College of Engineering

2012 Annual Report

Computing and Information Sciences
It is with great pleasure I share with you the 2012 annual research report for the department of Computing and Information Sciences (CIS) at Kansas State University. The CIS department is continuing to make progress with strong support of our faculty excellence in research and teaching. Our graduate program continues to strengthen and students are in high demand, and we have strong interdisciplinary teaching and research programs.

The state of Kansas has announced a University Engineering Initiative Act that provides additional funds to the College of Engineering over the next 10 years to increase the number of graduates to meet the demand for engineers in Kansas. To accommodate the growth, the college has started building the final Phase IV of the Engineering Complex. I am pleased to announce the CIS department will be moving to the new building, anticipated completion in 2015, which will provide expanded and better space to grow our research programs.

Research programs in our core areas continue to grow strongly. In particular, we obtained a significant number of research grants in 2012 for cybersecurity research and education. Eugene Vasserman, in collaboration with John Hatcliff and Dan Andreasen, received a $482K NSF grant to study security, privacy and trust for next generation of interoperable medical devices. An NSF grant of $227K was awarded to David Schmidt for a project that applies parsing and static analysis techniques for detecting errors and vulnerabilities in online scripts. Simon Ou, Eugene Vasserman, John Hatcliff, Scott DeLoach and Gurdip Singh were awarded $2.37M for an NSF project that provides scholarships to university students who pursue studies and career paths in cybersecurity and information assurance. Eugene Vasserman, along with Gary Brase (psychology), received a $148K NSF grant to develop and test user feedback strategies to determine their relative effectiveness in informing users of security failures and in keeping users from making security-critical mistakes. Finally, Scott DeLoach and Simon Ou were awarded a $1M grant from AFOSR to understand and quantify the impact of moving target defense technologies on computer networks.

CIS faculty are making great progress in the area of medical device technologies in collaboration with their industrial and academic partners. In addition to our continued funding from the NSF/FDA SIR program and the grant on security issues in medical device systems mentioned above, John Hatcliff, Robby, Steve Warren, Eugene Vasserman and Patrice Chalin also received an $888K NSF grant in 2012 from the Cyber-Physical Systems program to develop an open source innovation platform to enable key stakeholders within the nation's health care ecosphere to develop solutions to key technology and regulatory challenges that must be overcome to develop a commodity market of regulated medical components.

CIS faculty are extensively involved in multidisciplinary research supported by our high-performance computing infrastructure. With additional support from Kansas State University, our computing infrastructure is expanding and we now have two full-time system administrators to provide HPC support to the K-State community.

This 2012 report cannot cover all of the CIS accomplishments for the year. Please visit our website at http://www.cis.ksu.edu for a more complete picture.

Gurdip Singh
Department Head
Computing and Information Sciences
Kansas State University
The importance of computing science continues to grow for our nation, economy, and security. Yet conversely, the topics and techniques of computing science are increasingly being pushed out of K-12 curriculums. Kansas is no exception. While serving 477,857 students through 286 school districts, the state offers no licensure for teachers in computing science education. Those schools that do offer computer science coursework typically do so through the career and technical education pathways program, yet these are sparsely implemented through the state: web and digital communications (53 districts), programming and software development (10 districts), network systems (two districts), and information support services (one district). Further, these are increasingly being pushed out of K-12 curriculums.

The National Science Foundation’s program to support Graduate Teaching Fellows in K-12 Education (GK-12) provides a mechanism for establishing such an infrastructure. This program seeks to improve graduate students’ communication, teaching, collaboration and team-building skills by engaging graduate student fellows in K-12 classrooms, working directly with K-12 teachers and students. These fellows take on the role of “visiting experts,” bringing their knowledge and research activities into the classroom and becoming a resource for teachers interested in expanding their methodologies, developing new curriculum materials, and integrating technology and computing science principles within their teaching. The fellows also serve as role models for the students they work with, both sharing exciting opportunities within their field and answering general questions about university student life.

These experiences are especially important for disadvantaged students who may not have role models from their social and family environment from which to draw. When the fellows themselves are drawn from underrepresented populations, students can better understand that STEM disciplines are not out of reach for themselves. The fellows also serve within the INSIGHT program for up to two years. The INSIGHT GK-12 Program has been effective in integrating sensor technologies and computing science principles into diverse K-12 classrooms, garnering positive feedback from all of its participants. Coupling the intensive training of the summer institute with an ongoing partnership between a teacher and a fellow has proved to be a productive and valuable strategy. Staggering new entrants, teachers and fellows into the program has also been an important strategy, as doing so ensures every new cohort of teachers and fellows train side by side with a group of returning veterans from the previous year. This also helps to encourage out-of-the-box thinking, as the previous cohort has already tackled the often challenging task of identifying ways in which sensors can be used in unusual settings, such as physical education classes. This can in turn lead to fresh thinking from the new participants. The result is an active and imaginative community of practice, committed to integrating sensor technologies and computing science fundamentals into everyday classroom practice.

A major component of the project is the INSIGHT Summer Institute, an intensive two-week training program for both partner teachers and fellows that introduces many of the various sensor technologies and computing science principles utilized within the project, along with hands-on lessons, pedagogical techniques and challenges, lesson planning strategies and team-building experiences. As with many intensive training experiences, the confidence and enthusiasm generated during the two weeks begins to fade as time passes and the practical challenges involved become more obvious. This is where the partnership between an INSIGHT teacher and fellow comes to the fore—the interaction between the two helps alleviate both the teacher’s concerns about utilizing unknown technology in the classroom—as he or she has a technology expert who can ensure that aspect runs smoothly—and the fellow has an experienced teacher to help her/him understand how to communicate effectively with the class, and offer support should the fellows falter. Further, it allows teachers to present STEM content within a real-world framework.

Finally, as teachers grow more confident in the use of sensor technology within their classrooms, they can begin to take on more of the instructional tasks—leading to the continuation of such efforts even after teachers have left the program at the end of their two years. Most of INSIGHT’s contributions to a teacher’s classroom strategy take the form of small curricular modules. This allows for manageable inclusion into an already existing curriculum; facilitates the in-classroom interaction between the teacher, fellow and students within a discrete block of time; and perhaps most importantly, allows the module to be documented and disseminated as a stand-alone lesson plan.

The INSIGHT GK-12 Program has been effective in integrating sensor technologies and computing science principles into diverse K-12 classrooms, garnering positive feedback from all of its participants. Coupling the intensive training of the summer institute with an ongoing partnership between a teacher and a fellow has proved to be a productive and valuable strategy. Staggering new entrants, teachers and fellows into the program has also been an important strategy, as doing so ensures every new cohort of teachers and fellows train side by side with a group of returning veterans from the previous year. This also helps to encourage out-of-the-box thinking, as the previous cohort has already tackled the often challenging task of identifying ways in which sensors can be used in unusual settings, such as physical education classes. This can in turn lead to fresh thinking from the new participants. The result is an active and imaginative community of practice, committed to integrating sensor technologies and computing science fundamentals into everyday classroom practice.

A sampling of some of the modules that have been developed and/or delivered by INSIGHT fellows and partner teachers include using WiiMotes to learn Newton’s laws, constructing such things as catapults, and measuring acceleration in sports and rock- etry. Detailed lesson plans for these activities and others can be found online on INSIGHT’s website at http://gk12.cis.ksu.edu.

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Teaching: Databases, algorithms, logic and verification, formal language theory, programming languages.

Research: Program analysis, language-based security, program slicing, information-flow analysis, dependency analysis.

Torben Amtoft
Associate Professor
Ph.D. Computer Science, University of Aarhus, 1993
M.Sc., Computer Science, University of Copenhagen, 1989
B.Sc., Mathematics and Computer Science, University of Copenhagen, 1985
Research: Program analysis, language-based security, program slicing, information-flow analysis, dependency analysis.
Teaching: Databases, algorithms, logic and verification, formal language theory, programming languages.

Daniel Andriesen
Associate Professor
Ph.D., Computer Science, University of California, Santa Barbara, 1997
M.S., Computer Science, California Polytechnic State University, SLO, 1992
B.S., Computer Science and Mathematics, Westmont College, 1990
Research: Parallel and distributed computing, scheduling and run-time systems, high-performance scientific computing, distributed-sensor networks, telemedicine.
Teaching: Operating systems, distributed systems, computer architecture, WWW technology.

Doina Caragea
Associate Professor
Postdoctoral, Computer Science, Iowa State University, 2004-2006
Ph.D., Computer Science, Iowa State University, 2004
M.S., Computer Science, University of Bucharest, Romania, 1997
B.S., Computer Science, University of Bucharest, Romania, 1996
Research and teaching: Bioinformatics, artificial intelligence, machine learning, data mining and knowledge discovery, visual data mining, ontologies and information integration, information retrieval and semantic web.

Patrice Chalin
Associate Professor
Ph.D., Computer Science, Concordia University, 1995
M.S., Computer Science, Concordia University, 1989
B.S., Computer Science, Concordia University, 1988
Research: Program synthesis and software verification, medical device integration, coordination and interoperability, software engineering, web-based enterprise applications.
Teaching: Software specification, semantics of programming languages.

Scott A. DeLoach
Professor
Ph.D., Computer Engineering, Air Force Institute of Technology, 1996
M.S., Computer Engineering, Air Force Institute of Technology, 1987
B.S., Computer Engineering, Iowa State University, 1982
Research: Applying software engineering methods, techniques and models to design and development of intelligent, complex, adaptive and autonomous multiagent systems; applying adaptive techniques to computer network security and cyber-physical systems; building tools and techniques necessary to design and build adaptive systems; building and developing hybrid intelligent systems that include humans, software agents and mobile hardware agents.
Teaching: Agent-oriented software engineering, software engineering, software management.

David A. Gustafson
Professor
Ph.D., Computer Science, University of Wisconsin, 1979
M.S., Computer Science, University of Wisconsin, 1973
B.S., Meteorology, University of Utah, 1969
B.S., Mathematics, University of Minnesota, 1967
Research and teaching: Software engineering, software metrics, software testing, design analysis, robotics, vision, face recognition, emotion recognition, biometrics, healthcare applications of robots.

John Hatcliff
Professor
Ph.D., Computer Science, Kansas State University, 1994
M.Sc., Computer Science, Queen’s University, Kingston, Ontario, Canada, 1991
B.A., Computer Science/Mathematics, Mount Vernon Nazarene College, 1988
Research: Formal methods in software engineering, software verification, security analysis and certification, model checking, static analyses of programs, concurrent and distributed systems, middleware, model-integrated computing, semantics of programming languages, compiler construction, logics and type theory.
Teaching: Foundations of programming languages, software specification and verification, logic and set theory, construction of concurrent systems, compiler construction, formal language theory, software engineering, functional programming, logic programming.

Rodney Howell
Associate Professor
Ph.D., Computer Science, The University of Texas at Austin, 1988
B.S., Computer Science, Wichita State University, 1984
Research: Real-time scheduling, algorithm analysis, self-stabilizing systems.
Teaching: Analysis of algorithms, data structures, formal language theory, symbolic logic, real-time scheduling theory.

William Hsu
Assistant Professor
Ph.D., Computer Science, University of Illinois at Urbana-Champaign, 1998
M.S., Computer Science, Johns Hopkins University, 1993
B.S., Computer Science and Mathematical Sciences, Johns Hopkins University, 1993
Research: Laboratory for Knowledge Discovery in Databases (KDD)—research group emphasizing machine learning and intelligent systems.

Masaki Mizuno
Professor
Ph.D., Computer Science, Iowa State University, 1987
M.S., Computer Science, Pennsylvania State University, 1982
M.S., Electrical Engineering, Keio University, Japan, 1980
B.S., Electrical Engineering, Keio University, Japan, 1978
Research and teaching: Operating systems, distributed systems, real-time embedded systems, object-oriented systems.

Mitchell Neilsen
Associate Professor
Ph.D., Kansas State University, Computer Science, 1992
M.S., Kansas State University, Computer Science, 1989
M.S., Kansas State University, Mathematics, 1987
B.S., University of Nebraska-Kearney, Mathematics, 1982
Research: Distributed computing systems, real-time embedded systems, computational engineering, natural resources.
Teaching: Computer architecture, operating systems, networking, real-time systems.
Xinming (Simon) Ou
Associate Professor
Ph.D., Computer Science, Princeton University, 2005
M.E., Computer Science, Tsinghua University, 2000
B.E., Computer Science, Tsinghua University, 1998
Research and teaching: Computer and information security, enterprise network security, security analysis, moving-target defense, smart phone security, programming languages, high-assurance systems.

Robby
Associate Professor
Ph.D., Computer Science, Kansas State University, 2004
M.S., Computer Science, Kansas State University, 2000
B.S., Computer Science, Oklahoma State University, 2000
Research: Software verification, specification, analysis, transformation, specialization, testing, software engineering, model-driven software development.
Teaching: Specification and verification of software, programming languages, compiler design and implementation.

David A. Schmidt
Professor
Ph.D., Computer Science, Kansas State University, 1981
M.S., Computer Science, Kansas State University, 1977
B.A., Mathematics, Fort Hays State University, 1975
Research: Abstract interpretation, static program analysis, denotational semantics.
Teaching: Programming methodology, program validation, software architecture.

Eugene Vasserman
Assistant Professor
Ph.D., Computer Science, University of Minnesota, 2010
M.S., Computer Science, University of Minnesota, 2008
B.S., Biochemistry, Neuroscience, University of Minnesota, 2003
Research: Distributed system security, privacy and anonymity, peer-to-peer systems, network security, medical and embedded device security, applied cryptography usable security.
Teaching: Secure networks and distributed systems.

Beth Unger
Professor Emeritus
B.S., Mechanical Engineering, Michigan State University, 1961
M.S., Mathematics, Michigan State University, 1963
Ph.D., Computer Science, The University of Kansas, 1978
Research: Database and knowledge system design, data security, information technology for learning, university of the future.
Teaching: Databases, data security.

Vigil Willement
Professor
Ph.D., Computer Science, Iowa State University, 1972
M.S., Computer Science, Iowa State University, 1970
B.S., Mathematics, Iowa State University, 1965
Research: Parallel scientific simulations, verification of concurrent software, health IT systems.
Teaching: Parallel and distributed systems, impact of computing on society.

Argus Group—Cyber Security Research
http://www.arguslab.org

The Argus group carries out cyber security research under the direction of Dr. Simon Ou. Argus' focus is on the defense aspect of cyber space, and the philosophy that successful cyber defense can only be achieved through automated coordination of various observation and action points in an enterprise environment. The research focuses on creating technologies that can assist human security analysts through automation. Industry partners include Arbor Networks, Honeywell, HP, General Dynamics and Symantec; governmental agencies include the National Institute of Standards and Technology, and Idaho National Laboratory. New security paradigms investigated include bringing anthropological research methods into cybersecurity study, moving-target defense, cloud security and smartphone security. The research aims at providing solutions both theoretically sound and practically relevant—"start from real problems, create solutions that last."

CISA—Center for Information and Systems Assurance
http://www.cisa.ksu.edu

The Center for Information and Systems Assurance (CISA) at Kansas State University is an umbrella organization established in 2009 for all cybersecurity and information assurance research at the university. Faculty at CISA conduct research in computer and network security, high-assurance software systems, language-based security, security in health IT systems, privacy and anonymity, censorship resistance and security for smart grids. CISA has extensive collaboration with a number of external industry and government partners such as Rockwell Collins, HP Labs, DRDC–Ortau, National Institute of Standards and Technology (NIST), Idaho National Laboratory, Honeywell and General Dynamics. Research in CISA is funded by the National Science Foundation, Department of Defense, NIST, NIH and a number of industry partners.

Machine Learning and Bioinformatics (MLB) Group
http://people.cis.ksu.edu/~duaranga/mlb

The MLB group aims to design algorithms and develop tools for analyzing large amounts of data, in particular, molecular sequence and text data. Main projects focus on the following:
- design and development of semi-supervised and domain adaptation algorithms
- RNASeq analysis, alternative splicing discovery and gene prediction
- sentiment analysis and recommender systems
- ontology engineering and classifier learning from semantically heterogeneous data sources

Among others, the MLB group is collaborating with the Bioin-
computational engineering research involves collaboration with engineers at Sandia National Laboratories. High-performance computing and finite-element analysis (FEA) is used to develop thermal battery models to evaluate thermal, mechanical and chemical properties of thermal batteries, and to analyze solder interconnections for electronic component packaging. Preliminary results were reported in Sandia SAND Technical Reports in 2012.

Distributed Systems Lab
http://www.cis.ksu.edu/bocat

The distributed systems lab supports a wide range of interdisciplinary research around a core interest in efficient, effective distributed systems. Key projects include the K-State research computing cluster, BosCat, the largest academic cluster in Kansas with 1,000 cores; enhancing the efficiency of SOAP/WMX communications; medical informatics; ecological modeling; and veterinary tele-medicine. Our work is frequently cross-disciplinary and common collaborators go beyond engineering, ranging from agricultural economics to veterinary medicine. Since 1998, the distributed systems lab has received funding from agencies such as the National Science Foundation, U.S. Food and Drug Administration, U.S. Department of Agriculture and NSF EPSCOR.

KDD Lab
http://www.kdd.cis.ksu.edu

The laboratory for knowledge discovery in databases (KDD lab) aims at developing technologies for building models of events and processes from data, and then using these models to help make decisions. Research in the KDD lab focuses on developing algorithms and techniques for the following:

- data mining, machine learning, and probabilistic reasoning over large data sets and text collections
- human language technologies: computational linguistics and information extraction
- visualizing, learning, and reasoning about events and event streams
- analysis of spacial data: georeferencing, spatial outlier detection, deduplication, etc.
- modeling cognitive processes to better understand how humans reason about causality, especially with spacial and temporal data

Application of these algorithms include software tools for bioinformatics, epidemiology, health informatics, computational physics, sensor network optimization and computer security.

Tools developed by the lab have been used by the Department of Defense, Office of Naval Research (ONR), Army Research Lab (ARL), National Agricultural Biosecurity Center (NABC) and Kansas Department of Transportation (KDOT). Federal and corporate sponsors of the KDD lab since 1999 include the NSF, DHS, ONR, ARL, Raytheon and American Diagnostic Medicine. The KDD lab maintains a research collaboration with the University of Illinois at Urbana-Champaign, including the National Center for Supercomputing Applications (NCSA).

Application areas currently being pursued in the laboratory for knowledge discovery in databases include user modeling, adaptation and personalization; game-theoretic approaches to information security and tamper-resistant sensor networks; geoinformatics, bioinformatics and medical informatics; information extraction for question answering; information trust; and opinion mining, sentiment analysis and subjectivity analysis.

MACR Laboratory
http://macr.cis.ksu.edu

The multi-agent and cooperative robotics (MACR) laboratory focuses on applying software engineering methods, techniques, and models to the design and development of distributed, intelligent, complex, autonomous and autonomous systems.

Current research is focused on understanding and quantifying potential and limitations for adaptive, “moving-target” defenses (MTD) for protecting computer networks against malicious attacks. A second key research focus is developing a multi-agent system architecture capable of adaptively controlling future electrical power distribution systems (PDS), which are expected to include a large number of renewable power generators, energy storage devices, and advanced metering and control devices. This research also includes building and developing hybrid intelligent systems that include humans, software agents and mobile hardware agents. Key elements of this work are—

- a set of methods and techniques for analyzing and designing complex, adaptive systems;
- a set of organization-based models upon which the system analysis, design and implementation are based;
- a set of generic technologies that implement organization-based models; and
- a set of multi-agent and cooperative robotic systems used to demonstrate our approaches.

The lab has produced the organization-based multi-agent systems engineering methodology (O-MaSE) and its associated agentTool development environment. The MACR Lab has active collaborations with CIS’ Argus Cyber Security Research Lab, the Kansas State Smart Grid Lab and the Human-Machine Training Laboratory at Vanderbilt University. Since 2002, the MACR Lab has received more than $7.7 million in funding from the National Science Foundation, the Air Force Office of Scientific Research, United States Marine Corps, M2 Technologies and Stanfield Systems Inc.

Networked and Distributed Systems Security Group

The Networked and Distributed Systems Security Group is doing research in areas of privacy and censorship resistance, medical system safety and security, ad hoc and low-power network security, and usable security.

Projects include the following:

- compositional security and safety of dynamic medical systems (in collaboration with SanToS lab)
- large-scale censorship resistance
- low-power and ad hoc network security and user privacy
- usability of software security and password creation systems

Theories, systems and protocols being developed will help secure future health care and mobile networking, and make them easier to use.

SanToS Laboratory
http://santos.cis.ksu.edu

The laboratory for specification, analysis and transformation of software (SanToS) aims to develop technologies and tools for effective construction of high-confidence software systems. Work in the lab emphasizes—

- use of rigorous analysis techniques with solid mathematical underpinnings,
- a variety of forms of code and model-integrated software specifications to capture crucial system correctness properties, and
- use of software models as a key mechanism for capturing essential software structure leading to system analysis and verification.

The lab has produced tools including the Bandera and Bogor software model checking frameworks, the Cadena modeling frameworks for component-based systems, and the Indus static and analysis and slicing frameworks that are widely recognized within the academic software engineering and verification communities. SanToS researchers are currently focusing on applications in security software product lines, integrated medical devices and sensor networks. Since 1999, SanToS Laboratory has received more than $8.5 million in funding through agencies and companies such as the National Science Foundation, Army Research Office, Air Force Office of Scientific Research, Defense Department Advanced Projects Agency (ARPA), NASA, Lockheed Martin, Rockwell Collins, IBM, Honeywell and Intel.

The Sensor Networks Laboratory
http://persnl.cis.ksu.edu

The sensor networks laboratory is conducting research to develop tools and methodologies for development of sensor applications, and supports multidisciplinary research that draws on faculty expertise from several disciplines. The lab has the following goals:

- develop model-driven tools for designing and deploying large-scale sensor networks
- provide the infrastructure support necessary to enable K-State researchers to perform multidisciplinary research and address challenges posed by the next generation of sensor systems
- provide laboratory support in various courses to educate and train students for networking and distributed computing research

The lab is currently supported by the K-State’s Targeted Excellence Program to promote multidisciplinary research. With additional instrumentation support grants from NSF and DoD, an experimentation test bed has been established to rapidly prototype large-scale sensor applications and to evaluate developed technologies. Multidisciplinary projects in the areas of veterinary telemedicine, hydrology, grain science, agriculture, agricultural engineering and environmental monitoring are being pursued in collaboration with researchers from several departments in engineering, veterinary medicine, agronomy and agriculture.
Amtoft


Andresen


Caragea


Chalin


DeLoach


Gustafson


Hatchett


Howell


Hsu

Grants

Amtoft

- Senior Personnel (with PI Cynthia Weinig, co-PIs Steve Welch, Justin Maloof, and Sanjoy Das), National Science Foundation (NSF), DBI - Plant Genome Research Project, TRMS: Ecological Annotation of Gene Function and Computational Analysis of Gene Networks. KSU award amount: $1,212,620, C bruises 76, 2010 - 2015.

Andresen

- PI (with co-PI Walter Dodds, Brett Esry, David Steward, and Diona Caragea), National Science Foundation (NSF), “MRI: Acquisition of a Hybrid GPU Computing Cluster for High-End Applications in Science and Engineering,” $700,000, September 2011 – August 2014.
- Co-PI, National Science Foundation (NSF) EPSCoR RII Track II (Award no. 0919443), “Oklahoma and Kansas: A cyberCommons for Ecological Forecasting,” $3M ($1.3M to K-State, $6M between KS and OK) September 2009 – August 2012.
- Co-PI (with PI John Hatcliff, co-PIs Robby and Steve Warren), National Science Foundation (NSF) CPS (Award no. 0932289), “CPS:Medium:Collaborative Research: Infrastructure and Technology Innovations for Medical Device Coordination,” NSF Collaborative Grant with the University of Pennsylvania. Total Amount: $1,500,000, KSU Portion: $839,548, September 2009 - August 2012.

Caragea

- Co-PI (with PI Daniel Andresen, co-PI Walter Dodds, Brett Esry, and David Steward ), National Science Foundation (NSF), “MRI: Acquisition of a Hybrid GPU Computing Cluster for High-End Applications in Science and Engineering,” $700,000, September 2011 - August 2014.

Chalin


Deloach


Gustafson


Hatcliff

- PI (with co-PI Torben Amtoft, Xinming Ou, Robby, and Andrew Appel-Princeton University), Air Force Office of Scientific Research (AFOSR), “Evidence-Based Trust in Large-Scale MLS Systems,” Total Amount: $3,000,000, KSU Portion: $2,000,000, May 2009 - August 2014.
- PI (with co-PIs Daniel Andresen, Robby, and Steven Warren), National Science Foundation (NSF) CPS (Award no. 0932289), “CPS:Medium: Collaborative Research: Infrastructure and Technology Innovations for Medical Device Coordination,” NSF Collaborative Grant with the University of Pennsylvania. Total Amount: $1,500,000, KSU Portion: $839,548, September 2009 - August 2012.


- Co-PI (with PI Patrice Chalin, co-PI Robby), National Science Foundation (NSF), “FIDA SR: Tools, Process, and Artifacts for Certifiable Clinical Applications in Interoperable Medical Device Frameworks,” $80,000, October 2012 – September 2013.

Hsu

- PI, IQ Gateway LLC, “Computational Information and Knowledge Management: Data Mining, Analytics, and Information Extraction and Integration Tasks,” $40,000, December 2011 – May 2013.

Neilsen


- Co-PI (with PI John Hatcliff, co-PIs Daniel Andreessen and Steven Warren), NSF Infrastructure and Technology In- novations for Medical Device Coordination. (U.S. National Science Foundation—CNS 0932289). NSF Collaborative Grant with the University of Pennsylvania. Total Amount: $1,500,000, KSU Portion: $839,548, September 2009 - Au- gust 2012.


Schmidt


Robby

Singh


Vasserman


Wallentine

Amtoft
- Reviewer panel, National Science Foundation (NSF), 2012.

Arendsen
- Member, program committee, GPM Annual Meeting, Kansas City, MO, 2012.
- Member, international program committee, 2012 International Conference on Grid Computing and Applications (GCA ’12), Las Vegas, NV, 2012.
- Member, international program committee, 2012 International Conference on Semantic Web and Web Services (SWWS’12), Las Vegas, NV, 2012.
- Member and session chair, international program committee, 2012 International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA’12), Las Vegas, NV, 2012.
- Member, international program committee member, 2012 International Conference on Internet Computing (ICOMP’12), Las Vegas, NV, 2012.
- Member, external advisory committee, Arkansas CI-TRAIN, Fayetteville, AR, 2012.
- Member, program committee, GPM “Big Data” workshop, 2012.
- Member, IMLS Lifecycle Management for Research Data Research Group, 2012.

Caragea
- Member, program committee, IEEE International Conference on Bioinformatics and Biomedicine (BIBM), 2012.
- Member, program committee, First IEEE International Conference on Computational Advances in Bio and Medical Sciences (ICCABS), 2012.
- Member, program committee, International Conference on Knowledge Engineering and Ontology Development (KEOD), 2012.
- Member, program committee, International Symposium on Bioinformatics Research and Applications (ISBRA), 2012.
- Member, program committee, International Symposium on Bioinformatics, Computational Biology and Bioengineering (CTCBIO), 2012.

Chain
- Member, program committee, NASA Formal Methods Symposium, 2012.
- Reviewer, ACM Transactions on Software Engineering and Methodology, 2012.

DeLoach
- Member, program committee, International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2012.
- Member, program committee, International Conference on Agents and Artificial Intelligence (ICARAT), 2012.
- Member, program committee, Intl Workshop on Agent-Oriented Software Engineering (AOSE), 2012.
- Member, program committee, International Conference on Agent Technology (IAT), 2012.

Gustafson

Hatcliff
- Member, steering committee, Software Certification Consortium, 2012.

Hsu
- Reviewer, International Joint Conference on Uncertainty in Artificial Intelligence (UAI), 2012.

Neilsen
- Reviewer and panelist, NSF, 2012.
- Session chair, ESA 2012.
- Session chair, CAINE 2012.

Ou
- TPc member, International Symposium of Resilient Control Systems (ISRCS), 2012.
- Member, organizing committee, KanSec, 2012.

Ou

Schmidt
- Member, steering committee, Conference series on Verification, Model Checking, and Abstract Interpretation (VMCAI), 2012.
- Member, steering committee, Static Analysis Symposium (SAS), 2012.
- Co-chair, program committee, Static Analysis Symposium, Deauville, France, 2012.

Singh

Vasserman
- Member, program committee, Workshop on Privacy in the Electronic Society (WPES), 2012.
- Member, program committee, Cyber Security (CyberSec), 2012.
- Reviewer, Transactions on Information and System Security (TISSEC), 2012.
- Reviewer, Network and Distributed System Security Symposium (NDSS), 2012.
- Reviewer, Wireless Networks (WINET), 2012.
The CIS department offers two B.S. degrees: one in information systems (IS) and one in computer science (CS). The department also offers a minor in computing and information sciences (CIS).

IS is the study of applying information technology to managing information, and enabling communication and commerce. IS majors learn to build and administer computer networks, web servers and enterprise information systems. They study software programming skills as employed by system developers and administrators, enterprise information system developers and administrators, webserver developers and software programmers/engineers.

CS is the study of computing and its applications. The CS degree program has two options:

- A traditional computer science track, which focuses on foundational and scientific issues, including courses on operating systems, databases, programming languages and algorithms, and
- A software engineering track, which focuses on software development, including enterprise information systems, project management, parallel programming and software development in a team environment.

Undergraduate studies

Both degree programs allow students flexibility in their programs of study. Students are encouraged to pursue a minor or to study interdisciplinary subjects while still completing their degrees within four years.

ACM Student Chapter

One of the primary ways CIS students make social and professional connections with other students, faculty and potential employers is through the student chapter of the Association for Computing Machinery (ACM), the largest educational and scientific computing society in the world. Monthly meetings host speakers from faculty and industry, and include barbecues and LAN/console gaming nights each semester. The group hosts a local programming contest one Saturday per semester, sponsored by local industry, providing prizes such as iPads and 42 inch LCD TVs for the winners. Getting involved with ACM offers a great way to make friends and increase visibility both at K-State and with future employers.

Certificate program

Graduate certificate in real-time embedded systems.

Resources for current and prospective graduate students

- CIS admissions: http://cis.ksu.edu/programs/grad/admissions
- CIS research projects: http://cis.ksu.edu/research
- CIS profile on Peterson's Online guide: http://graduate-schools.petersons.com

How to apply

For a graduate application and other information, contact:

Graduate Studies
Department of Computing and Information Sciences
234 Nichols Hall
Kansas State University
Manhattan, KS 66506 USA

Phone: 785-532-6350; Fax: 785-532-7353

email: cis-gradapps@ksu.edu

Graduate studies

The department of computing and information sciences is committed to excellence in scholarly activities in research and graduate teaching. We offer courses and a rich variety of projects in the areas of programming languages, high-assurance software, distributed computing, networking, software engineering, bio-informatics, computer security and data mining. In addition to basic research, our curriculum emphasizes collaborative and interdisciplinary research, collaboration with industrial partners, and development and distribution of software tools. We offer two master-level degrees, the master of science (M.S.) and master of software engineering (M.S.E.), and the doctor of philosophy degree in computer science. We offer the M.S.E. degree via distance learning, and a graduate certificate program in real-time embedded systems in collaboration with other engineering departments.

Admission requirements

Applicants for our graduate degrees must possess a bachelor’s degree, with at least a 3.0 grade point average or equivalent, from an accredited institution. Students not possessing a degree in computer science must have background that includes the equivalent of core undergraduate computer science courses.

Areas of concentration

These include programming language, high-assurance software, distributed computing, networking, software engineering, bio-informatics, computer security and data mining, and high-performance computing.

Certificate program

Graduate certificate in real-time embedded systems.

Resources for current and prospective graduate students

- CIS admissions: http://cis.ksu.edu/programs/grad/admissions
- CIS research projects: http://cis.ksu.edu/research
- CIS profile on Peterson's Online guide: http://graduate-schools.petersons.com

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Advisory board

The CIS advisory board is composed of leaders in the development and deployment of software in industry. Because software is pervasive throughout our society, these advisors are technical, management and executive leaders in a broad spectrum of industrial sectors—software development, e-commerce, health IT, transportation, manufacturing, retail, communications, wealth management, military and academe. This industrial leadership helps us in three ways:

- Through industrial and university affiliations, it connects us to our alumni, practicing professionals, industry leaders, government leaders and academic researchers. These connections enable us to build collaborative relationships between academics and industry.
- It provides advice on the "state of the practice" in the software industry. This perspective helps us better prepare students for the software development profession, and better integrate our research results into real products and industrial processes.
- Advisory board members provide financial support from both personal and industry sources.

Katherine (Kacy) Clark
Principal Consultant / Architect
Cloud Technology Partners

Terry Ecklund
Private IT Consultant

Lynn Frick
Database Administrator
Kansas State University Foundation

Dominic Gelinas
Software Engineer
L-3 Communications

Dr. Mary Lou Hines
CIO, Vice Provost
UMKC (Board Chair)

Martin Malley
Assistant Vice President
Union Pacific Railroad

Emeritus Members

Don Mounday
President / Co-Founder
Falcon Technology Group, LLC

Jerry Havemann
Vice President, Retired
Cargill

Mark Schonhoff
Vice President
Cerner Corp.

Ken Switzer
President / Founder, Retired
Pegasus Programming Solutions

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