About FIU

- FIU opened in 1972 with 5,667 students – the largest opening day enrollment in U.S. collegiate history.
- Today, FIU has more than 38,000 students, over 1,000 full-time faculty and 124,000 alumni, placing it among the nation’s 25 largest universities.
- The University offers more than 200 bachelors, masters, and doctoral programs in 21 colleges and schools.
- The University is ranked as a Research University in the High Research Activity category of the Carnegie Foundation’s prestigious classification system.
- Sponsored research funding (grants and contracts) from external sources for the year 2005-2006 totaled $92 million.
- FIU has an economic impact of more than $1.7 billion on the South Florida economy.

SCIS Facts

- Degrees offered: BS in Computer Science
  BS/BA in Information Technology
  MS/PhD in Computer Science
- 21 Tenure Track faculty and 8 instructors, representing a 30% increase in tenure-track faculty members since 2001.
- 6 research centers and clusters, 25 teaching and research laboratories using a first class technology infrastructure and occupying over 20,000 sq. ft.
The School’s success can be seen in the awards our faculty members have earned for their research and teaching excellence, the diverse, outstanding students our programs produce, the state-of-the-art technologies and innovations our communities are developing, and our global, interdisciplinary collaboration with government, industry, and academia.

Florida International University’s School of Computing and Information Sciences (FIU SCIS), a well-respected 20-year old computer science education program, has built a focused, highly productive, and energized multi-disciplinary research community at one of the largest public universities in the US. In particular, the past five years has seen a major transformation in the growth and quality of work in all of the School’s areas: enrollment, graduate assistantships, degrees awarded, prestigious peer-reviewed publications and conferences, external research funding, leadership in diversity, and industry partnerships. The School’s success can be seen in the awards our faculty members have earned for their research and teaching excellence, the diverse, outstanding students our programs produce, the state-of-the-art technologies and innovations our communities are developing, and our global, interdisciplinary collaboration with government, industry, and academia.

• FIU SCIS is one of the leading computing research programs in Florida in terms of its annual per-faculty external funding
• FIU SCIS has become one of the largest producers of Hispanic CS and IT talent within the United States

Located in South Florida and part of a rapidly growing IT region, the School is one of the largest Computer Science and Information Technology degree programs in the State University System of Florida. However, the School’s innovative programs promise that its impact reaches well beyond Florida’s borders. The Latin American Grid, a research and education partnership with leading universities from South America in conjunction with IBM, and the NSF Partnership for Advanced Cyberinfrastructure, a global collaboration of research centers, are two of the programs that allow students and faculty to work with the world’s leading research centers and to focus their efforts on making discoveries that will have an impact on society.

SCIS’s state-of-the-art research is focused on data management, software engineering, informatics, distributed computing, and other areas highlighted in this brochure. Our faculty members and students are performing research and developing applications that include, in various combinations, aspects of telematics, grid and supercomputing, weather forecasting, DNA studies, and self-optimization programming. SCIS offers many scholarships programs for undergraduate and graduate students, as well as internship and mentorship programs with industry to ensure that our students are well-prepared for careers in academia, industry, or as entrepreneurs.

As SCIS continues growing, transforming, and excelling, we look forward to expanding our existing collaborations, working with new collaborators, performing world-class research, and graduating high-quality students with a global perspective and the cutting edge knowledge and technology experience they need to become the next generation of computer science and information technology leaders.

Dean’s Message

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Faculty Co-Advisor, Women in Computer Science, http://www.cis.fiu.edu/wics
Research and Instructional Interest: Logic, Constructivist Principles and their Applications to Cognitive Science (AI, Philosophy of Science, Consciousness Studies, and Pragmatics), Women’s Studies, and Math Education; prior research includes Partial Algebra and Theoretic, Foundations of Computation

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Director, NASA Regional Applications Center, http://tesraf.ly.fiu.edu
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Research and Instructional Interest: Database Design/Management and High Performance Computing, Semantic Database Performance, Internet Data Extraction, and Computer Medicine/Life Sciences, Software Engineering, and Geographic Information Systems

Florida International University • School of Computing and Information Sciences
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Research and Instructional Interest: Distributed Multimedia Database Systems, Multimedia Data Mining, and Multimedia Communications and Networking

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Research and Instructional Interest: Major Research Interests: Affective Computing, Human-Computer Interaction, Artificial Intelligence, Human-Robot Interaction, Human-Centered Design, Cognitive and Social Informatics, Building Human Information and Communication Technologies for the Future

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Research Interests: Theory of Programming Languages (Formal Semantics, Type Systems) and Computer Security (Secure Information Flow, Language-Based Security, Applied Cryptography)

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Research and Instructional Interest: Software Testing, Software Metrics, Software Maintenance, and Model-Driven Software Development

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Research and Instructional Interest: Database and Information Retrieval Systems (Information Discovery in Various Domains Including Bibliographic, Clinical and Biological Databases, Keyword Search in Relational and Semi-Structured Databases, Data Performance and Semantics of Ranked Queries, Web Search, XML Storage and Parsing)

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Research and Instructional Interest: Data Mining, Machine Learning, Information Retrieval, and Bioinformatics

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Research and Teaching: Modeling and Simulation, Computer Networks, and Parallel Computing (Parallel Discrete-Event Simulation, High-Performance Simulation and Modeling of Large-Scale Communication Networks and Computer Systems)

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Director of Programming Competitions
Faculty Advisor, FIU Student ACM Chapter, http://www.cis.fiu.edu/~acm
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Research and Instructional Interest: Programming Languages and Methodology, Computer Systems and Organization, and Discrete Structures

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Research and Instructional Interest: Introductory and Intermediate Level Programming Courses, CGS Courses

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Research and Instructional Interest: Mathematics and Introductory and Intermediate Programming Languages

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Research and Instructional Interest: Introduction to Microcomputers, Introduction to Computer Applications for Business, and Computer Data Analysis

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Research and Instructional Interest: NET technology, C++, Java, Web Development, Networking, Software Engineering, User Interfaces, CGS Courses, Database Management, and Educational Software
Research Highlights

Our research community is pursuing a diverse collection of research opportunities whose goals are the advancement of the computer science field of study. IT industry collaboration including technology transfer and the development of exciting research challenges for our students. Our approach has also grown from traditional computer science themes such as algorithmic analysis and computer language development to one which embraces the integration of computing in fields like bioinformatics, disaster management, Geographical Information Systems, as well as cutting edge computing topics like Internet technologies, autonomic systems, and highly reliable systems. We firmly embrace a multi-disciplinary approach to solve both theoretical and applied computing problems. SCIS faculty experts focus their research efforts on one or more of the area topics presented on the following pages.

Collaborative Research

Our NSF Center of Research Excellence in Science & Technology (CREST), led by Yi Yi Deng and Co-PIs Nafshali Rishe, Xudong He, Armando Barreto, and Malek Adjoudi, has been one of the most successful implementations in this large NSF program. This $4.5M project represents a large scale multidisciplinary collaboration at FIU with significant impacts to both our research and student training. Over 20 FIU faculty members and dozens of graduate students are involved. To date, we have produced 37 Ph.D.s in CS and CE (including ten Hispanic and fourteen women) and 28 MS degrees in computing (including fourteen Hispanic and ten women). On the research side, we have produced over 250 publications, been awarded 2 patents, leveraged $12.7 million in new research awards and in-kind equipment donations, and incubated numerous collaborations with our partners in academia and industry. This project represents a large scale multidisciplinary collaboration at FIU with significant impacts to both our research and student training. Over 20 FIU faculty members and dozens of graduate students are involved. To date, we have produced 37 Ph.D.s in CS and CE (including ten Hispanic and fourteen women) and 28 MS degrees in computing (including fourteen Hispanic and ten women). On the research side, we have produced over 250 publications, been awarded 2 patents, leveraged $12.7 million in new research awards and in-kind equipment donations, and incubated numerous collaborations with our partners in academia and industry. The NSF Center of Research Excellence in Science & Technology (CREST) represents a large scale multidisciplinary collaboration at FIU with significant impacts to both our research and student training. Over 20 FIU faculty members and dozens of graduate students are involved. To date, we have produced 37 Ph.D.s in CS and CE (including ten Hispanic and fourteen women) and 28 MS degrees in computing (including fourteen Hispanic and ten women). On the research side, we have produced over 250 publications, been awarded 2 patents, leveraged $12.7 million in new research awards and in-kind equipment donations, and incubated numerous collaborations with our partners in academia and industry.
Dr. Chen has developed an interactive 3D animation system for simulating hurricane impact. This project involves the design and implementation of a 3D animation environment for the real-time modeling of the severe weather conditions involved in a hurricane. This project is composed of two sub-projects, one of which is to process the GIS airborne LIDAR (Light Detection And Ranging) data to extract information including building footprints, roof parameters of buildings, roads, vegetation, etc. The second sub-project addresses 3D visualization of the location affected by a hurricane by utilizing the GIS data extracted from the LIDAR data. This system provides an interactive animation environment that allows its users to fly through and examine the simulated hurricane effects from any location, while viewing the modeled environment.

Dr. Hristidis is collaborating with Miami Children’s Hospital to develop new techniques to search Electronic Medical Records (EMRs). As the use of Electronic Medical Records (EMRs) becomes more widespread, so does the need to search and provide effective information discovery on them. Information discovery methods will allow practitioners and other healthcare stakeholders to locate relevant pieces of information in the growing corpus of available EMRs. Some of the research challenges he is investigating include: “What are the semantics of keyword queries on EMRs?”, and “What is a meaningful result?” Using data stored in an XML-based standard HL7 CDA, he is studying the quality of resulting queries which incorporate ontological knowledge provided by SNOMED.
Dr. He and his research collaborators have developed an overall framework and the associated methods for ensuring the design of high confidence systems. Software architecture model (SAM) is a formal software architecture description model developed at FIU. SAM adopts the popular component and connector software architecture view, and supports a hierarchical decomposition of a software system. Thus a software system is defined by a hierarchical set of related components and connectors in SAM. SAM integrates two formal methods Petri nets and temporal logic as its foundation. Techniques have been developed in all aspects in designing, analyzing, and implementing software architecture with SAM.

While much research has been done on finding similarities between protein sequences, there has not been the same progress on finding similarities between protein structures. Dr. Narasimhan and his research team have developed an algorithm (SBLAST) which discovers the largest common substructures between two proteins using a triangle-based variant of the geometric hashing of protein structures algorithm. In collaboration with IBM Systems Technology Group at Rochester, the team implemented a parallel algorithm for SBLAST using MPI routines on the IBM Blue Gene/L massively parallel supercomputer.

iCat is a social robotic platform developed by Philips for studying human-robot interaction. It communicates with interlocutors via simulated social patterns, for example the expression of some facial and vocal emotions. iCat is composed of a mechanical head and it is able to move its lips, lids, eyes, eyebrows and neck. It has a webcam in its nose, speaker and microphones in their paws, and touch sensors and lights (blue, red, green) in their paw and ears. Dr. Lisetti and her team have created 9 emotional facial expressions, based on recently published psychological theory, demonstrating the differences between models which describe facial expressions for humans versus those made for robots.

The Weather Research and Forecasting (WRF) code is a community based atmospheric numerical model, developed by the National Center for Atmospheric Research (NCAR), which was designed to bring together both operational forecasting and atmospheric research model needs in a single design and structure, but to allow wide variation in specific model configuration. In this Joint Project of the Latin American Grid, Dr. Sadjadi and co-leaders from IBM Research and the University of North Florida are developing a Grid-capable WRF portal to provide community researchers the ability to harness the power of available shared resources while improving the performance and administration of their WRF experiments.

Dr. Clarke and his research group have developed a Taxonomy Tool for the Object-Oriented Language Java (TaxTOOLJ). This reverse engineering tool catalogs the classes of a Java software application in order to provide information relevant to testing. For example, based on a class's categorization, a suitable testing technique can be determined. The current version of TaxTOOLJ catalogs Java classes using reflection only and presents a summary of the characteristics for each class in a Java application. The tool provides users with a Graphical User Interface (GUI) that allows easy configuration of various aspects of a TaxTOOL project. These include configuring the path to the source code to be analyzed, adding the required library prefixes, and configuring the path where output will be stored.
The success of advancing technologies critical to designing future-generation high-performance global networks and reliable distributed applications hinges on the available tools that can effectively prototype, test, and analyze new ideas. The goal of Dr. Liu’s PRIME research project is to investigate fundamental technologies that enable real-time large-scale network simulations and to develop a real-time immersive network simulation environment.

The need for energy-efficient storage systems for personal computers and data centers is well established. Being the only mechanical device in today’s computers, the disk is the third most power-hungry component after the CPU and display. Dr. Rangaswami and his research team have designed and implemented an energy-optimizer system for the Linux kernel that uses an external device for caching and prefetching data so it can be retrieved directly from this media. This allows the disk to spin-down for long periods of time to save energy.

With the advent of mobile, pervasive, and grid computing, software systems must be designed to dynamically adapt to changes that occur in their runtime environments. Certainly, careful system design and modeling are key factors for systems to be complete. However, as technology changes and new forms of technology continue to emerge, predetermining all possible scenarios in which a system may be running is nothing short of impossible. These issues can be addressed with a tool called TRAP/J (Transparent Reflective Aspect Oriented Programming in Java, compile modeled pictured). Dr. Sadjadi and students from our NSF REU Site are focused on improving the performance of the generation and adaptation phases of Transparent Adaptation while keeping ease of usability in mind.

Dr. Chen has developed a distributed multimedia management system, DMMManager (Distributed MultiMedia Manager), which supports multimedia capturing, analysis, retrieval, authoring and presentation in one single framework. A distributed client/server architecture is adopted in DMMManager such that multiple requests from different clients can be handled simultaneously. A set of multimedia management functionalities are realized in DMMManager so that the user can complete various tasks including features like: live video/audio capture, image feature extraction and video analysis (shot detection), content based image retrieval, and key-frame based video browsing and support for standards based multimedia data/presentation distribution through computer networks.

Both meta-scheduling and job flow are technologies that will increase the productivity of grid systems and grid applications. A Joint Project of the Latin American Grid, led by Dr. Masoud Sadjadi and IBM Research staff, is investigating support for interoperability of network of distributed schedulers and orchestration of composite jobs in grid environments. Some of the key technology goals are to: Optimize utilization of resources across scheduling domains, maximize resource availability to users with transparency of locations, showcase necessary tooling for composite job flow, and optimize and adapt job flow execution across scheduling domains.

The success of distributed computing: systems:

Faculty Experts: Chen, Deng, Liu, Sadjadi

The success of distributed computing: systems:

Faculty Experts: Li, Liu, Prabakar, Rangaswami, Sadjadi

Florida International University • School of Computing and Information Sciences
Dr. Tao Li's research explores two related topics on learning from data—how to efficiently discover useful patterns and how to effectively retrieve information. The interests lie broadly in data mining, machine learning and information retrieval, studying both the algorithmic and application issues. The algorithmic aspects involve developing new scalable, efficient and interactive algorithms that can handle very large databases. The underlying techniques studied include clustering, classification, semi-supervised learning, similarity, and temporal pattern discovery. The application issues focus on actual implementation and usage of the algorithms on a variety of real applications with different characteristics including bioinformatics, text mining, music information retrieval, malware detection, business intelligence, and event mining for computer system management.

Dr. Li's research has appeared in journals such as Machine Learning, IEEE Transactions on Knowledge and Data Engineering, Bioinformatics, IEEE Transactions on Computational Biology and Bioinformatics, and conferences such as SIGMOD, SIGKDD, SIGIR, ICML, AAAI, IEEE ICDM, and SIAM Data Mining. Recent awards include: NSF Career Award, 2006-2011; IBM Faculty Award, 2005 & 2007; IBM Shared University Research (SUR) Award, 2005; Xerox University Affairs Committee (UAC) Award, 2005-2008; Excellence in Research Award, School of Computer Science, Florida International University, 2005.

Dr. Naphtali Rishe is Florida International University’s inaugural Outstanding University Professor and the Director of the High Performance Database Research Center at FIU (since 1994) and of the NASA Regional Applications Center at FIU. Dr. Rishe is the author of 2 books on database design, editor of 4 books on database management and high performance computing, inventor of 4 U.S. patents on semantic database performance, Internet data extraction, and computer medicine, and the author of 200 papers in journals and proceedings on databases, software engineering, Geographic Information Systems, Internet, and life sciences. He is the awardee of over $30 million in research grants by Government and Industry, including $6M from NSF.

Dr. Rishe’s group has developed TerraFly, an end-user Web tool available at TerraFly.fiu.edu. TerraFly allows Internet/Intranet/Extranet users to "fly" over remote sensed imagery and interactively manipulate data. Tools include user friendly geospatical querying, data drill-down interfaces with real-time data suppliers, demographic analysis, after annotation, route dissemination last via autopilots, customizable sentence applications, and production of aerial atlases. TerraFly can be used as a vertical application platform to share information among decision makers.
Our NSF-sponsored PIRE program builds upon and leverages the Latin American Grid (LA Grid, pronounced “lah grid,” http://www.latinamericangrid.org) University/Industry partnership. Founded by FIU SCIS and IBM, LA Grid brings together computer scientists, domain experts, and industry experts by synergistically combining research, education and workforce development activities to produce the next generation of leaders of the IT industry. LA Grid:

- Includes 12 academic and industry partners sharing over 1,500 systems in an experimental grid
- Focuses on computing research areas such as grid application enablement, job meta scheduling and workflow, and grid resource management,
- Explores domain areas that are critical to society such as disaster mitigation, healthcare, and bioinformatics
- Receives extensive industry support including IBM’s commitment of $5 million of internal funding, in-kind funding, and equipment donations that enable its international intellectual enterprise to be the bridge that links each LA Grid institution
- Seamlessly integrates IBM research and university faculty research, student mentoring, and industry internship experiences to its participants

FIU SCIS and its partner Florida Atlantic University have been awarded a highly competitive 5-year, $2.3 million, grant from the National Science Foundation (NSF) under the Partnerships for International Research and Education (PIRE) program (www.pire.fiu.edu). This grant, one of only 20 awards made in response to 500 proposals, creates a "Global Living Laboratory for Cyber-Infrastructure Application Enablement" that will facilitate collaborative research at prestigious international academic and industry research sites such as Barcelona Supercomputing Center, IBM Research in China and India, Tsinghua University, and Tech Monterrey, among other world-class research partners in Argentina, China, France, India, Japan, Mexico, and Spain.

The collaborative research focuses on better utilization of Cyber-Infrastructure to solve complex societal problems by using a common application enablement framework. Students participating in PIRE research will be co-supervised by FIU faculty members and their international partners; they will receive training in the culture and language of their international partners’ countries before traveling to perform hands-on research in the PIRE partner laboratories. The exemplary undergraduate, graduate and post-doctoral students selected to participate in PIRE research will receive all-expenses-paid trips to the sites of our international partners. Several of our top Ph.D. students will receive PIRE research fellowships or IBM Research Internship awards.
Florida International University’s School of Computing and Information Sciences, with its public and private sector partners including Miami-Dade County’s Office of Emergency Management, Palm Beach County Division of Emergency Management, Office Depot, IBM, Wal-Mart, Greater Miami Chamber of Commerce, and others have developed a unique public service called the Business Continuity Information Network (BCIN, pronounced “beacon”) for Rapid Disaster Recovery (www.bizrecovery.org). Led by Dr. Yi Deng, the BCIN project utilizes the latest research advances in database integration, data mining, Web, and GIS software technologies to create a user friendly, Internet-based, information-rich service that provides businesses with effective and timely disaster recovery information and that acts as a vital part of a company’s business continuity process, thus potentially reducing closure time.

This project can provide substantial impact to our society:
• Studies have shown that 40% of companies shut down for three days by a disaster fail within 36 months, causing the loss of thousands of jobs.
• Another analysis shows that if BCIN helped 5% of the companies in South Florida to speed up their hurricane recovery and reopen one week earlier, it would prevent $219,300,000 of non-property economic losses from those companies’ closures.

BCIN allows its users to:
• Rapidly report, map and share critical up-to-the-minute information about infrastructure conditions and recovery efforts immediately following a storm by working with County Emergency Management Offices and major private infrastructure providers. BCIN will localize and tailor relevant information to business managers who will use this information to better assess the hurricane’s impact to their facilities, employees, suppliers and customers.
• Develop a B2B network, which will include government and NGOs, to assist businesses in obtaining disaster recovery resources, products, and services while allowing them to collaborate in recovery efforts.
• Provide a channel for businesses to report their operational status and need of assistance back to governments and NGOs so that these organizations can prioritize their relief efforts.

The convergence of data, voice, and multimedia over digital networks, coupled with the continuous improvement in network capacity and reliability, has enabled a wide range of communication applications such as VOIP technology, voice, video, and multimedia conferencing. However, today’s communication tools are developed on an ad-hoc basis with limited separation between application needs and logic, device types, and underlying networks:
• Communication systems are complex, costly and take a long time to develop.
• Communication systems designed for vertical applications like telemedicine typically have fixed functionality and interfaces that do not interoperate with other applications.
• Fixed communication systems cannot evolve to meet dynamic user needs so users need to switch between several tools to satisfy their communication needs.

An Innovative Strategy
Our Communication Virtual Machine (CVM) is a software technology that enables a new concept, process, and design for conceiving, synthesizing, and delivering digital communication solutions across application domains. In addition, CVM provides a new means of rich multimedia information exchange. This model-driven process can deliver tailor-made applications to fit users’ dynamic communication needs: 1) a domain expert elicits communication requirements, 2) the expert models the needs in CVM, producing a communication schema, 3) users end the option to load and further modify the schema to satisfy their needs, and 4) communication is ready to begin. With this fully-automated, model-driven process, a sophisticated communication model can be built in hours or days rather than the months or years needed for designing and implementing a major communication application.

An Adaptable Technology
An immediate application of CVM is in telemedicine, where it can support healthcare communication and information exchange. Other applications include disaster management, defense communication, banking & finance, and any other industry sector that requires complex communication.
Over the last five years, the Florida International University School of Computing and Information Sciences has become one of the leading and most dynamic Computer Science (CS) and Information Technology (IT) programs in the State of Florida. It is a national leader in diversity, a premier organization in computing research and innovation, and a major driver in partnerships with industry and community. We invite you to join us and be a part of our success.

**Graduate Assistantships**

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<tr>
<td></td>
<td>32</td>
<td>67</td>
</tr>
</tbody>
</table>

*59% increase in graduate assistants supported, mostly funded by the significant increase in external grants and research funding.

**Enrollment**

**25% increase in undergraduate CS/IT enrollment, despite a major nationwide decline.**

**106% increase in Ph.D. enrollment.**

Established the school as the largest undergraduate CS/IT program in the State University System of Florida and the second largest program when combining bachelor’s, master’s and doctoral enrollments.

(Florida State University System of Florida Board of Governors)

**Degrees Awarded**

**25% increase in bachelor’s and master’s degrees awarded.**

**200% increase in the number of Ph.D. degrees awarded while significantly improving job placement of Ph.D. graduates.**

The School has developed into one of the largest producers of Hispanic CS and IT talent in the United States.  

*The average number of PhDs awarded per year prior to 2002

**Publications**

- Increased the School’s overall number of peer-reviewed research publications by 68%
- Tripled the number of research papers in premier journals and conference proceedings

**External Research Funding**

- 139% increase in annual external research funding, with most grants from premier federal agencies
- $2.2M per year in industry donations and in-kind grants over the last five years

One of the leading computing research programs in the State of Florida in terms of annual per-faculty external funding.

**Industry Partnerships**

The School established blossoming partnerships with industry through a multitude of collaborations in workforce development, research, and innovation

The School co-founded and co-led the Latin American Grid Consortium (Latinamericangrid.org) with IBM—a national partnership and living laboratory with 11 universities in the United States, Mexico, Argentina, and Spain for world-class collaboration in research and education.

Developed an expanding industry internship and co-training program, with more than 30 highly competitive internships from IBM at BS to Ph.D. levels in summer 2006 alone.
The School of Computing and Information Sciences at FIU offers B.S., M.S., and Ph.D. degrees in Computer Science, and B.A. and B.S. degrees in Information Technology; more than 1,200 students are enrolled in these programs. Degree programs are also offered by FIU in the Caribbean region.

- At the core of our educational programs are faculty researchers and educators who are well versed at training the next generation of computer scientists and information technologists.
- Our training methods are based on national accreditation requirements and the rigors of many years of pedagogical development.

Assistantship and Fellowship Opportunities for Graduate and Undergraduate Students in Computer Science at Florida International University

Florida International University (FIU), a public university located in Miami, Florida, is ranked by the Carnegie Foundation as a Research University with High Research Activity. The School of Computing and Information Sciences (SCIS) is a designated program of excellence at FIU. The following opportunities provide support for SCIS students to conduct research in one of more than thirty clusters led by our world-class faculty members. Please contact our Graduate Program Director, Dr. Xiaodong He, at hxe@cs.fiu.edu for more information.

- Project-funded Research Assistantships
- FIU Graduate School’s Presidential Fellowships
- FIU Graduate School’s Dissertation Year Fellowships
- U.S. Department of Education GAANN Fellowships
- NSF PIRE Fellowships and Assistantships for international students

Ph.D. Students
- SCIS Graduate Assistantships
- Project-funded Research Assistantships
- FIU Graduate School’s Presidential Fellowships
- FIU Graduate School’s Dissertation Year Fellowships
- U.S. Department of Education GAANN Fellowships
- NSF PIRE Fellowships and Assistantships for international students

M.S. Students
- SCIS Teaching Assistantships
- Project-funded Research Assistantships
- NSF PIRE Assistantships for international research

B.S. Students
- NSF Research Experiences for Undergraduate students
- Project-funded research experiences
- NSF PIRE Assistantships for international research experiences

Educational Initiatives

SCIS students participate in many challenging activities outside of their academic programs. SCIS mentors prepare our students for both industry and research jobs. FIU provides programming competitions and industry and research lectures for high school computer science students as well as its own students. Our faculty members work together with student organizations to help them with tutoring programs, research grants, networking through social activities, and interaction with professional programmers and IT leaders.

- IBM has selected FIU students for about 20 internships per year via Extreme Blue, LAGrid, and other IBM programs.
- Our Research Experience for Undergraduates (REU) site allows undergraduate students from across the US to work with our faculty during the summer.
- Our Partnership for International Research and Education (PIRE) trains its participants about language and cultural issues of the collaborating countries.

Faculty Profiles

Dr. Shu-Ching Chen

Dr. Chen is a well-recognized leader in graduate education at FIU SCIS, having been awarded the Excellence in Graduate Mentorship Award from FIU in 2006, the University Outstanding Faculty Research Award from FIU in 2004, the Outstanding Faculty Service Award from SCIS in 2004, and the Outstanding Faculty Research Award from SCIS in 2003. Dr. Chen has served as major advisor for 12 Ph.D. students and 22 M.S. students. His research record enables him to create attractive research projects for his students. As an example, Dr. Chen’s first Ph.D. graduate, Dr. Chengcui Zhang, who became a tenure-track Assistant Professor at the University of Alabama at Birmingham, in the Department of Computer and Information Sciences upon her graduation in 2004 had already co-authored seven journal papers, three refereed book chapters, and twenty conference/symposium/workshop papers.

Dr. Mark Allen Weiss

Among students, Dr. Weiss is most well-known at FIU for his Data Structures course, which he has taught at least once every year for twenty consecutive years. In 1996, his Data Structures course was the first in the world to use Java as the programming language. Although he is known as a demanding instructor, his teaching evaluation scores from the students are among the highest in the School year after year, and serve to underline his thoroughness, fairness, and professionalism in teaching.

- Outside of FIU, Professor Weiss is most well-known as the sole author of nine different textbooks, two of which are in their third editions. In 2000, his first textbook, published in 1992, was named one of the thirty most influential books in Computer Science (it was ranked number 13). His books have been used by hundreds of thousands of Computer Science majors at thousands of universities worldwide.
- Professor Weiss was named by Educational Testing Service (ETS) as a member of the Advanced Placement Computer Science Development Committee (that writes the curriculum and exams) from 1997-2000, and then served as Chair of the Committee from 2000-2004. In this capacity, he was one of the people most responsible for overseeing the transition of the exam (taken by 20,000 high school students annually) from Pascal to C++ and then to Java.
- He has been recipient of several awards at FIU including both the University’s Excellence in Research and Excellence in Teaching awards.

Tim Downey

Tim Downey has been an instructor in the School of Computing and Information Sciences since 1991. He has received three Excellence in Teaching awards from FIU since that time. He has consistently ranked among the top in our school in student teaching evaluations.

- His course content and material reflects rapidly changing technologies. His main interest is in web development, an area in which he has developed a course and published a book.
- As an undergraduate advisor, he has provided invaluable guidance to hundreds of our students as they have navigated our challenging programs, policies and processes and his mentorship has helped to bridge many of our most qualified students into our graduate programs, fueling the remarkable growth in diversity that our School has seen in the last five years.

Florida International University • School of Computing and Information Sciences
Leadership in Diversity
The School of Computing and Information Sciences continues to expand as a national leader in educating and graduating minority, particularly Hispanic, students at the B.S., M.S., and Ph.D. levels.

- The number of Hispanic computer science Ph.D. students enrolled in our program has increased from 2 in 2002 to 26 in Fall 2006. Today’s population represents more than 13% of the total enrollment in the 188 research universities surveyed by the Computer Research Association (CRA).

- Sixty-six percent of the Ph.D.s graduated in 2006 – 2007 were women, including one Hispanic woman.

- Programs for minority students provide scholarships and research opportunities to work on projects in areas like healthcare, informatics, and data management.

Distinguished Alumnus Award
FIU honored Dr. James O'Brien with a Distinguished Alumnus Award at its 6th Annual Torch Awards Gala.

Dr. James O’Brien, who received his B.S. in Computer Science from FIU in 1992 is an associate professor in the Computer Science Division of the Department of Electrical Engineering and Computer Sciences at the University of California at Berkeley, where he conducts research in the area of computer graphics with an emphasis on simulation and motion-capture techniques. O’Brien’s work creating computer-generated simulations of natural phenomena such as waves, snowdrifts, mud and fire is driven by computer codes called physics engines. Currently, his algorithms are used in PlayStation 2 software and at Pixar.

- In 2004, O’Brien was named one of the world’s top 100 technology innovators by Technology Review magazine.
- One year later, he was recognized by Time magazine as “one of the world’s top experts on how to make computers simulate complex physical systems.”
- O’Brien is the recipient of a Sloan Fellowship, a prestigious award given to only the very best young faculty members in specified fields of science.
- One of his field’s most dynamic scholars, he has received awards for his research from the Okawa and Helms Foundations.
<table>
<thead>
<tr>
<th>SCIS Faculty</th>
<th>Title</th>
<th>Agency</th>
<th>Amount</th>
<th>Duration</th>
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<tr>
<td>Shu-Ching Chun (Co-PI)</td>
<td>Public Hurricane Loss Projection Model</td>
<td>Florida/Department of Insurance Regulation</td>
<td>$5,500,000</td>
<td>2001-2008</td>
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<td>Shu-Ching Chun (Co-PI)</td>
<td>An Interactive 3D Visualization and Animation System for Hurricane Impacts</td>
<td>NOAA</td>
<td>$190,000</td>
<td>2004-2009</td>
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<tr>
<td>Shu-Ching Chun (Co-PI)</td>
<td>3D Visualization and Animation System for Hurricane Impacts with Lighting and Sound</td>
<td>NOAA</td>
<td>$185,000</td>
<td>2001-2009</td>
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<tr>
<td>Shu-Ching Chun (Co-PI)</td>
<td>An Interactive Web-based 2D Visualization System for Hurricane and Storm Impacts</td>
<td>NOAA</td>
<td>$795,000</td>
<td>2006-2009</td>
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<td>Peter Clarke (PI)</td>
<td>Collaboration Research: Web-Based Repository of Software Testing Tools</td>
<td>NSF</td>
<td>$512,000</td>
<td>2008-2010</td>
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<tr>
<td>Yi Deng (PI), Xudong He, Napatih Sadiq (Co-PIs)</td>
<td>CREST: Center of Emerging Technologies for Advanced Information Processing and High-Confidence Systems</td>
<td>NSF</td>
<td>$4,589,000</td>
<td>2003-2008</td>
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<td>Yih-Chung Hu, Shu-Ching Chen, S. Moussad Sadqi (Co-PIs)</td>
<td>PRE: A Global Living Laboratory for Cyberinfrastructure Application Enablement</td>
<td>NSF</td>
<td>$2,377,000</td>
<td>2007-2012</td>
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<td>Xudong He, Tao Li (Co-PI)</td>
<td>Distributed Flexible Resource Scheduling in Production Systems</td>
<td>LS-Optimal, Inc.</td>
<td>$100,000</td>
<td>2008-2010</td>
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<td>Xudong He (PI), S. Moussad Sadqi (Co-PI)</td>
<td>Software for Advanced Energy Systems</td>
<td>NSF</td>
<td>$100,000</td>
<td>2008-2010</td>
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<tr>
<td>Xudong He (PI), Mouaad Mhawi, Peter Clarke (Co-PI)</td>
<td>GARRN Fellowships in Computer Science at Florida International University</td>
<td>US Department of Education</td>
<td>$394,000</td>
<td>2007-2010</td>
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<td>Xiaojun Liu (Co-PI)</td>
<td>CAREER: Immersive Large-Scale Network Simulations</td>
<td>NSF</td>
<td>$624,000</td>
<td>2007-2012</td>
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<td>Mouaad Mhawi (PI), Tao Li (Co-PI)</td>
<td>Computer Science, Engineering, and Mathematics Scholarships</td>
<td>NSF</td>
<td>$400,000</td>
<td>2004-2008</td>
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<td>Mouaad Mhawi (PI), Tao Li (Co-PI)</td>
<td>Research Experiences for Undergraduates</td>
<td>NSF</td>
<td>$300,000</td>
<td>2009-2012</td>
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<td>Giri Narasimhan (PI)</td>
<td>Role of R. Amygdaloides beta-lactamase genes</td>
<td>NIH</td>
<td>$615,000</td>
<td>2005-2008</td>
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<td>Giri Narasimhan (PI)</td>
<td>NINJA: Integrated Genomic Databases and Microarray Analysis</td>
<td>NIH</td>
<td>$370,000</td>
<td>2006-2008</td>
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<td>Aina Patricia (Co-PI)</td>
<td>MRI Hardware/Software Integration for the Design of Real-Time Prototypes Merging Assistor Technologies to Neuroscience</td>
<td>NSF</td>
<td>$1,000,000</td>
<td>2009-2010</td>
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<td>Raaj Ragunathan (PI), Yanghsie He misdci (Co-PI)</td>
<td>Building/efficient, Native Storage Systems for Semi-structured Data</td>
<td>NSF</td>
<td>$384,000</td>
<td>2006-2008</td>
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<td>Raaj Ragunathan (PI), Yanghsie He misdci (Co-PI)</td>
<td>QR-Enabled High-Performance Storage Systems for Data-intensive Scientific Computing</td>
<td>US Department of Energy</td>
<td>$300,000</td>
<td>2006-2009</td>
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<tr>
<td>Raaj Ragunathan (PI)</td>
<td>CAREER: Active Block Layer Extensions: A Foundation for Building Self-Managing Storage Systems</td>
<td>NSF</td>
<td>$400,000</td>
<td>2008-2013</td>
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<tr>
<td>Napatih Sadiq (PI)</td>
<td>MIRI Infrastructure for Research and Training in Database Management for Web-based Geospatial Data Visualization with Applications to Aviation Safety</td>
<td>NSF</td>
<td>$1,574,000</td>
<td>2002-2008</td>
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<tr>
<td>Napatih Sadiq (PI)</td>
<td>Efficient Reliable Computer Models for Providing Information Security</td>
<td>NDOD</td>
<td>$24,000</td>
<td>2001-2008</td>
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<td>Napatih Sadiq (PI)</td>
<td>Acquisition of Research Instrumentation for Web-based Visualization of Spatiotemporal Data</td>
<td>NSF</td>
<td>$440,000</td>
<td>2003-2008</td>
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<tr>
<td>Napatih Sadiq (PI), Shu-Ching Chen, S. Moussad Sadqi (Co-PIs)</td>
<td>Collaborative Research: Science of Search Data Search, Analytics, and Information Systems Center (DASIM)</td>
<td>NSF</td>
<td>$380,000</td>
<td>2006-2008</td>
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<td>S. Moussad Sadqi (Co-PI)</td>
<td>CI-TEAM Implementation Project: Global Cyberinfrastructure (GCI)</td>
<td>NSF</td>
<td>$776,000</td>
<td>2006-2008</td>
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<tr>
<td>Tao Li (PI)</td>
<td>CAREER: Mining Log Data for Computing System Management</td>
<td>NSF</td>
<td>$591,000</td>
<td>2006-2010</td>
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</tbody>
</table>

**Current Funded Activities (as of February 2008)**

- Chenqing Yang, Erlang Zeng, Kalai Mathie, Giri Narasimhan, “3DFTM: A Database for Predicted Transcription Factor Binding Sites in Plasmid Falciparum”, Methods of Microarray Data Analysis V. Kluger, 2007, 121-136

**Recent Publications (2006-2007)**

- Giri Narasimhan, “Pattern Discovery in Bioinformatics”, Henry Stewart Talks, 2006
- Tim Downey, “Web Development with Java”, Springer-Verlag, Fall 2007

**Book Chapters**

- Changping Yang, Erlang Zeng, Kalai Mathie, Giri Narasimhan, “3DFTM: A Database for Predicted Transcription Factor Binding Sites in Plasmid Falciparum”, Methods of Microarray Data Analysis V. Kluger, 2007, 121-136


<table>
<thead>
<tr>
<th>Topic</th>
<th>Speaker</th>
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<tr>
<td>Scaling eScience Impact</td>
<td>Dr. Ian Foster</td>
<td>Argonne National Laboratory</td>
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<tr>
<td>Realizing the Model-Driven Engineering Vision of Software Development</td>
<td>Dr. Robert France</td>
<td>Colorado State University</td>
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<tr>
<td>Module Discovery and Analysis in MicroRNA-spanned Regulatory Network</td>
<td>Wei Yu</td>
<td>Texas A&amp;M University</td>
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<tr>
<td>Multiscale Modeling of Calcium Dynamics in Cardiac Myocytes from Imaging to Simulation</td>
<td>Dr. Nicholas Tsinoberis</td>
<td>University of Miami</td>
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<tr>
<td>Designing Filtering Strategies for Faster Protein and RNA to Traffic Mining</td>
<td>Yanni Sun</td>
<td>Washington University</td>
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<td>Internet Malware Detection in Enterprise Networks</td>
<td>Khaled Elmeelegy</td>
<td>Rice University</td>
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<td>Mining Massive Moving Object Datasets: From RFID Data Flow Analysis</td>
<td>Tovi Grossman</td>
<td>University of Toronto</td>
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<td>Decoupling QoS and Resource Management in Virtualized Data Centers</td>
<td>Guofei Gu</td>
<td>Georgia Tech</td>
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<td>Supporting Content Dissemination for Multi-Site/Multi-Stream Systems Clustering Support Vector Machines with Application to Prediction of Protein Local Tertiary Structures</td>
<td>Hector Gonzalez</td>
<td>University of Illinois</td>
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<tr>
<td>Data Mining using Fractals and Power Laws</td>
<td>Xuefeng Zhou</td>
<td>Washington University</td>
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<td>Decoupling QoI and Resource Management in Virtualized Data Centers</td>
<td>Dr. Zeyun Yu</td>
<td>University of California</td>
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<tr>
<td>Estimating Entropy of Network Traffic Flow Data</td>
<td>Dr. Ishfaq Ahmad</td>
<td>University of Texas</td>
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<tr>
<td>Meeting the Challenges of Ultra-Large-Scale Distributed Real-time and Embedded Systems with Model-Driven Engineering</td>
<td>Ming Zhao</td>
<td>University of Florida</td>
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<tr>
<td>Mining and Searching Graphs in Biological Databases</td>
<td>Dr. Zhenyu Yang</td>
<td>University of Illinois</td>
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<td>Provenance-Aware Storage Systems</td>
<td>Dr. Yi Pan</td>
<td>Georgia State University</td>
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<td>Grid and Supercomputing Technology</td>
<td>Christos Faloutsos</td>
<td>Carnegie Mellon University</td>
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<td>Microsoft Tech Talk</td>
<td>Dr. José Fortes</td>
<td>University of Florida</td>
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<tr>
<td>An Integrated Self-Testing Framework for Autonomous Computing Systems</td>
<td>Dr. Mitsunori Ogihara</td>
<td>University of Miami</td>
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<td>An Overview of The Toilers: An Ad Hoc Networks Research Group</td>
<td>Douglas C. Schmidt</td>
<td>Vanderbilt University</td>
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<td>Efficient Communication Protocols for Underwater Acoustic Sensor Networks</td>
<td>Jiawei Han</td>
<td>University of Illinois</td>
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<td>Evolution of Wireless Networks and its Impact on Future Internet Design</td>
<td>Dr. Margo Seltzer</td>
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<td>Expressiveness and Design Considerations for the Generalized Temporal RBAC Model</td>
<td>Pete Martinez</td>
<td>IBM</td>
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<td>Formal Engineering Methods for Software Development</td>
<td>Alfredo Vargas and Maria Fernandez</td>
<td>Microsoft</td>
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<td>From Toasters to Clusters: An Evolution of a Storage Appliance into a High-Performance Scale-Out Cluster Technology Group</td>
<td>Tariq King</td>
<td>Florida International University</td>
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<td>How the Internet is used to Advance Jihad</td>
<td>Dr. Tracy Campbell</td>
<td>Colorado School of Mines</td>
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<td>MISER: A Framework for Power Aware High Performance Computing</td>
<td>University of Wisconsin</td>
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<td>Modeling and Measuring Worm Attacks and Internet Malicious Sources Montisokolipor: A State Exploration-Based Approach to Testing Java Monitor</td>
<td>Dario Pomplini</td>
<td>Georgia Institute of Technology</td>
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<tr>
<td>Multi-Granular Waveband Switching in Optical Networks Technology</td>
<td>Dr. Sanjoy Paul</td>
<td>Rutgers University</td>
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<td>How is the Internet used to Advance Jihad</td>
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<td>From Toasters to Clusters: An Evolution of a Storage Appliance into a High-Performance Scale-Out Cluster Technology Group</td>
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<td>Network Appliance Advanced</td>
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<td>Virginia Tech</td>
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<td>University of Texas</td>
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<td>MISER: A Framework for Power Aware High Performance Computing</td>
<td>Dr. Xiaojun Cao</td>
<td>Rochester Institute of</td>
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<thead>
<tr>
<th>Topic</th>
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<tr>
<td>Probabilistic Algorithms for Manifold Learning and Clustering</td>
<td>Dr. Miguel A. Carreira-Perpinan</td>
<td>Oregon Health &amp; Science University</td>
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<td>Problem-Solving for Autonomous Agents in Real-Time, Dynamic, and Adversarial Environments</td>
<td>Dr. Ubbo Visser</td>
<td>University of Bremen</td>
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<td>Secure Collaboration in Mediator-Free Environments</td>
<td>Mohamed Shehab</td>
<td>Purdue University Madison</td>
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<td>Taking a Load Off: Shifting the Burden of MAC Layer Overhead in Sensor Networks</td>
<td>Dr. Rebecca Braynard</td>
<td>Duke University</td>
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<td>Taming the Sensor Networking Challenges</td>
<td>Gang Zhou</td>
<td>University of Virginia</td>
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<td>Testing Aspect-Oriented Programs with State Models</td>
<td>Dr. Dianxiang Xu</td>
<td>North Dakota State University</td>
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<td>The PRIME Research: Virtually All for Real</td>
<td>Dr. Jason Liu</td>
<td>Colorado School of Mines</td>
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<td>TRUST-TECH based Algorithms for Learning</td>
<td>Chandan Reddy</td>
<td>Cornell University</td>
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<td>Understanding the Blogosphere</td>
<td>Dr. Yaakov Yeshia</td>
<td>University of Maryland and Multicore Computational Center</td>
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<tr>
<td>Matrix-based Learning Algorithms for Data Mining and Bioinformatics</td>
<td>Dr. Chris Ding</td>
<td>Lawrence Berkeley National Laboratory</td>
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<td>Interactive Multimedia What’s in IT for Computer Science Education</td>
<td>Dr. Rachelle Heller</td>
<td>George Washington University</td>
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<td>Lightweight Security Protocols for Wireless Sensor Networks</td>
<td>Dr. Kan G. Shi</td>
<td>University of Michigan</td>
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<td>Looking for Bugs in all the RIGHT Places</td>
<td>Thomas Ostrand</td>
<td>AT&amp;T Laboratories - Research</td>
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<td>Protein Interaction Module Detection Using Graph Algorithms</td>
<td>Dr. Chris Ding</td>
<td>Lawrence Berkeley National Laboratory</td>
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<td>Video Background Separation and Super Resolution</td>
<td>Yihong Gong</td>
<td>NEC Research</td>
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<td>Actor Model and Knowledge Management Systems: Social Interaction as a Framework for Knowledge Integration</td>
<td>Dr. Irmak Becerra-Fernandez</td>
<td>Florida International University</td>
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<td>An Interactive Semantic Video Mining and Retrieval Platform – Application in Transportation Surveillance Videos for Incident Detection</td>
<td>Dr. Chengcui Zhang</td>
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