michael Brown
Benjamin Burnett
Michael Busch
Timothy Callahan
Aaron Cardwell
Eric Caspary
Justen Castle
Adam Champion
Derick Chan
Michael Christman
Adam Cohen
Joseph Cora
Daniel Davis
Brandon DeHart
Dorsey Dick
Mark Dickson
Benjamin Dumford
Olga Firdman
Sean Foster
Jeffery Gullett
Wasim Hanna
Keren Harari
Joseph Herriott
Anthonius Hersan
Nathan Hessler
Trevor Hoffman
Justin Holewinski
John Homan
Jerry Hsieh
Brent Huffman
Parag Jagdale
Andrea Junizar
Rahul Kalwani
Jason Karns
Robert Keller
Joseph Kidwell
Hong Kim
William Koch
Vjekoslav Kovacevic
Brett Lalonde
Andrew Lathrop
Joel Lehman
Jordan Lehmiller
Christian Lent
Jason Lockhart
Jerry Lou
David Manley
Ryan Mitchell
Robert Mohr
Alexander Moore
Joshua Morris
Mohd Syahmi Mustapha
Travis Nauman
Poonam Patel
Ankitkumar Patel
Jonathan Perry
Michael Petersheim
Jason Profitt
Nicholas Ramser
Edward Rho
Jason Ribble
Joseph Rosensweig
Anthony Rudd
Rahul Sareen
Neal Schneider
Steven Schwarck
John Scott
Stephen Sebeny
Nicholas Seddon
Patrick Sharkey-Toppen
David Telintelo
Cooper Thompson
William Triest
Kyle Trout
Hendra Tuty
Daniel Um
Emmanuel Vargas
Harshit Varia
Jason Wagner
Brandon Walters
Wan Mohd Kha Wan Mohamed
Hary Wijaya
Annatala Wolf
Matthew Yoho

Computer & Information Science degrees earned from the College of Math and Physical Science

Derek Austin
Derek Bistline
Brian Buckley
Daniel Burgher
Samuel Calabrese
Hye Jung Choi
Hao-Jen Chung
Jared Curtis
Brian Darby
Matthew Delambo
Clovis Dye
Christopher Foley
Joseph Harmon
Jason Holt
Jeffrey Holycross
Greg Horvath
Lisa Kan
Elizabeth Kearns
Ju Kim
Jason Kim
Minwoo Kim
Jason Labar
Shareef Lahham
Frank Lamantia
First Name Last Name
Fendy Limanto
Yanqing Lu
Sean Ludemann
Bradley Mauk
Elizabeth Neiderman
Vincent Paulson
Yevgen Polishchuk
Christopher Price
David Pryor
Scott Ramer
Michael Schamer
James Shumaker
David Solomon
Sarin Touch
Tyson Tozier
William Valentine-Cooper
Nathaniel Wagner
James Weber
Jeffrey Willis
Lei Zheng
Ruby Zheng

Faculty and Staff

Department Research Area:
SYSTEMS
Interests: System Software for Parallel and Distributed Environments; Compiler and Runtime Support for Data Intensive Applications; Scalable Data Mining; Performance Modeling and Prediction; and Grid Middleware for Processing Streamlining Data.

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:
NETWORKING
Interests: Wireless sensor networks; fault-tolerant, secure and timely computing; distributed systems and networks; embedded systems; component-based design; formal methods; concurrency semantics.

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
ARTIFICIAL INTELLIGENCE

Interests: Pattern Recognition 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; Data Mining And Applications To Areas With Abundant Unlabeled Data

Mikhail Belkin

Assistant 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: Language Understanding Software Components and Linguistic Resources for Ubiquitous Computing and Language Enabled VR Environments; Spoken Dialog Interfaces; Pronoun Resolution.

Donna Byron

Assistant Professor

B.A., French, University of Texas, Arlington, 1986; M.B.A., Information Systems, University of Texas, Arlington, 1987; M.S.C.S., Computer Science and Engineering, University of Texas, Dallas, 1996; Ph.D., Computer Science, University of Rochester, 2002.

Department Research Area:
GRAPHICS
Interests: Computer Graphics; Scientific Visualizations; Medical Imaging; and Volume Rendering.

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.

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; Geometric Modeling; Shape Modeling.

Hakan Ferhatosmanoglu

Associate Professor

B.S., Computer and Information Science, Bilkent University, Turkey, 1997; Ph.D., Computer Science, University of California, Santa Barbara, 2001.

Department Research Area:
SYSTEMS
Interests: Bioinformatics; Data Streams; High Performance Databases for Multi-dimensional and Scientific Applications, and Multimedia and Spatial Data.

Eric Fosler-Lussier

Assistant Professor

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

Department Research Area:
ARTIFICIAL INTELLIGENCE
Interests: Automatic Speech Recognition, Corpus-based Computational Linguistics, Spoken Dialogue Systems, Semantics of Path Planning

Eitan M. Gurari

Associate Professor

B.S., Physics, Technion-Israel Institute of Technology, Israel, 1971; M.S., Computer Science, Technion-Israel Institute of Technology, Israel, 1974; Ph.D., Computer Science, University of Minnesota, 1978.

Department Research Area:
SOFTWARE ENGINEERING
Interests: Hypertext Production and Manipulation; Theoretical Computer Science; Literate Programs; and Programmed Figures.

Department Research Area:
NETWORKING
Interests: Wireless Networks; Mobile Computing; and Parallel and Distributed Computing.

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.

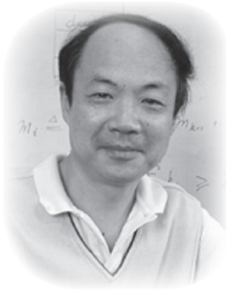
Department Research Area:
NETWORKING

Interests: Data communications and networking: foundation, reliability and applications.

David Lee

Ohio Board of Regents Distinguished 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: Computer Architecture and Networking; Parallel and Distributed Computing; Wireless and Mobile Computing; and Protocol Engineering and Design.

Ming-Tsan (Mike) Liu

Full Professor

B.S.E.E., Electrical Engineering, National Cheng Kung University, Taiwan, 1957; M.S.E.E., Electrical Engineering, University of Pennsylvania, 1961; Ph.D., Electrical Engineering, University of Pennsylvania, 1964.

Department Research Area:
SOFTWARE ENGINEERING
Interests: Design, Implementation, Verification, Testing and Application of Reusable Software Components.

Timothy J. Long

Associate Professor

B.S., Education, University of Cincinnati, 1972; B.A., Mathematics, Unviersity of Cincinnati, 1972; M.S., Computer & Information Science, The Ohio State University, 1974; Ph.D., Computer Science, Purdue University, 1978.

Department Research Area:
GRAPHICS

Interests: Graphics; Visualization; Scientific Computing; and Signal Processing.

Raghu Machiraju

Associate 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.

Dhabaleswar K. Panda

Full Professor

B.S., Electrical Engineering, Indian Institute of Technology, Kampur, 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: Network-based Computing; Interprocessor Communication; Parallel Computer Architecture; High Performance Networking; Clustered and Heterogeneous Systems; and High-performance Computing.

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

Srinivasan Parthasarathy

Associate 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; Parallel and Distributed Computing and Systems; Bioinformatics.

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

Atanas (Nasko) Rountev

Assistant 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

Interests: Static and Dynamic Program Analysis; Software Testing; Programming Languages and Compilers; Object-Oriented Software

Department Research Area:
SYSTEMS

Interests: Scheduling and Resource Management; Performance Optimizations for High-Performance Scientific Computing.

Ponnuswamy 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:
BIOMEDICAL INFORMATION

Interests: Bioinformatics; Data Caching; Processing and Parallel I/O

Joel H. Saltz, M.D.

Chair of the Department of Biomedical Informatics
Joint Appointment - Full Professor

B.S., Mathematics and Physics, University of Michigan, 1977; M.S., Mathematics, University of Michigan, 1978; M.D., Ph.D., Computer Science, Duke University, 1985.

Department Research Area:
GRAPHICS

Interests: Computer Graphics; Scientific Visualization; Large Scale Time-Varying Data, Remote Data Exploration; Volume Rendering.

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:
NETWORKING

Interests: Wireless and Wireline Communication Networks.

Ness B. Shroff

Ohio Eminent Scholar
Full 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: Sensor Networking; Ad-hoc Networking; Mobile Computing; Wireless Networking

Prasun Sinha

Assistant 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.

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

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

Neelam Soundarajan

Associate Professor

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

Department Research Area:
SOFTWARE ENGINEERING

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

Kenneth J. Supowit

Associate Professor

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

Department Research Area:
SOFTWARE ENGINEERING

Interests: Combinational Algorithms

DeLiang (Leon) Wang

Full Professor

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

Department Research Area:
ARTIFICIAL INTELLIGENCE

Interests: Machine Perception and Neurodynamics

Yusu Wang

Assistant 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.

Department Research Area:
SOFTWARE ENGINEERING

Interests: Component-Based Software

Bruce W. Weide

Associate Chair
Full Professor

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

Department Research Area:
COMPUTER GRAPHICS

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

Rephael Wenger

Associate Professor

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

Department Research Area:
NETWORKING

Interests: Scalable QoS Guarantees; Network Security; and Application Layer Networking

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:
SYSTEMS

Interests: Distributed and High Performance Systems

Xiaodong Zhang

Chairperson of
Computer Science & Engineering
Robert M. Critchfield Professor

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

Department Research Area:
SOFTWARE ENGINEERING

Interests: Reusable Software; Quality Evaluation; and Engineering Education.

Stuart H. Zweben

Full Professor
Associate Dean
College of Engineering

B.S., Mathematics, City College of New York, 1968; M.S., Statistics and Computer Science, Purdue University, 1971; PhD., Computer Science, Purdue University, 1974.

Clinical Assistant Professor

Rajiv Ramnath

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: Workflow and Work-Management Systems; Complex Enterprise Systems; Distributed Dystems; Systems Integration; Software Engineering; Enterprise Architecture; Enterprise Strategic Planning

New Faculty arriving Autumn 2006 & Summer 2007

Hui Fang

B.S., Computer Science, Tsinghua University, 2001; M.S., Computer Science, University of Illinois at Urbana-Champaign, 2004; Ph.D., Computer Science, University of Illinois at Urbana-Champaign, 2007

Research Interests: Information Retrieval; Text Mining; Bioinformatics

Emeritus appointments

Professor Emeritus

Balakrishnan Chandrasekaran
Charles A. Csuri
Sandy Mamrak
Mervin E. Muller

Associate Professor Emeritus

Clinton R. Foulk
Douglas S. Kerr
William F. Ogden
Anthony E. Petrarca

Adjunct faculty

Kikuo Fujimura
Raj Jain

Courtesy Appointments

Chris Brew	Linguistics
Wayne Carlson	Chair, Industrial Design
Harvey M. Friedman	Mathematics
Kun Huang	Biomedical Informatics
Furrukh Khan	Electrical and Computer Engineering
Michael Knopp	Chair, Radiology
Alan Saalfeld	Geodetic Science

Researchers

Research Interests:
Artificial Intelligence

Balakrishnan Chandrasekaran

Senior Research Scientist

B.E., Electrical Engineering, A. C. College of Engineering and Technology, Madras University, India, 1963; Ph.D., Electrical Engineering, Moore School of Electrical Engineering, University of Pennsylvania, 1967

Research Interests:
Methods For Analysis and Engineering of Complex Adaptive Enterprise Architectures Using Pattern Ontologies, Complexity Theory, Autonomic Programming as Well as Technologies Such as Middleware, Workflow, Mobile Computing, Agents, and Web Services.

Jay Ramanathan

Senior Research Scientist

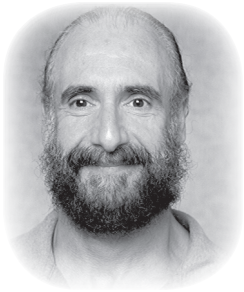
B.S. (with Distinction), Computer Science (with Mathematics and Physics minor), Purdue University, Lafayette,1970; M.S. in Computer Science, Purdue University, 1972; Ph.D. Computer Science, Rice University, 1977.

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

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:

Wireless Sensor Networks, Dynamic Resource Management, Compositional Stabilization.

William M. Leal

Research Scientist

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

Research Interests:

Software Engineering; Computer Science Education

Paolo Bucci

Senior Research Associate

Laurea in Science 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.

Lecturers

Gojko Babic

Senior Lecturer

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.

Research Interests:
Computer Networking and Security.

Bettina Bair

Senior Lecturer

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

Research Interests:
Women in Computing; Effects of Technology on Business and Culture; and Computer Education.

Debby Gross

Lecturer

B.S., Chemical Engineering, Massachusetts Institute of Technology, 1977; M.B.A., University of Chicago, 1987.

Research Interests:
Business Technology and Applications.

Wayne Heym

Senior Lecturer

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.

Research Interests:
Software Engineering and Computing Education.

H. David Mathias

Senior Lecturer

B.S., Computer Science, University of Delaware, 1991; M.S., Computer Science, Washington University, 1993; D.Sc., Computer Science, Washington University, 1996.

Research Interests:
Computational Learning Theory.

Part-Time Lecturers

Moez Chaabouni
Alan Cline
Michael Compton
Matt Curtin
Steve Gomori
Charles Giles
John Heimaster
Robert Joseph
Perumal Krishnasamy
Igor Malkiman
Michelle Mallon
Robert Mathis
Prasad Mikkilineni
Doyt Perry
Steven Romig
Ron Salyers
Al Stutz

Administrative Staff

Carrie Casto: Grants Administrator.

Catrena Collins: Human Resources Officer, Textbooks, Grades.

Tamera Cramer: Annual Report, Faculty Search Secretary, Departmental PR.

Tom Fletcher: Copy Room, Mail Room, Receptionist, SETs, Tech Reports.

Don Havard: Fiscal Officer.

Marty Marlatt: Administrative Associate to the Department Chairperson.

Elizabeth O'Neill: Graduate Admissions and Graduate Studies Coordinator.

Kitty Reeves: Program Administrator, Graduate Student Assignments, Course Scheduling.

Ewana Witten: Receptionist.

Computing Services Staff

Mike Compton -- Director, Computing Services

Rich Crompton -- Systems Administrator

Bob Joseph-- Systems Developer/Engineer, DBA

Tami King -- Sr. Systems Developer/Engineer

Dave Kneisly -- Systems Administrator

Shaun Rowland -- Manager, Software Support and Development

Mike Ruiz -- Systems Administrator

Ted Welch -- Systems Administrator

Kat Wenger -- Systems Administrator

Financial Support

The Department of Computer Science and Engineering is sincerely grateful for the support the Department receives each year from its alumni and friends. As a young discipline, we do not have the long-standing traditions which imbue an almost instinctive loyalty and following enjoyed by other others in the College of Engineering. Yet, we find there are many who believe in our mission and will give us the helping hand we need during austere budget times.

And we are grateful.

We would like to thank the following individuals who have donated to our endowed funds.

The O'Connell Family Fund

- **Christina** (former staff member) and **Con O'Connell,** PhD '90

The Leggett Family Fund

- **Robert and Susan Leggett**

The Eleanor Quinlan Memorial Fund

- **Julie A Barnes**, PhD '90
- **Karen Quinlan Cutler**
- **Susan Quinlan Kruse**, MA '97
- **Richard E Halverstadt**
- Current faculty and staff members

We appreciate the funds given to our general fund from the following individuals.

- **Guy H. Bazanos**, BS in CIS '84
- **Thomas A. Christian**, BS in CSE '98
- **Robert S. and Anne Napier Delaney**, MS in ME '67; PhD in ISE '70 and MS in CIS '70, respectively
- **Nicholas Finnegan**, BS in CSE '04
- **Robert A. Fisher**, MS in CIS '76
- **Susan W. Fitzsimons**, BS in CIS/Math '81
- **Bruce Flinchbaugh** and **Mary Fontana**, MS in CIS '76; Ph.D in CIS '80 and MS in CIS '78, respectively
- **Jeffri H. Frontz**, BS in CIS '87
- **Charles P. Giles**, BS in CIS/Math '98; MS in CIS '00
- **Martin A. Granger**, BS in CIS '84
- **Richard E. Halverstadt,** MS in Math '80; MS in CIS '84
- **Christopher and Erin Harmon**, AA in ASC '00; BS in CSE '03 and MS in CIS '03, respectively
- **Joanne K. Horowitz**, BA '73
- **Craig and Marilyn Joseph**, MS in CIS '86
- **Vignesh S. Kannappan**, MS in CIS '03
- **William R. Lenzotti**, MS in CIS '85
- **Fuchun J. Lin**, MS in CIS '85; Ph.D in CIS '88
- **Michael J. Mangino**, BS in CIS/Math '00; M(F) Bus Adm '04
- **Steve and Gwen May**, BS in CIS/Math '90; BS in CIS '92, PhD in CIS '98
- **James and Melody Murray**, MS in CIS '78 and MS in CIS '78, respectively
- **Scott M. and Hilary Pike**, MS in CIS '99; Ph.D in CIS '04 and BS in CIS '02; MS in CIS '04, respectively
- **Joseph J. Porostosky**, BS in CIS/Math '00
- **Doug Roble and Deborah Shands**, MS in CIS '87; PhD in CIS '92 and MS in CIS '88; PhD in CIS '94, respectively
- **Kevin R. Schneider**, BS in CIS '82
- **William S. Stalcup**, MS in CIS '74
- Arthur Shapiro, MS in CIS '73
- **Al and Sue Stutz**, BS in CIS/Math '72; MS in CIS '75
- **Gregor M. Taulbee**, Ph.D in CIS '90
- **L. David Umbaugh**, MS in CIS '79; Ph.D in CIS '83
- **Lawson and Kathy Wade**, MS in CIS '93; Ph.D in CIS '00
- **Chao Wu Yang**, MS in Math '80; MS in CIS '81
- **Vladimir Yarmolenko**, MS in CIS '03

Selected Publications by Areas

Artificial Intelligence

M. Belkin, P. Niyogi, "Convergence of Laplacian Eigenmaps", *Proceedings of the 20th Annual Conference on Neural Information Processing Systems (NIPS'06)*, 2006.

H. Narayanan, **M. Belkin**, P. Niyogi, "On the Relation Between Low Density Separation, Spectral Clustering and Graph Cuts", *Proceedings of the 20th Annual Conference on Neural Information Processing Systems (NIPS'06)*, 2006.

M. Belkin, H. Narayanan, P. Niyogi, "Heat Flow and a Faster Algorithm to Compute the Surface Area of a Convex Body", *Proceedings of the 47th Annual IEEE Symposium on Foundations of Computer Science (FOCS'06)*, 2006.

W. Gegg-Harrison and **D. Byron**, "PYCOT: An OT-based Pronoun Resolution Component", *Proceedings of the 15th Language Resources and Evaluation Conference (LREC'06)*, 2006.

L. Stoia, D. Shockley, **D. Byron, and E. Fosler-Lussier**, "Noun Phrase Generation for Situated Dialogs", *Proceedings of the Fourth International Natural Langue Generation Conference*, pp 81-88, Sydney, Australia, July 2006.

J. Davis and V. Sharma, "Background-Subtraction in Thermal Imagery Using Contour Saliency", *International Journal of Computer Vision*, Vol. 71, No. 2, pp 161-181, 2007.

J. Davis, A. Morison, and D. Woods, "An Adaptive Focus-of-Attention Model for Video Surveillance and Monitoring", *Machine Vision and Applications Journal*, Vol. 18, No. 1, pp 41-64, 2007.

J. Davis and V. Sharma, "Background-Subtraction Using Contour-based Fusion of Thermal and Visible Imagery", *Computer Vision and Image Understanding*, Vol. 106, No. 2-3, May/June 2007.

E. Ammicht, **E. Fosler-Lussier**, and A. Potamianos, "Information Seeking Spoken Dialogue Systems – Part I: Semantics and Pragmatics", *IEEE Transactions on Multimedia*, 9:3, pp 532-549, April 2007.

A. Potamianos, **E. Fosler-Lussier**, E. Ammicht, and M. Perakakis, "Information Seeking Spoken Dialogue Systems – Part II: Multimodal Dialogue", *IEEE Transactions on Multimedia,* 9:3, pp 550-566, April 2007.

J. Morris and **E. Fosler-Lussier**, "Further Experiments with Detector-based Conditional Random Fields in Phonetic Recognition", *Proceedings of the International Conference on Acoustics Speech and Signal Processing (ICASSP07)*, Honolulu, Hawaii, April 2007.

X. Liu and **D.L. Wang**, "Image and Texture Segmentation Using Local Spectral Histograms", *IEEE Transactions on Image Processing*, Vol. 15, pp 3066-3077, 2006.

S. Srinivasan, N. roman, and **D.L. Wang**, "Binary and Ratio Time-Frequency Masks for Robust Speech Recognition", *Speech Communication*, Vol. 48, pp 1486-1501, 2006.

D.S. Brungart, P.S. Chang, B.D. Simpson, and **D.L. Wang**, "Isolating the Energetic Component of Speech-on-Speech Masking with Ideal Time-frequency Segregation", *Journal of the Acoustical Society of America*, Vol. 120, pp 4007-4018, 2006.

N. Roman and **D.L. Wang**, "Pitch-based Monaural Segregation of Reverberant Speech", *Journal of the Acoustical Society of America*, Vol. 120, pp 4040-4051, 2006.

G. Hu and **D.L. Wang**, "Auditory Segmentation Based on Onset and Offset Analysis", *IEEE Transactions on Audio, Speech, and Language Processing*, Vol. 15, pp 396-405, 2007.

Y. Li and **D.L. Wang**, "Separation of Singing Voice From Music Accompaniment for Monaural Recordings", *IEEE Transactions on Audio, Speech, and Language Processing*, pp 1475-1487, 2007.

Computer Graphics

Visualization and Graphics

M. Jankun-Kelly, M. Jiang, D. Thompson, and **R. Machiraju**, "Vortex Visualization for Practical Engineering Applications", *IEEE Transactions on Visualization and Computer Graphics (Proceedings Visualization/ Information Visualization 2006)*, Vol. 12, No. 5, pp 957-964, 2006.

R. Sharp and **R. Machiraju**, "Accelerating Subsurface Scattering Using Cholesky Factorization", *The Visual Computer*, Springer Berlin/Heidelberg, Vol. 22, No. 8, pp 541-554, August 2006.

S. Mehta, **R. Machiraju**, **S. Parthasarathy**, "Visual Exploration of Spatio-temporal Relationships for Scientific Data", *Proceedings of Symposium on Visual Analytics Science and Technology (VAST)*, pp 11-18, 2006.

Y. Kim, **R. Machiraju**, D. Thompson, "Path-based Control of Smoke Simulations", *ACM SIGGRAPH/Eurographics Symposium on Computer Animation*, pp 33-42, September 2006.

R. Sharp, R. Ridgway, K. Mosaliganti, P. Wenzel, T. Pan, A. deBruin, **R. Machiraju**, K. Huang, G. Leone, **J. Saltz**, "Volume Rendering Phenotype Differences in Mouse Placenta Microscopy Data", *IEEE Computing in Science and Engineering*, Vol. 9, No. 1, pp 38-47, January/February 2007.

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Books

T.K. Dey, *Curve and surface reconstruction: Algorithms with mathematical analysis*, Cambridge University Press, New York, October 2006.

Course Listing

No.	Course Title	Credits
100	Introduction to Computing Technology	3
101	Computer Assisted Problem Solving	4
200	Computer Assisted Problem Solving for Business	5
201	Elementary Computer Programming	4
202	Introduction to Programming and Algorithms for Engineers and Scientists	4
203	Computational Thinking in Context: Interactive Animation and Games	4
204	Computational Thinking in Context: Digital Images and Sound	4
214	Data Structures for Information Systems	4
221	Software Development Using Components (honors section offered once a year)	4
222	Development of Software Components (honors section offered once a year)	4
230	Introduction to C++ Programming	4
294A	Computing Fundamentals in Context: Digital Images and Sound	4
294I	Computing Fundatmentals in Context: Creative Interactive Media	3
314	Business Programming with File Processing	4
321	Case Studies in Component-Based Software	4
360	Introduction to Computer Systems	4
459.11	The UNIX Programming Environment	1
459.21	Programming in C	1
459.22	Programming in C++	1
459.23	Programming in Java	1
459.31	Programming in LISP	1
459.41	Programming in COBOL	1
459.51	Programming in PERL	1
489	Professional Practice in Industry	2
502	Object-Oriented Systems Analysis	4
541	Elementary Numerical Methods	3
551	Introduction to Information Security	3
560	Systems Software Design, Development and Documentation	5
581	Interactive Computer Graphics	4
601	Social and Ethical Issues in Computing	1
612	Introduction to Cognitive Science	3
616	Object-Oriented Systems Analysis	4
621	Introduction to High-Performance Computing	3
625	Introduction to Automata and Formal Languages	3
630	Survey of Artificial Intelligence I: Basic Techniques	3
634	Computer Vision for Human-Computer Interaction	3
651	Network Security	3
655	Introduction to the Principles of Programming Languages	4
660	Introduction to Operating Systems	3
662	Operating Systems Laboratory	3
668	Applied Component-Based Programming for Engineers and Scientists	3
670	Introduction to Database Systems I	3
671	Introduction to Database Systems II	3
674	Introduction to Data Mining	3
675.01	Introduction to Computer Architecture	4
675.02	Introduction to Computer Architecture	4
676	Microcomputer Systems	3
677	Introduction to Computer Networking	3
678	Internetworking	3
679	Introduction to Multimedia Networking	3
680	Introduction to Analysis of Algorithms & Data Structures	3
681	Introduction to Computer Graphics	4
682	Computer Animation	4
693	Individual Studies	1-5
694A	Computer Animation: Algorithms and Techniques	4
694G	Game Design and Development Project	4
694X	Applied Information Security Projects	4
721	Introduction to Parallel Computing	4
725	Computability and Unsolvability	3
727	Computational Complexity	3
730	Survey of Artificial Intelligence II: Advanced Topics	3
731	Knowledge-Based Systems	4
732	Computational Linguistics	3
735	Methods of Pattern Recognition	3
737	Proseminar in Cognitive Science	2
739	Knowledge-Based Systems in Engineering	3
741	Comparative Operating Systems	3
755	Programming Languages	3
756	Compiler Design and Implementation	4
757	Software Engineering	3
758	Software Engineering Project	4
760	Operating Systems	3
762	Advanced Operating Systems Laboratory	3
763	Introduction to Distributed Computing	3
767	Applied Use Case Driven Object-Oriented Analysis & Design for Engineers & Scientists	3
770	Database System Implementation	3
772	Information System Project	4
775	Computer Architecture	3
777	Telecommunication Networks	3
778	Computer Aided Design and Analysis of VLSI Circuits	4
779	Introduction to Artificial Neural Network Methods	3
780	Analysis of Algorithms	3
781	Introduction to 3D Image Generation	4
782	Advanced 3D Image Generation	3
H783	Honors Research	1-5
784	Geometric Modeling	3
788	Intermediate Studies in Computer Science and Engineering	3
793	Individual Studies	1-5
794J	Applied Enterprise Services Architectures	3
794K	Applied Enterprise IT Architectures II	3
875	Advanced Computer Architecture	3
885	Seminar on Research Topics in Computer Science and Engineering	1
888	Advanced Studies in Computer Science and Engineering	1-5
889	Advanced Seminar in Computer Science and Engineering	2
999	Research	1-18

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