NDSU DEPARTMENT OF COMPUTER SCIENCE
AND OPERATIONS RESEARCH

ANNUAL REPORT
2008-2009

Primary Contact:
Dr. Kenneth Magel, Associate Chair
Kenneth.Magel@ndsu.edu

Faculty, Lecturer's and Special Appointments Profiles

Four new tenure-track faculty (two replacements and two new positions) and a new advisor/lecturer were hired during 2008-09. They start in 2009-10. The Department is searching for a new senior systems administrator to replace Lynn Thorp. A new assistant professor of practice funded by Distance and Continuing Education was recruited unsuccessfully during 2008-09.

Dr. Anne Denton, Assistant Professor
PhD, University of Mainz, Germany 1996

Dr. Denton teaches courses in database management, bioinformatics, problem solving and foundations of computer science. Her research interests include data mining, bioinformatics, course management systems for distance education, and computational physics. Anne was promoted to Associate Professor with tenure effective August 16, 2009.

Dr. Hyunsook Do, Assistant Professor
PhD, University of Nebraska – Lincoln 2007

Dr. Do joined the faculty in the Fall of 2007. She teaches courses in networks, network security, and software engineering. Her research program concerns software engineering, particularly software testing, maintenance, and empirical methodologies.

Dr. Xiaojiang (James) Du, Assistant Professor
PhD, University of Maryland, 2003

Dr. Du joined the faculty in the summer of 2004. He teaches courses in comparative programming languages, networks, network security, and software engineering. His research program concerns computer networks, network security, and intrusion detection. James is the receipant for the College of Science and Math Research Award. Dr. Du resigned from the University effective August 16, 2009 to take a position at Temple University in Philadelphia.

Dr. Wei Jin, Assistant Professor
PhD, University of Buffalo, 2008

Dr. Wei Jin joined the faculty in the Fall of 2008. She teaches courses in comparative languages and information retrieval. Her research interests focus on Text Mining, Information Retrieval and social Network analysis and Bioinformatics.

Dr. Jun Kong, Assistant Professor
PhD, University of Texas at Dallas, 2005

Dr. Kong is interested in visual modeling languages, model driven development and web-data interoperation. He teaches courses in operating systems and human computer interaction.

Dr. Juan Li, Assistant Professor
PhD, University of British Columbia, Vancouver Canada 2008

Dr. Juan Li joined the faculty in the Fall of 2008. She teaches courses in artificial intelligence, parallel and distributed simulations. Her research interests are in networking and distributed systems.

Dean Knudson, Associate Professor
PhD, Northwestern University,

Dr. Knudson is coordinator of the capstone program for bachelor of science students in CS and MIS. In this role he develops external sponsors for projects and mentors the student teams in project management. He teaches CSci 445, Capstone: Software Projects. Dr. Knudson has extensive experience working as a development executive for Microsoft and several other companies.

Dr. Kenneth Magel, Professor and Associate Head
PhD, Brown University, 1977

Dr. Magel teaches a wide variety of courses, including software engineering, programming languages, and social implications of computing. His software engineering research activities explore what makes programming difficult and programs complex. Dr. Magel conducts seminars and courses in XML, C# and .net technologies. He coordinates the graduate programs in software engineering. Beginning July 1, 2007 he became Associate Head for the Department.

Dr. John Martin, Associate Professor and Graduate Program Coordinator
PhD, Rice University, 1971

Dr. Martin teaches computer science foundations, theoretical computer science and algorithm analysis. He is interested in formal languages and automata theory and computational complexity. Dr. Martin wrote the textbook Introduction to Languages and the Theory of Computation, which is widely adopted by universities around the country. He serves as freshman advisor, transfer advisor, and undergraduate coordinator for the department.

Dr. Kendall E. Nygard, Professor
PhD, Virginia Polytechnic Institute and State University, 1978

Dr. Nygard teaches courses in simulation, social implications of computing, mathematical modeling, network optimization, systems analysis and design, and software testing and maintenance. His research interests include software systems for military mission planning for cooperative control of autonomous aircraft systems, software agents, and geographic information systems (GIS) for school transportation. Primary sponsors of his research are the Air Force and Navy. Starting in summer, 2006 he became graduate coordinator for the Department.

Dr. William Perrizo, Engberg Presidential Professor
Ph.D., University of Minnesota, 1972

Dr. Perrizo teaches courses in database systems, data mining, bioinformatics, and networks. His research interests include database and information systems, data mining, data warehousing, distributed database systems, bioinformatics, precision agriculture, and remotely sensed data management and visualization. His research has been funded by many federal and private sources. Dr. Perrizo is a co-founder of the worldwide Virtual Conference on Bioinformatics. Dr. Perrizo has served in leadership roles for many conferences and on many boards and has a strong international reputation in research. In fall, 2007, he became one of the first seven University Distinguished Professors at NDSU, and in spring, 2008, was named Fargo-Moorhead Chamber of Commerce Professor

Dr. Brian M. Slator, Professor and Department Head
Ph.D., New Mexico State University, 1988

Dr. Slator teaches courses in artificial intelligence (AI), multimedia educational systems, computer science problem solving, and comparative languages. His research interests revolve around active environments for learning, including the use of software agents, case-based reasoning, knowledge representation, multimedia systems, distance education, synthetic environments, and multi-user educational games. Dr. Slator is a recipient of the Ernest L. Boyer International Award for Excellence in Teaching, Learning and Technology.

Dr. Vasant Ubhaya, Professor
Ph.D., University of California, Berkeley, 1971

Dr. Ubhaya teaches courses in Discrete Mathematics, Algorithm Analysis, Performance Evaluation, Mathematical Programming, and Dynamic Programming. He does research in Algorithms, Optimization and Approximation, and publishes his results regularly in journals. He is often invited by professional societies to organize and chair sessions, and give talks at their meetings. His research has been supported by the National Science Foundation and EPSCoR.

Dr. Dianxiang Xu
Ph.D., Nanjing University, China, 1995

Dr. Xu is interested in formal methods in software engineering, software security, aspect-oriented programming, and intrusion prevention and detection. He is leading departmental initiatives in computer forensics. He also teaches courses in computer science foundations and in software testing. Dr. Xu resigned from NDSU in spring, 2009 to take a position in South Dakota.

Dr. Weiyi (Max) Zhang, Assistant Professor
PhD, Arizona State University, 2007

Dr. Zhang joined the faculty in the Fall of 2007. He teaches courses in object oriented systems, and software engineering. His research interests are networking and bio-informatics.

LECTURERS

Ms. Dana Johnson, Adjunct Senior Lecturer
MS, University of Denver, 1980

Ms. Johnson retired following the fall, 2005 semester, but continues to teach distance education courses for the Department from her mansion in Colorado. She also serves as web administrator for the Department.

Mr. Sameer Abufardeh, Lecturer
MS, St. Cloud State University, 2000

Mr. Abufardeh teaches courses in Java. His research interest has been in the area of requirements engineering. He is an active Ph.D. student starting in Fall, 2004. He is expected to complete his Ph.D. in fall, 2008.

Mr. Pratap Kotala, Adjunct Lecturer
MS, North Dakota State University, 2002

Mr. Kotala left the Department to pursue entreprenaurial opportunities. He continues teaches the web-based business computer courses through Distance and Continuing Education.

Richard Rummelt, Lecturer
MS, Grand Valley State University, Michigan, 2005

Mr. Rummelt teaches courses in Java and the advanced Visual Basic .NET courses. His research interest has been in the area of requirements engineering. He is an active Ph.D. student. Starting in spring, 2006, he is the faculty advisor for our new chapter of UPE, the Computer Science Honor Society. Mr. Rummelt is being promoted to Senior Lecturer starting August, 2009.

Oksana Myronvych, Lecturer
MS, Kiev University, 1989

Mrs. Myronovych teaches courses in Java and the advanced Visual Basic .NET courses. Her research interest has been in the area of requirements engineering. She is an active Ph.D. student. She is currently the Treasurer/Secretary for the student chapter of UPE, the Computer Science Honor Society.

STAFF

Lynn Thorp, Systems Technician

Ms. Thorp administers department systems and configurations for the departmental instructional laboratories. Lynn went on disability July 1, 2009.

Carole Huber, Administrative Assistant

Ms. Huber coordinates the administrative functions of the department. This includes managing research and appropriated funds, purchasing and accounts payable. She is the contact person for all student employment applications, time-slips, and tuition waivers. She coordinates all Teaching/Research/Grading positions for the department.

Betty Opheim,
Part-time Administrative Secretary

Ms. Opheim carries out inventory, equipment and software support functions and assists in back-up office support.

Stephanie Sculthorp,
Administrative Secretary

Ms. Sculthorp carries out office support functions, including data development, reporting, survey work, and assisting students and faculty.

Otto Borchert
Programmer Analyst
MS, North Dakota State University, 2008

Mr. Otto Borchert began his Programmer Analyst position August 2007. His duties include educational games, research and software development.

Guy Hokanson
Programmer Analyst

Mr. Guy Hokanson began his Programmer Analyst position August 2007. His duties include educational games, research and software development.

I. Goals/accomplishments for the current year

A. INSTRUCTION AND STUDENT SUCCESS

1. **Exit Interviews**

During 2008-09, the Department continued to interview graduating seniors. Each senior was asked to return a questionnaire and the results were tabulated. The questionnaire used is:

Student Exit Interview
Computer Science

Date:_____ Interviewed By: _____

Student's name: _____
Degree Completed: _____

Address (after graduation):

_____

_____

_____

Email (after graduation): _____

1. What are your immediate future plans (job, graduate school):

2. What are your most memorable academic experiences of your time at NDSU:

3. In what areas or skills do you feel the NDSU Computer Science program has done the best job of preparing you for your future:

4. In what areas of skills do you feel the NDSU Computer Science program has not done as good a job as it should in preparing you for your future:

5. The next set of questions concern our goals for your learning in the Computer Science undergraduate programs. You should rank how well you feel you have mastered each goal on a scale from 1 to 5 where 1 means very poorly, 2 means almost adequately, 3 means adequately for my future plans, 4 means a little more than adequately, and 5 means much more than adequately.

1. Knowledge in Scientific and Technical areas. **Graduates will have sufficient breadth and depth in the fundamental scientific and technical areas of computer science, to provide for their success as computer science professional practitioners, lifelong learners, professional software developers, and graduate students. 1 2 3 4 5**
2. Development of computer-based systems. **Graduates will be capable of applying scientific methodology to the design, implementation, analysis, and evaluation of computer based systems.** **1 2 3 4 5**
3. Skills in project-oriented teamwork and communication. **Graduates will have the ability to work collaboratively with others in complex problem settings involving cross-functional relationships, including effectively communicating both orally and in writing. 1 2 3 4 5**
4. Understanding of ethical, cultural, societal, legal and global issues in computing. **Graduates will understand and be able to incorporate into their work considerations that relate to empowerment, quality of life, risks and responsibilities, and privacy 1 2 3 4 5**

6. What would you like to see us do that we did not do in your program:

7. Why:

8. What would you like to see us do more of:

9. Why:

10. What would you like us to do less of:

11. Why:

12. What were the most significant barriers to your doing better or getting more out of your Computer Science program?

13. Why?

Selected results from these questionaries for 2008-09 are presented here. Starting with fall, 2008, the surveys are done online using Survery Monkey.

Nineteen graduating seniors returned completed surveys in 2008-09.

- Immediate future plans: 14 job in the field, 4 graduate school, 1 unsure;
- Most memorable academic experiences: 5 capstone software development project; 8 discussions with fellow students concerning assignments; 6 discussions with faculty;

- What NDSU has done best: software development, networking, working in groups;
- Need for NDSU improvement: communication, UNIX experience, software testing, use of comprehensive development environments;
- Achievement of Goals:
    - Scientific and technical areas: 3 rated as 3, 7 rated as 4, 9 rated as 5
    - Development: 2 rated as 3, 12 rated as 4, 4 rated as 5, 1 did not rate
    - Teamwork and communication: 6 rated as 3, 5 rated as 4, 8 rated as 5
    - Ethical issues: 5 rated as 2, 8 rated as 3, 4 rated as 4, 2 rated as 5
- Missing, but desired: scripting languages, C++, .NET, Eclipse;
- We should do more: team work, work with industry, UNIX, testing, coordination among classes;
- We should do less: theory, repetitive assignments

Capstone Projects:

The 2008-09 academic year marked the seventh year in which capstone projects for seniors in CS have been sponsored by external constituencies, primarily private corporations. The intent is to help students develop a strong background in real software development issues, learn software project management skills, and develop the ability to work in teams. Successful student teams use many of the skills they learned in earlier Computer Science courses. The sponsors for spring semester 2009 are as follows:

3M
Appareo
ATK
CNSE
IBM
NISC
Phoenix International
Polaris
Rockwell Collins
Sundog
Thomson Reuters
West

Capstone Project Student Survey – Results for Spring 2009

Knowledge in Scientific and Technical Areas: Did you have enough background from your class work to be able to learn what you needed to in order to make a good contribution to your project?

Very Good	Good	Marginal	Poor	N/A
6	20	6		

Teamwork/Dedication to task: Did your team members work well together and show a dedication to completing your project on time and with high quality?

Very Good	Good	Marginal	Poor	N/A
10	16	5	1	

Communication/Status Reporting: How good were communications with your mentor and sponsor throughout the semester?

Very Good	Good	Marginal	Poor	N/A
17	6	2		

Capstone Project Value: Overall, what is your opinion of the value of the NDSU Computer Science Capstone Program?

Very Good	Good	Marginal	Poor	N/A
25	6	1		

Project Definition: Was your project appropriate for a Capstone Project?

Very Good	Good	Marginal	Poor	N/A
19	10	2		

Summary tabulation of the Project Sponsor Survey, Compiled May, 2009

PROJECT	OPINION OF CAPSTONE PROGRAM	WILLING TO SPONSOR NEXT YEAR	FINAL GRADE FROM SPONSOR	COMMENTS – SPONSOR/MENTOR
3M	Good	Likely	A	"Very happy! This will save me a lot of time and work.
Appareo	Good	Likely	A/B	"Overall, the intent of the course is absolutely superb. Students getting a real world, hands on experience is invaluable for them".
ATK	Good	Likely	A	"ATK has had a good time working with the students this year and would be happy to work with the NDSU Capstone program again">
CNSE	Very Good	Likely	A	"The delivered produce will be useful".
IBM	Good	For Sure	B-	"Any classroom environment where the students can gain real world experience is extremely valuable. The NDSU program is well designed to give the students

				exposure to new tools and languages without the hand holding typically associated with classroom work. My main suggestion would be that the students be exposed as early as possible to this sort of creative probem solving"
NISC	Good	For sure	A	"Dean has really improved the quality of this program. Project teams appear to be held accountable for delivering results".
Phoenix	Good	Likely	A-	"I think it is VERY important that the students have classes like this. It is the soft skills that it helps to develop and real world experience".
Polaris	Good	For Sure	A-	"It is definitely a great program, and an invaluable experience for the students".
Rockwell Collins	Very good	Likely	A	"These guys were great. I wish we could get them to RC".
Sundog	Very Good	For Sure	A	"As usual, I enjoyed the experience and hope to continue in the future".
Thomson Reuters	Very Good	For Sure	A-	"Very good solution and workaround for integration issues".
West	Very Good	For Sure	B	"love the program!!"

2. Advisees 2008-2009

John Martin serves as New Student Advisor for undergraduates. He advises freshmen and transfer students during their first year at NDSU. Graduate students are assigned an initial course work advisor before they arrive in the Department. Computer Science graduate students are assigned Ken Nygard and Software Engineering graduate students are assigned Ken Magel. Students select their own research advisor some time during their first or second years of attendance. The selected research advisor must accept the student before that student-advisor relationship becomes official.

The list below provides the student advisees for each faculty member. Nontenured faculty are shielded from most undergraduate advising.

Ellingson,Christopher David	Freshman	BS-Computer Science	Denton,Anne
Kallod,James Joseph	Freshman	BS-Computer Science	Denton,Anne
Mahodaya,Rupam Ramnath	Freshman	BS-Computer Science	Denton,Anne
Spotts,David	Freshman	BS-Computer Science	Denton,Anne
Douglas,Steven Robert	Junior	BS-Computer Science	Denton,Anne
Klemz,David Paul	Junior	BS-Computer Science	Denton,Anne
Odden,Mathew R	Junior	BS-Computer Science	Denton,Anne
Olson,Darwin Glenn	Junior	BS-Computer Science	Denton,Anne

Hanson,Christopher Alan	Senior	BS-Computer Science	Denton,Anne
Sheoran,Deepak	Senior	BS-Computer Science	Denton,Anne
Gerhardt,Sean Alan	Sophomore	BS-Computer Science	Denton,Anne
Pearson,Leif Hokan	Sophomore	BS-Computer Science	Denton,Anne
Smothers,Tyler	Sophomore	BS-Computer Science	Denton,Anne
Ganesan,Arjun	Graduate	MS-Computer Science	Denton,Anne
Jain,Harsh	Graduate	MS-Computer Science	Denton,Anne
Sahni,Ritika	Graduate	MS-Computer Science	Denton,Anne
Woznica,Szymon	Graduate	MS-Computer Science	Denton,Anne
Al-Azzam,Omar Ghazi	Graduate	PHD-Computer Science	Denton,Anne
Besemann,Christopher Adam	Graduate	PHD-Computer Science	Denton,Anne
Wu,Jianfei	Graduate	PHD-Computer Science	Denton,Anne
Hou,Xuan	Freshman	BS-Computer Science	Du,Xiaojiang
Humphrey,Cody Allen	Freshman	BS-Computer Science	Du,Xiaojiang
Kostelecky,Marc Joseph	Freshman	BS-Computer Science	Du,Xiaojiang
Jayawardena,Supra Keli	Junior	BS-Computer Science	Du,Xiaojiang
Wolter,Michael	Junior	BS-Computer Science	Du,Xiaojiang
Johnson,Trevor Ray	Senior	BS-Computer Science	Du,Xiaojiang
Karels,Paul J	Senior	BS-Computer Science	Du,Xiaojiang
Lee,Rikki Michelle	Senior	BS-Computer Science	Du,Xiaojiang
Mazumder,Narayana	Senior	BS-Computer Science	Du,Xiaojiang
Rogers,David DeLoach	Senior	BS-Computer Science	Du,Xiaojiang
Williamson,Tyler W	Senior	BS-Computer Science	Du,Xiaojiang
Hendrickson,Aaron Daniel	Sophomore	BS-Computer Science	Du,Xiaojiang
Kondakindi,Swathi	Graduate	MS-Computer Science	Du,Xiaojiang
Reindl,Phillip Steven	Graduate	MS-Computer Science	Du,Xiaojiang
Chauhan,Anuj Kumar Singh	Graduate	MS-Software Engineering	Du,Xiaojiang
Rizvi,Huma	Graduate	MS-Software Engineering	Du,Xiaojiang
Kambhampaty,Krishna Kanth	Graduate	PHD-Computer Science	Du,Xiaojiang
Lu,Tingda	Graduate	MS-Computer Science	Juell, Paul
Hoff,Garrett G	Graduate	MS-Computer Science	Kim, Sung W
Wang,Yan	Graduate	MS-Computer Science	Kim,Sung W
Oesterreich,David	Senior	BA-Computer Science	Magel,Kenneth
Roach,Mitchell Lee	Freshman	BS-Computer Science	Magel,Kenneth
Dicken,Austen Leo	Junior	BS-Computer Science	Magel,Kenneth
Myers,Cody James	Junior	BS-Computer Science	Magel,Kenneth
Nygaard,Justin Lee	Junior	BS-Computer Science	Magel,Kenneth
Faught,David J	Senior	BS-Computer Science	Magel,Kenneth
Gupta,Munmun	Senior	BS-Computer Science	Magel,Kenneth
Knoll,Kenneth	Senior	BS-Computer Science	Magel,Kenneth
Kramer,Christopher James	Senior	BS-Computer Science	Magel,Kenneth
Longanecker,Joel Thomas	Senior	BS-Computer Science	Magel,Kenneth
Nelson,Douglas Allyn	Senior	BS-Computer Science	Magel,Kenneth
Paulus,Benjamin Jay	Senior	BS-Computer Science	Magel,Kenneth
Schuler,Jonathan Matthew	Senior	BS-Computer Science	Magel,Kenneth
Serfling,Roger Lee	Senior	BS-Computer Science	Magel,Kenneth
Stone,Jason Blackwood	Senior	BS-Computer Science	Magel,Kenneth
Timm,Geoffrey Gaylen	Senior	BS-Computer Science	Magel,Kenneth
Ward,Elizabeth Clarissa	Senior	BS-Computer Science	Magel,Kenneth

Christensen,Kyle James	Sophomore	BS-Computer Science	Magel,Kenneth
Knox,Anthony Tice	Sophomore	BS-Computer Science	Magel,Kenneth
Potla,Yaswanth	Graduate	MS-Computer Science	Magel,Kenneth
Sivanandam,Dinesh Arun	Graduate	MS-Computer Science	Magel,Kenneth
Bhowmick,Dibakar	Graduate	MS-Software Engineering	Magel,Kenneth
Cimic,Senad	Graduate	MS-Software Engineering	Magel,Kenneth
Eda,Ravi	Graduate	MS-Software Engineering	Magel,Kenneth
Limke,Jed Patrick	Graduate	MS-Software Engineering	Magel,Kenneth
Maresca,Louis	Graduate	MS-Software Engineering	Magel,Kenneth
Minot,Scott J	Graduate	MS-Software Engineering	Magel,Kenneth
Murugaiyan,Elangovan	Graduate	MS-Software Engineering	Magel,Kenneth
Pillarikuppam,Naresh	Graduate	MS-Software Engineering	Magel,Kenneth
Rahman,Mohamed Saif Ur	Graduate	MS-Software Engineering	Magel,Kenneth
Sarker,Mridula	Graduate	MS-Software Engineering	Magel,Kenneth
Shrestha,Bickrant	Graduate	MS-Software Engineering	Magel,Kenneth
Srichinta,Pallavi	Graduate	MS-Software Engineering	Magel,Kenneth
Srivastava,Arun	Graduate	MS-Software Engineering	Magel,Kenneth
Takahashi,Naomi	Graduate	MS-Software Engineering	Magel,Kenneth
Thalloji,Pramodh Kumar	Graduate	MS-Software Engineering	Magel,Kenneth
Upadhyay,Rajat	Graduate	MS-Software Engineering	Magel,Kenneth
Ahmadi,Hamed	Graduate	PHD-Software Engineering	Magel,Kenneth
Myronovych,Oksana	Graduate	PHD-Software Engineering	Magel,Kenneth
Ranganathan,Prakash	Graduate	PHD-Software Engineering	Magel,Kenneth
Rummelt,Richard	Graduate	PHD-Software Engineering	Magel,Kenneth

Guyot,Ryan Jay	Freshman	BA-Computer Science	Martin III,John C
Albus,John Michael	Freshman	BS-Computer Science	Martin III,John C
Bechtold,Benjamin G	Freshman	BS-Computer Science	Martin III,John C
Carlson,Daniel Alan	Freshman	BS-Computer Science	Martin III,John C
DeMarce,Francis Chad	Freshman	BS-Computer Science	Martin III,John C
El-Ghandour,Bilal	Freshman	BS-Computer Science	Martin III,John C
Gandrud,Ryan Wallace	Freshman	BS-Computer Science	Martin III,John C
Geiser,Jeffrey Richard	Freshman	BS-Computer Science	Martin III,John C
Greff,Alex Michael	Freshman	BS-Computer Science	Martin III,John C
Grendahl,Jacob Paul	Freshman	BS-Computer Science	Martin III,John C
Hagel,Wesley James	Freshman	BS-Computer Science	Martin III,John C
Holmes,Dustin Allen	Freshman	BS-Computer Science	Martin III,John C
Knudson,Ryan Thomas	Freshman	BS-Computer Science	Martin III,John C
Kobilansky,Brandon James	Freshman	BS-Computer Science	Martin III,John C
Ladwig,Andrew Jon	Freshman	BS-Computer Science	Martin III,John C
Lamb,Andrew Patrick	Freshman	BS-Computer Science	Martin III,John C
Leingang,Brandon Gerald	Freshman	BS-Computer Science	Martin III,John C
Lyons,Daniel	Freshman	BS-Computer Science	Martin III,John C
Mahrer,Alex J	Freshman	BS-Computer Science	Martin III,John C
Meier,Mandi Lynn	Freshman	BS-Computer Science	Martin III,John C
Netzer,Nathaniel	Freshman	BS-Computer Science	Martin III,John C
Peterson,John William	Freshman	BS-Computer Science	Martin III,John C
Peterson,Spenser Duran	Freshman	BS-Computer Science	Martin III,John C
Podolecki,Mark	Freshman	BS-Computer Science	Martin III,John C
Quast,Jared Lee	Freshman	BS-Computer Science	Martin III,John C
Stenger,Philip M	Freshman	BS-Computer Science	Martin III,John C
Valnes,Taylor James	Freshman	BS-Computer Science	Martin III,John C
Wald,Deborah Jean	Freshman	BS-Computer Science	Martin III,John C

White,Shane Paul	Freshman	BS-Computer Science	Martin III,John C
Whittington,Patrick Daniel	Freshman	BS-Computer Science	Martin III,John C
Dandey,Santosh Raj	Graduate	MS-Computer Science	Martin III,John C
Gooduru,Ramakrishnareddy	Graduate	MS-Computer Science	Martin III,John C
Kar,Angshu	Graduate	MS-Computer Science	Martin III,John C
Lanke,Ramesh	Graduate	MS-Computer Science	Martin III,John C
Debilt,Daniel George	Graduate	MS-Software Engineering	Martin III,John C
Lin,Yong-Sheng	Junior	BA-Computer Science	Martin III,John C
Ahlf,Travis Martin	Junior	BS-Computer Science	Martin III,John C
Al Dhahi,Mahmoud Mohammed	Junior	BS-Computer Science	Martin III,John C
Albee,Christopher Jahn	Junior	BS-Computer Science	Martin III,John C
Alic,Edin	Junior	BS-Computer Science	Martin III,John C
Bragstad,Lance Matthew Dean	Junior	BS-Computer Science	Martin III,John C
Brown,Cody Harold	Junior	BS-Computer Science	Martin III,John C
Carlsrud,Ryan Thomas	Junior	BS-Computer Science	Martin III,John C
Dobler,Jeremy Joseph	Junior	BS-Computer Science	Martin III,John C
Dotzenrod,Neil William	Junior	BS-Computer Science	Martin III,John C
Ehresmann,Nathan Daniel	Junior	BS-Computer Science	Martin III,John C
Eluzai,Wani Oliver	Junior	BS-Computer Science	Martin III,John C
Gedgaud,Philip Michael	Junior	BS-Computer Science	Martin III,John C
Helbling,Chad A	Junior	BS-Computer Science	Martin III,John C
Jackson,Abram Jerome	Junior	BS-Computer Science	Martin III,John C
Jin,Han	Junior	BS-Computer Science	Martin III,John C
Kaber,Brett James	Junior	BS-Computer Science	Martin III,John C
Kaufman,Mark Joel	Junior	BS-Computer Science	Martin III,John C
Klingbeil,Seth Andrew	Junior	BS-Computer Science	Martin III,John C
Kwiecien,Stanley	Junior	BS-Computer Science	Martin III,John C
Lindstrom,Robert James	Junior	BS-Computer Science	Martin III,John C
Mahoo,Christopher Joachim	Junior	BS-Computer Science	Martin III,John C
Maier,Jacob Ryan	Junior	BS-Computer Science	Martin III,John C
McDaniel,Trevor Michael	Junior	BS-Computer Science	Martin III,John C
Piehl,Matthew J	Junior	BS-Computer Science	Martin III,John C
Rasmussen,Kevin Ryan	Junior	BS-Computer Science	Martin III,John C
Skrei,Brandon M	Junior	BS-Computer Science	Martin III,John C
Byberg,Travis D	Senior	BA-Computer Science	Martin III,John C
Kariluoma,Matti Maurice	Senior	BA-Computer Science	Martin III,John C
Reinhardt,Lee Edwin	Senior	BA-Computer Science	Martin III,John C
Samanta,Alex George	Senior	BA-Computer Science	Martin III,John C
Holisky,Adam S	Senior	BS-Computer Science	Martin III,John C
Agarwal,Abhishek	Senior	BS-Computer Science	Martin III,John C
Barsness,Timothy P	Senior	BS-Computer Science	Martin III,John C
Bhargava,Anirudh	Senior	BS-Computer Science	Martin III,John C
Baskerville,Patrick Michael	Senior	BS-Computer Science	Martin III,John C
Blattner,David George	Senior	BS-Computer Science	Martin III,John C
Asthana,Anant Daksh	Senior	BS-Computer Science	Martin III,John C
Carr,Joel Matthew	Senior	BS-Computer Science	Martin III,John C
Chale,William L	Senior	BS-Computer Science	Martin III,John C
Chaturvedi,Richa	Senior	BS-Computer Science	Martin III,John C
Christenson,Anna Elizabeth	Senior	BS-Computer Science	Martin III,John C
Daigle,Nicholas Richard	Senior	BS-Computer Science	Martin III,John C
Dosso,Vamorris	Senior	BS-Computer Science	Martin III,John C
Ewert,Shane	Senior	BS-Computer Science	Martin III,John C
Frohlich,Mark Richard	Senior	BS-Computer Science	Martin III,John C

Gjorven,Michael	Senior	BS-Computer Science	Martin III,John C
Helmer,Brady Lee	Senior	BS-Computer Science	Martin III,John C
Kerber,Dustin	Senior	BS-Computer Science	Martin III,John C
Khandal,Milind	Senior	BS-Computer Science	Martin III,John C
Krishnagiri,Krithick Sarveswaran	Senior	BS-Computer Science	Martin III,John C
Kumar,Ajay	Senior	BS-Computer Science	Martin III,John C
Kumar,Gaurav Kavshfk	Senior	BS-Computer Science	Martin III,John C
Lennington,Matthew Jacob	Senior	BS-Computer Science	Martin III,John C
Lenthe,Josiah Edmund	Senior	BS-Computer Science	Martin III,John C
Levahn,David	Senior	BS-Computer Science	Martin III,John C
Lutz,Jared	Senior	BS-Computer Science	Martin III,John C
Lynch,Anthony Wayne	Senior	BS-Computer Science	Martin III,John C
Mehrotra,Anand	Senior	BS-Computer Science	Martin III,John C
Mueller,Benjamin Edward	Senior	BS-Computer Science	Martin III,John C
NLN,Arun	Senior	BS-Computer Science	Martin III,John C
Nordsven,Benjamin Vern	Senior	BS-Computer Science	Martin III,John C
Parson,Scott Michael	Senior	BS-Computer Science	Martin III,John C
Passi,Vibhu	Senior	BS-Computer Science	Martin III,John C
Peabody,Matthew James	Senior	BS-Computer Science	Martin III,John C
Samuelson,Matthew J	Senior	BS-Computer Science	Martin III,John C
Schelkoph,Daniel J	Senior	BS-Computer Science	Martin III,John C
Seelig,Celton B	Senior	BS-Computer Science	Martin III,John C
Sehgal,Nakul	Senior	BS-Computer Science	Martin III,John C
Sharma,Harshwardhan	Senior	BS-Computer Science	Martin III,John C
Sheoran,Arun	Senior	BS-Computer Science	Martin III,John C
Smith,Matthew	Senior	BS-Computer Science	Martin III,John C
Sonalkar,Vishal Vivek	Senior	BS-Computer Science	Martin III,John C
Stockton,Alexander Craig	Senior	BS-Computer Science	Martin III,John C
Teotia,ashish	Senior	BS-Computer Science	Martin III,John C
Thompson,Christopher Ernest	Senior	BS-Computer Science	Martin III,John C
Tomer,Avijeet	Senior	BS-Computer Science	Martin III,John C
Torgerson,David Dwight	Senior	BS-Computer Science	Martin III,John C
Triplett,Jeffrey Vernon	Senior	BS-Computer Science	Martin III,John C
Chhina,Ramneet	Senior	Major-Computer Science	Martin III,John C
Gupta,Anshul	Senior	Major-Computer Science	Martin III,John C
Mittal,Naman	Senior	Major-Computer Science	Martin III,John C
Sharma,Susbi	Senior	Major-Computer Science	Martin III,John C
Tangsrud,Andrea Renee	Sophomore	BA-Computer Science	Martin III,John C
Bauer,Nicole A	Sophomore	BS-Computer Science	Martin III,John C
Bochman,Jayme Scott	Sophomore	BS-Computer Science	Martin III,John C
Bredahl,Joseph Michael	Sophomore	BS-Computer Science	Martin III,John C
Bremseth,Lucas John	Sophomore	BS-Computer Science	Martin III,John C
Christian,Benjamin Carl	Sophomore	BS-Computer Science	Martin III,John C
Cline,Tyler J	Sophomore	BS-Computer Science	Martin III,John C
Delaney,Michael Thomas	Sophomore	BS-Computer Science	Martin III,John C
Erbentraut,Eric James	Sophomore	BS-Computer Science	Martin III,John C
Floan,Luke Maverick	Sophomore	BS-Computer Science	Martin III,John C
Knaust,Bryce Delmarr	Sophomore	BS-Computer Science	Martin III,John C
Kramer,Andrew J	Sophomore	BS-Computer Science	Martin III,John C
Lein,Nicholas Alexander	Sophomore	BS-Computer Science	Martin III,John C
Nash,Brock Jordan	Sophomore	BS-Computer Science	Martin III,John C
Nordlie,Jeffrey	Sophomore	BS-Computer Science	Martin III,John C
Oberlander,Shane Micheal	Sophomore	BS-Computer Science	Martin III,John C

Palazzo,Anthony Michael	Sophomore	BS-Computer Science	Martin III,John C
Pavicic,Abel Joseph	Sophomore	BS-Computer Science	Martin III,John C
Phelps,Bryan Michael	Sophomore	BS-Computer Science	Martin III,John C
Prince,Adam Lawrence	Sophomore	BS-Computer Science	Martin III,John C
Reznechek,Adam Donald	Sophomore	BS-Computer Science	Martin III,John C
Roemmich,Christopher R	Sophomore	BS-Computer Science	Martin III,John C
Schmidt,Matthew Paul	Sophomore	BS-Computer Science	Martin III,John C
Stenger,Craig Andrew	Sophomore	BS-Computer Science	Martin III,John C
Svenkerud,Nathan Erik	Sophomore	BS-Computer Science	Martin III,John C
Thompson,Benjamin Joseph	Sophomore	BS-Computer Science	Martin III,John C
Towle,Daniel Thomas	Sophomore	BS-Computer Science	Martin III,John C
Utke,John A	Sophomore	BS-Computer Science	Martin III,John C
Wass,Cody Allen	Sophomore	BS-Computer Science	Martin III,John C
Aakula,Srikanth Goud	Graduate	MS-Computer Science	Nygard,Kendall E
Addy,Sydney Nee Tetteh	Graduate	MS-Computer Science	Nygard,Kendall E
Basu,Samidip	Graduate	MS-Computer Science	Nygard,Kendall E
Amuge,Betty Elizabeth	Graduate	MS-Computer Science	Nygard,Kendall E
Bouret,Megan Sue	Graduate	MS-Computer Science	Nygard,Kendall E
Chakraborty,Ushashi	Graduate	MS-Computer Science	Nygard,Kendall E
Chintamaneni,Venkata Santosh	Graduate	MS-Computer Science	Nygard,Kendall E
Chinthakayala,Krishna	Graduate	MS-Computer Science	Nygard,Kendall E
Dayala,Divya	Graduate	MS-Computer Science	Nygard,Kendall E
de Soysa,Shanaka Chathuranga	Graduate	MS-Computer Science	Nygard,Kendall E
Dumpala,Chaitanya	Graduate	MS-Computer Science	Nygard,Kendall E
Fazal,Kareemullah Khan	Graduate	MS-Computer Science	Nygard,Kendall E
Ganti,Annaji Sharma	Graduate	MS-Computer Science	Nygard,Kendall E
Garg,Bandana	Graduate	MS-Computer Science	Nygard,Kendall E
Garimedi,Rajani	Graduate	MS-Computer Science	Nygard,Kendall E
Ginjupalli,Siva Krishna	Graduate	MS-Computer Science	Nygard,Kendall E
Guduru,Srinivas Reddy	Graduate	MS-Computer Science	Nygard,Kendall E
Gupta,Divya	Graduate	MS-Computer Science	Nygard,Kendall E
Helsene,Adam P	Graduate	MS-Computer Science	Nygard,Kendall E
Hensley,Joel Michael	Graduate	MS-Computer Science	Nygard,Kendall E
Huff,Nathan Richard	Graduate	MS-Computer Science	Nygard,Kendall E
Huq,Shamima	Graduate	MS-Computer Science	Nygard, Kendall E
K.C.,Puja	Graduate	MS-Computer Science	Nygard,Kendall E
Kapoor,Chetan Sumant	Graduate	MS-Computer Science	Nygard,Kendall E
Khanchandani,Kavita	Graduate	MS-Computer Science	Nygard,Kendall E
Koganti,Nikhil	Graduate	MS-Computer Science	Nygard,Kendall E
Kondamarri,Samuel Sudhakar	Graduate	MS-Computer Science	Nygard,Kendall E
Kondoor,Dinesh	Graduate	MS-Computer Science	Nygard,Kendall E
Kroshus,John T	Graduate	MS-Computer Science	Nygard,Kendall E
Landin,Michael Kenneth	Graduate	MS-Computer Science	Nygard,Kendall E
Loree,Paul Edward	Graduate	MS-Computer Science	Nygard,Kendall E
Mudgal,Akshay	Graduate	MS-Computer Science	Nygard,Kendall E
Mukhami,Sudesh	Graduate	MS-Computer Science	Nygard,Kendall E
Mukka,Hari Krishna	Graduate	MS-Computer Science	Nygard,Kendall E
Narayanan,Vasanth	Graduate	MS-Computer Science	Nygard,Kendall E
Nayakam,Ghanashyam Nath	Graduate	MS-Computer Science	Nygard,Kendall E
Pachva,Srikar	Graduate	MS-Computer Science	Nygard,Kendall E
Pandey,Shivendushital Pyarelal	Graduate	MS-Computer Science	Nygard,Kendall E
Param,Sowjanya	Graduate	MS-Computer Science	Nygard,Kendall E

Paturu,Suresh Nityananda	Graduate	MS-Computer Science	Nygard,Kendall E
Podagatlapalli,Chaitanya	Graduate	MS-Computer Science	Nygard,Kendall E
Poreddy,Sandeep Reddy	Graduate	MS-Computer Science	Nygard,Kendall E
Pradeep Amaran,NFN	Graduate	MS-Computer Science	Nygard,Kendall E
Pullagurala,Praveen	Graduate	MS-Computer Science	Nygard,Kendall E
Raavi,Sandeep	Graduate	MS-Computer Science	Nygard,Kendall E
Radermacher,Alex David	Graduate	MS-Computer Science	Nygard,Kendall E
Raidu,Venkata Narasimha	Graduate	MS-Computer Science	Nygard,Kendall E
Rajaraman,Thilak Kumar	Graduate	MS-Computer Science	Nygard,Kendall E
Ramamurthy,Durga	Graduate	MS-Computer Science	Nygard, Kendall E
Rehman,Sana	Graduate	MS-Computer Science	Nygard,Kendall E
Sathiaseelan,Anu Evelyn	Graduate	MS-Computer Science	Nygard,Kendall E
Saxena,Kaustubh	Graduate	MS-Computer Science	Nygard,Kendall E
Sharma,Ranjana	Graduate	MS-Computer Science	Nygard,Kendall E
Sikharam,Sandeep	Graduate	MS-Computer Science	Nygard,Kendall E
Sundaram,Anita	Graduate	MS-Computer Science	Nygard,Kendall E
Suravarapu,Vijay Anand	Graduate	MS-Computer Science	Nygard,Kendall E
Vanteru,Siva Venkata	Graduate	MS-Computer Science	Nygard,Kendall E
Voorhees,William	Graduate	MS-Computer Science	Nygard,Kendall E
Yadav,Asha	Graduate	MS-Computer Science	Nygard,Kendall E
Jahan,Farzana	Graduate	MS-Software Engineering	Nygard,Kendall E
Pradhan,Basudha	Graduate	MS-Software Engineering	Nygard,Kendall E
Al-Nimer,Loai Medhat	Graduate	PHD-Computer Science	Nygard,Kendall E
Bengfort,Benjamin John	Graduate	PHD-Computer Science	Nygard,Kendall E
Bou ghosn,Steve Martin	Graduate	PHD-Computer Science	Nygard,Kendall E
Chi,Liang	Graduate	PHD-Computer Science	Nygard,Kendall E
El Ariss,Omar Aref	Graduate	PHD-Computer Science	Nygard,Kendall E
Gagneja,Kanwalinder jit Kaur	Graduate	PHD-Computer Science	Nygard,Kendall E
Kandah,Farah Issa	Graduate	PHD-Computer Science	Nygard,Kendall E
Marback,Aaron J	Graduate	PHD-Computer Science	Nygard,Kendall E
Zhao,Jingjun	Graduate	PHD-Computer Science	Nygard,Kendall E
Lua,Chin	Graduate	PHD-Software Engineering	Nygard,Kendall E
Lundell,Martin	Graduate	PHD-Software Engineering	Nygard,Kendall E
Pauli,Jeremy	Graduate	PHD-Software Engineering	Nygard,Kendall E
Bechtold,Jacob M	Freshman	BS-Computer Science	Perrizo,William K
Swanson,Andrew Drake	Freshman	BS-Computer Science	Perrizo,William K
Anderson,Lawrence R	Junior	BS-Computer Science	Perrizo,William K
Fleming,Eric David	Junior	BS-Computer Science	Perrizo,William K
Hatfield,Andrew Brian	Junior	BS-Computer Science	Perrizo,William K
Laney,Nicholas Joseph	Junior	BS-Computer Science	Perrizo,William K
Larson,Nicholas C	Junior	BS-Computer Science	Perrizo,William K
Zumwalde,Sarah Thavy	Junior	BS-Computer Science	Perrizo,William K
Katiyar,Arti	Senior	BS-Computer Science	Perrizo,William K
Haich,Abram Paul	Sophomore	BS-Computer Science	Perrizo,William K
Knight,Zachary Bryan	Sophomore	BS-Computer Science	Perrizo,William K
Lee,Huheun	Sophomore	BS-Computer Science	Perrizo,William K
Marsh,Adam Tyler	Sophomore	BS-Computer Science	Perrizo,William K
Chatterjee,Arijit	Graduate	MS-Computer Science	Perrizo,William K
Jockheck,William H	Graduate	PHD-Computer Science	Perrizo,William K
Oxton,Tyler John	Freshman	BS-Computer Science	Slator,Brian
Lemke,Todd Alan	Senior	BS-Computer Science	Slator,Brian

Shaske,Jacob K	Senior	BS-Computer Science	Slator,Brian
Wangota,Paul	Senior	BS-Computer Science	Slator,Brian
Frueh,Ryan Matthew	Sophomore	BS-Computer Science	Slator,Brian
Devina,Laiphangbam	Graduate	MS-Computer Science	Slator,Brian
Dischinger,Benjamin James	Graduate	MS-Computer Science	Slator,Brian
Frovarp,Richard Ernest	Graduate	MS-Computer Science	Slator,Brian
Hokanson,Guy Eric	Graduate	MS-Computer Science	Slator,Brian
Borchert,Otto Jerome	Graduate	PHD-Computer Science	Slator,Brian
Aguilar,Luis Juan	Freshman	BS-Computer Science	Ubhaya,Vasant A
Hanson,Kyle Christian Andrew	Freshman	BS-Computer Science	Ubhaya,Vasant A
Loegering,Davin Godfree	Freshman	BS-Computer Science	Ubhaya,Vasant A
Schneider II,Robert John	Freshman	BS-Computer Science	Ubhaya,Vasant A
Shellito,Christopher M	Freshman	BS-Computer Science	Ubhaya,Vasant A
Stoppleworth,Taylor Ryan	Freshman	BS-Computer Science	Ubhaya,Vasant A
Zhang,Shutao	Freshman	BS-Computer Science	Ubhaya,Vasant A
Crump,James	Junior	BS-Computer Science	Ubhaya,Vasant A
Ibwe,Nico Salum	Junior	BS-Computer Science	Ubhaya,Vasant A
Welle,Michael Paul	Junior	BS-Computer Science	Ubhaya,Vasant A
Wollan,Alexander L	Junior	BS-Computer Science	Ubhaya,Vasant A
Johnson,Christopher Merlin	Senior	BS-Computer Science	Ubhaya,Vasant A
Mehinagic,Damir	Senior	BS-Computer Science	Ubhaya,Vasant A
Sharma,Aman	Senior	BS-Computer Science	Ubhaya,Vasant A
Anderson,Justin S	Sophomore	BS-Computer Science	Ubhaya,Vasant A
Bapanpally,Pavan Kumar	Graduate	MS-Computer Science	Ubhaya,Vasant A
Chintapalli,Veera Venkata	Graduate	MS-Computer Science	Ubhaya,Vasant A
Dass,Pranav	Graduate	MS-Computer Science	Ubhaya,Vasant A
Burman,Eric Kenneth	Freshman	BS-Computer Science	Xu,Dianxiang
Hedden,David Scott	Freshman	BS-Computer Science	Xu,Dianxiang
Siejko,Haywood Thomas	Freshman	BS-Computer Science	Xu,Dianxiang
Teegarden,Joshua Paul	Freshman	BS-Computer Science	Xu,Dianxiang
Bunkowski,Joseph Cody	Junior	BS-Computer Science	Xu,Dianxiang
Gallenbeck,Gerald C	Junior	BS-Computer Science	Xu,Dianxiang
Sprague,Matthew Steven	Junior	BS-Computer Science	Xu,Dianxiang
Wadman,Thomas Alexander	Junior	BS-Computer Science	Xu,Dianxiang
Maas,Timothy R	Senior	BS-Computer Science	Xu,Dianxiang
Yadav,Anshul	Senior	BS-Computer Science	Xu,Dianxiang
Mertes,Matthew Gerard	Sophomore	BS-Computer Science	Xu,Dianxiang
Metzler,Zachary Donald	Sophomore	BS-Computer Science	Xu,Dianxiang
Norton,Matthew Edward	Sophomore	BS-Computer Science	Xu,Dianxiang
Stockwell,Perry	Sophomore	BS-Computer Science	Xu,Dianxiang
Chakravarthi,Satheesh	Graduate	MS-Computer Science	Xu,Dianxiang
Guduru,Vasumathi	Graduate	MS-Computer Science	Xu,Dianxiang
Gurram,Kiran	Graduate	MS-Computer Science	Xu,Dianxiang
Gurram,Samyuktha	Graduate	MS-Computer Science	Xu,Dianxiang
Sambaraju,Sharath Chandra	Graduate	MS-Computer Science	Xu,Dianxiang
Vellaswamy Chelaiah Ganesh	Graduate	MS-Computer Science	Xu, Dianxiang
Bhogadi,Manu Kishore	Graduate	MS-Software Engineering	Xu,Dianxiang
Kazeck,Jerilyn Dawn	Graduate	MS-Software Engineering	Xu,Dianxiang
Kwete,Yannick Mingashanga	Graduate	MS-Software Engineering	Xu,Dianxiang
Peiris,Ishan	Freshman	BS-Computer Science	undecided

Watt,Steven Matthew	Freshman	BS-Computer Science	undecided
Surana,Prince	Senior	BS-Computer Science	undecided
Thukral,Kushaagr	Senior	BS-Computer Science	undecided
Wadhwa,Ankush	Senior	BS-Computer Science	undecided
Yadav,Rajkumar	Senior	BS-Computer Science	undecided
Addy,Noah	Graduate	MS-Computer Science	undecided
Annapureddy,Anupama Reddy	Graduate	MS-Computer Science	undecided
Carlstedt,Daniel John	Graduate	MS-Computer Science	undecided
Emmadi,Praveen Kumar	Graduate	MS-Computer Science	undecided
Jensen,Per-Olof Fujimoto	Graduate	MS-Computer Science	undecided
Joseph,Priya	Graduate	MS-Computer Science	undecided
Kadam,Ramchandra Balkrishna	Graduate	MS-Computer Science	undecided
Li,Yi	Graduate	MS-Computer Science	undecided
Maddi,Sunil Reddy	Graduate	MS-Computer Science	undecided
Mandala,Narendar Reddy	Graduate	MS-Computer Science	undecided
Manori,Anshuman	Graduate	MS-Computer Science	undecided
Mattaparthy,Harika	Graduate	MS-Computer Science	undecided
Moses,Joseph Manoharan	Graduate	MS-Computer Science	undecided
Osmani,Md Golam	Graduate	MS-Computer Science	undecided
Padmanabhan,Ganesh	Graduate	MS-Computer Science	undecided
Phadke,Swapna Gautam	Graduate	MS-Computer Science	undecided
Schlecht,Ryun W	Graduate	MS-Computer Science	undecided
Tirupathi,Ambika Sashidhar	Graduate	MS-Computer Science	undecided
Tirupathi,Phani Ganga Bhavani	Graduate	MS-Computer Science	undecided
Tiwari,Shweta	Graduate	MS-Computer Science	undecided
Vellaswamy Chelaiah	Graduate	MS-Computer Science	undecided
Yamparala,Sri Harsha	Graduate	MS-Computer Science	undecided
Aceituna,Daniel	Graduate	MS-Software Engineering	undecided
Arora,Barjesh	Graduate	MS-Software Engineering	undecided
Bindra,Dhruv	Graduate	MS-Software Engineering	undecided
Christeson,Eric John	Graduate	MS-Software Engineering	undecided
Fonseka,Nilukshi	Graduate	MS-Software Engineering	undecided
Gunderson,Karl Nils	Graduate	MS-Software Engineering	undecided
Kallam,Lakshmi Mrudula	Graduate	MS-Software Engineering	undecided
Pinagapani,Sathish	Graduate	MS-Software Engineering	undecided
Nelson,Jeremy Ruben	Senior	Non-Degree	undecided
Lin,Fengjing	Graduate	PHD-Computer Science	undecided
Shanmugasundaram,Vijayakumar	Graduate	PHD-Computer Science	undecided
Zhang,Ming	Graduate	PHD-Computer Science	undecided
Falah,Bouchaib	Graduate	PHD-Software Engineering	undecided

3 Curriculum and course development and changes:

The Master of Software Engineering distance education degree was fully approved in spring, 2009. Because less than half the requested startup funds and none of the continuing funds were provided for this program, startup will be slow with limited students expected during 2009-10.

The Department has several proposed changes to its undergraduate degree requirements that will be considered during the next academic year. These include: (1) modification of B.S. degree requirements to replace CSci 373 with either CSci 413 or a new, 200-level introduction to Software Engineering; (2) a one semester projects course required of all

undergraduates during the sophomore year; (3) updating the elective courses available for the B.S. degree; (4) introduction of additional oral presentations by students throughout the programs; and (5) enhanced use of modern software development tools throughout the programs.

At the graduate level, the Department is considering the replacement of CSci 708 with an algorithms course as part of the M.S. core. Such a change would make the M.S. program more consistent with leading M.S. programs at other institutions.

The Bachelor of Applied Computing proposal has been placed in abeyance for the present. We expect to reconsider this program in the next couple of years.

4. Accreditation and reviews:

The B.S. in Computer Science has been accredited since 1986, the first year that accreditation was available. The ABET interim visit and review in the fall of 2007 was very successful. The B.S. continues to be accredited through June, 2010. Our reviewer has requested that we consider the M.S. in Computer Science and the M.S. in Software Engineering for possible submission for ABET accreditation. The Department will consider these possibilities in the future.

The department is also considering a strategy of switching the accredidation schedule to align with the NDSU College of Engineering. This might serve to reduce the onerous paperwork required by ABET and possibly offer economies of scale leading to shared and/or reduced costs.

Our normal reaccreditation visit from an ABET team is scheduled for October, 2009. During 2008-09 we spent substantial time preparing and submitting the required Self Study document for this visit.

5. Activities in student recruitment/retention, enrollment management, and other student activities:

The Department continued the two initiatives begun in 2005-06: introduction of a student honor society; and early selection of graduate teaching assistants as a recruiting tool. We implemented a sorely needed new web site also.

At the undergraduate level the Department recognizes there is a retention problem. We have identified the problems as four-fold:

(1) Students are not always sufficiently motivated to master the knowledge and skills they must learn;
(2) By the end of their sophomore year, successful students have acquired skills and experiences which are sought by industry. Each year, several students leave to take well-paying industrial jobs;
(3) Our courses are not sufficiently coordinated with each other to provide students with needed repeated reinforcement of skills and practices introduced in earlier courses;
(4) The analytical material we introduce in several courses is not well-accepted or mastered by many of our students.

We continue to attempt solutions to these problems. During 2008-09, we began to work on (3). We expect to complete this work during the next academic year.

Senior professors teaching freshman and transfer students:

Nearly all of the courses for CS majors, including those in the lower division, are taught by tenured or tenure-track professors, in accordance with ABET accreditation requirements. Entry level courses are regularly taught by senior professors.

Summer school activities:
The Department typically offers at least two graduate-level courses each summer, including at least one of the four graduate core courses. At least two courses for undergraduate majors are also offered. Service courses, such as CSci 114 and 116 are offered also. The Department offers several courses each summer under the self-support program. The self-support program is very beneficial for the department. Unfortunately, the minimum requirement for about twenty students in self support courses means that some of the courses we would like to offer are not actually offered each year. Several distance education courses are presented as well.

Career Center student employment

CS Bachelor students employment rate is 93% at a salary range of Low-Average-High being 31-54-75K. We believe these figures significantly underestimate the real employment rate since many graduating students do not go through the Career Center to procure employment. Our own discussions with graduating students indicate an employment rate near 100% for students who immediately seek employment.

6. *Distance Education and use of Technology in Courses:*

The Department offers distance versions of CSci 114, and 116 every semester and in the summer. Other service courses are offered via distance less frequently. Starting fall, 2006, we offered the Graduate Certificate in Software Engineering including four courses and a seminar through distance to students in India and elsewhere. We plan to expand our graduate distance education offerings to the M.S. in Software Engineering beginning fall, 2009. Introduction of new distance education courses is limited by the many time commitments already imposed upon faculty. Starting fall, 2009, we plan to advertise the Certificate and MSE programs regionally as well. Our efforts will be limited by our tight budget, however.

Every Computer Science course uses technology extensively. Courses use the Internet for delivery and many courses require extensive computer work. We are heavy users of Blackboard.

7. *Assessment*

The Department again reorganized our assessment procedures during 2008-09. This time, our reorganization was driven by a significant change in ABET accreditation requirements. For the first time, the ABET Computing Sciences Commission is requiring specific outcomes for the B.S. program. We replaced our existing outcomes with those required by ABET and reformulated our accreditation procedures to meet the new ABET requirements. Our University Assessment Report for 2008-09 is due January, 2010.

B. RESEARCH/CREAVTIVE ACTIVITY

1. *Research and creative activities:*

While almost all tenure track faculty regularly publish in high-quality media, external grants continue to be concentrated among too few faculty. The Department started a research enhancement program for junior faculty during 2005-06. This program continued in 2008-09. A program to encourage visits by more senior faculty in research areas of interest to our junior faculty was begun in 2006-07. This program pays expenses and a small honorarium either for senior faculty to travel to NDSU to work intensively with our faculty for two weeks or for our faculty to travel to work intensively with senior faculty elsewhere for one or two weeks. Available funds have limited the use of this program to one or two instances per semester.

Our long range goal for the next three to five years is to improve the visibility and prestige of the Department's research programs nationally. We believe the rather low prestige of the Department outside our region (where we are widely imitated as a research and teaching leader) hurts our grant acquisition capability from federal funding agencies and from large corporations. However, the NSF did cite our program as being in the top-100 Computer Science programs during 2006-07 aand subsequent years.

The Department has active research programs in data mining, software engineering, networks, virtual environments, computer systems, software security, and bioinformatics. These programs should continue to achieve more visibility within the profession.

2. *Grants/Contracts/Research:*

COMPUTER SCIENCE DEPARTMENT GRANTS AND CONTRACTS, PART 1
PROJECTS INITIATED PRIOR TO JULY 1, 2008, AND CONTINUING INTO THE 2008-2009 ACADEMIC YEAR

YEAR	GRANT #	PRINCIPAL INVESTIGATOR	TITLE	FUNDING SOURCE	AMOUNT
7/05 to 6/09	10693	Denton	Data Mining in the Presence of Quantitatively Diverse Information	NSF	272,557
5/1/07 to 4/30/09	12263	Du	Dept of Army Heterogeneous Sensor Network Testbed Research	Department of Army	58,150
09-01-07 to 08-31-10	12474	Du	CRI – A Heterogeneous Sensor Network Laboratory for Igegrated Research and Education	NSF	88,370
09-01-07 to 07-31-08	12649	Du	NeTS NOSS – Collaborative Research	NSF	122,376
10-15-07 to 8-30-08	37100	Du	Monitoring Control of Wheat Diseases using Wireless Sensor Networks	NDAES/ CSM	10,,000
1/08 to 7/31/08	18139	Nygard	Military Logistics	Upper Great Plains	15,000

YEAR	GRANT #	PRINCIPAL INVESTIGATOR	TITLE	FUNDING SOURCE	AMOUNT
8/15/06 to 8/15/09	11284	Slator	Pilot Project: Research on Serious Games fo Geoscience Education	NSF	73,959
4-15-08 to 9-15-08	14484	Xu	World of Learning	NIH WoWiWe Instruction Co	24,066
05-02-07 to 06-30-08	13760	Xu	NASA EPSCoR GRA Award	NASA/UND	13,053
TOTAL					**677,531**

COMPUTER SCIENCE DEPARTMENT GRANTS AND CONTRACTS
PROJECTS INITIATED DURING THE JULY 1, 2008 TO JUNE 30, 2009 TIME PERIOD

YEAR	GRANT #	PRINCIPAL INVESTIGATOR	TITLE	FUNDING SOURCE	AMOUNT
3-1-09 to 2-28-10	15445	Denton	Construction of High Resolution Physical Maps for Large Plant Genomes	NSF	35,521
6-1-09 to 8-31-10	15719	Du	Research Experience for Undergraduates	NSF	16,000
9-1-08 to 8-31-09	15186	Du	Espcor Nasa Match – Seed Award	State Epscor	5,478
11-14-08 to 6-30-09		Du	Travel for IEEE Global conference	NASA Epscor	1,500
7-15-08 to 7-14-11	13097	Du/Nygard	Designing Robust & Secure Heterogeneous Sensor Networks	U.S. Army	358,748
8-16-08 to 6-30-09	14921	Gu	New Faculty Award	Epscor	20,000
9-1-08 to 8-31-09	15040	Kong/Zhang	Espcor Nasa Match – Seed Award	State Epscor	5,064
9-1-08 to 8-31-09	15185	Kong/Zhang	Espcor Nasa Match – Seed Award	State Epscor	6,548
8-16-08 to 6-30-09	14663	Nygard	Graduate Research Assistantship for Paul Loree	Epscor	15,276
8-2-08 to 8-12-08	14560	Nygard	Instructional Workshop for Chinese Faulty members	Zhejiang Economic and Trade Polytechnic	9,000
1/09 to 7/31/09	18139	Nygard	Military Logistics	Upper Great Plains	15,000
12-2008	18335	Student Award	Student winnings	Digikey	1,800
Totals					**489.935**

3. ***Faculty Articles/Books/Publications/Presentation and Course Instruction:***

Anne Denton

Name, current academic rank, and tenure status:

Name: Anne Denton
Rank: Assistant Professor (promotion to Associate approved, effective 16 Aug 2009)
Tenure Status: Untenured (tenure approved, effective 16 Aug 2009)

Date of original appointment to this faculty, followed by dates and ranks of advancement:

Title: Assistant Professor
Dates Held: 16 Aug 2003 – 16 Aug 2009

Degrees with fields, institutions, and dates

Degree	Diplom
Field	Physics
Institution	University of Stuttgart
Date	1993

Degree:	Ph.D.
Field	Physics
Institution	Johannes Gutenberg University, Mainz
Date	1996

Degree:	M.S.
Field	Computer Science
Institution	North Dakota State University
Date	2003

Conferences, workshops, and professional development programs in which you have participated in the last 5 years to improve teaching and professional competence in the program area:

Participated in Peer Review of Teaching Program, NDSU, 2004, 2006, 2008
Attended 12 Pedagogical luncheons, lunch presentations / workshops with focus on teaching
Attended 3 IEEE, 4 ACM, 3 SIAM, and 4 Bioinformatics research conferences

Other related computing experience including teaching, industrial, governmental, etc. (where, when, description and scope of duties):

Date	1999 – 2000
Where	Acadia University
Duties	Instructor for one course on general use of computers and one database course

For the academic year in which the Self Study was written list your assigned duties other than for teaching, (community membership, advising, etc.) with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time or part time faculty, please indicate here which courses.

Service to the university	5 hours
Research	20 hours including working with graduate students
Advising	1-2 hours

In the summer 2008 I supervised a high school student in a research project, for 8 weeks, as part of the Governor School program.

For the four years preceding the Self Study, list all department, college, and/or university committees of which you are/were a member including year(s) served:

University / College committees

- Steering Committee for interdisciplinary Genomics Program 2005 - (ongoing)
- Bioinformatics Option subcommittee of steering committee for interdisciplinary Genomics Ph.D. program 2005/06
- Tech Fee Advisory Committee 2006 - (ongoing)
- University Library Committee 2006 – 2009
- Web-design Subcommittee of the University Senate Library Committee 2006/07
- Awards Committee 2006 - (ongoing)
- WISMET/FORWARD Interview Team for Upper Administration Candidate Searches 2007 - (ongoing)
- Dean's Advisory Committee 2006/07
- Search Committee for the Dean of the College of Science and Mathematics 2005/06

Departmental committees

- Faculty Search Committee 2007/08 and 2008/2009
- Committee for the evaluation of possible replacements for the SOD cluster (computer cluster using UNIX operating system) 2008
- CS Department Proposal Review Committee 2008
- Committee for Computer Science Department Bioinformatics degree offerings 2005
- Committee to design a placement exam for students who consider enrolling in the course CSci160, "Computer Science 1" 2004

Principal publications during the last five years. Give in standard bibliographic format.

1. Anne Denton and William Perrizo, "A kernel-based semi-naive Bayesian classifier using P-trees," In Proc. of the 2004 SIAM Int. Conf. on Data Mining (SDM'04), Lake Buena Vista, FL, pp. 427-436, April 22-24, 2004.
2. Anne Denton, "Density-based clustering of time series subsequences," 3rd Workshop on Mining Temporal and Sequential Data (TDM 04) in conj. with the 10th ACM SIGKDD Int'l Conf. on Knowledge Discovery and Data Mining, Seattle, WA, Aug. 22, 2004.
3. Christopher Besemann and Anne Denton, Ajay Yekkirala, Ron Hutchison, and Marc Anderson, "Differential association rule mining for the study of protein-protein interaction networks," In Proc. of the 4th Workshop on Data Mining in Bioinformatics (BIOKDD 04) in conj. with the 10th ACM SIGKDD Int. Conf. on Knowledge Discovery and Data Mining, Seattle, WA, pp. 74-82, Aug. 22, 2004.
4. Sisir Ray, Christopher Besemann, Anne Denton, and Kendall E. Nygard, "Learning theory and styles in online computer science courses," *Transactions on Adv. in Engineering Education* 1(1), 83-87, 2005.
5. Christopher Besemann and Anne Denton, "Integration of profile hidden Markov model output into association rule mining," In Proc. of the 11th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, Chicago, IL, pp. 538-543, Aug. 21-24, 2005.
6. Anne Denton, "Kernel-density-based clustering of time series subsequences using a continuous random-walk noise model," In Proc. of the 5th IEEE Int. Conf. on Data Mining, Houston, TX, pp. 122-129, Nov. 27-30, 2005.
7. Imad Rahal, Dongmei Ren, Weihua Wu, Anne Denton, Christopher Besemann, and William Perrizo, "Exploiting edge semantics in citation graphs using efficient, vertical ARM," *Knowledge And Information Systems (KAIS) Journal*, Vol.10, No.1, pp. 57-91, Springer-Verlag, London, 2006.
8. Birgit M. Prüβ, Christopher Besemann, Anne Denton, and Alan J. Wolfe, "A complex transcription network controls the early stages of biofilm formation," *J. Bacteriol.* 188:3731-3739, 2006.
9. Christopher Besemann, Anne Denton, Nathan J. Carr and Birgit M. Prüß, "BISON: bio-interface for the semi-global analysis of network patterns," *Source Code for Biology and Medicine*, 1:8, pp. 1-13, 2006.
10. Jianfei Wu and Anne Denton, "Mining Vector-Item Patterns for Annotating Protein Domains," Mining Multiple Information Sources Workshop in conjunction with the ACM KDD '07 Conference on Knowledge Discovery and Data Mining, San Jose, CA, pp. 31-39, Aug. 12, 2007.

11. Dietmar Dorr and Anne Denton, “Generalized Sequence Signatures through Symbolic Clustering,” Proceedings of the the 6h Int. Conf. on Machine Learning and Applications, Workshop on Machine Learning in Biomedicine and Bioinformatics, Cincinnati, OH, pp. 567-572, Dec. 13-15, 2007.
12. Anne Denton and Angshu Kar, "Finding differentially expressed genes through noise elimination," Workshop on Data Mining for Biomedical Informatics in conjunction with the 7th SIAM Int'l Conf. on Data Mining, Minneapolis, MN, Apr. 28, 2007.
13. Christopher Besemann and Anne Denton, "Mining edge-disjoint patterns in graph-relational data," Workshop on Data Mining for Biomedical Informatics in conj. with the 7th SIAM Int'l Conf. on Data Mining, Minneapolis, MN, Apr. 28, 2007.
14. William Perrizo, Qin Ding, Maleq Kahn, Qiang Ding, and Anne Denton, “An efficient weighted nearest neighbor classifier using vertical data Representation,” *Int. Journ. of Business Intelligence and Data Mining* 2(1), 64-78, 2007.
15. Kenneth Lepper, Steven L. Reneau, Jennifer Thorstad, Anne Denton, "OSL dating of a lacustrine to fluvial transitional sediment sequence in Valle Toledo, Valles caldera, New Mexico," *Mexico Geology*, 29(4), 112-116, 2007.
16. Dietmar Dorr and Anne Denton, "A pattern mining approach toward discovering generalized sequence signatures," Proceedings of the SIAM Int. Conf. on Data Mining (SDM08), Atlanta, GA, pp. 353-362, April 24-26, 2008.
17. Anne M. Denton, Christopher A. Besemann and Dietmar H. Dorr, "Pattern-based time-series subsequence clustering using radial distribution functions," *Knowledge and Information Systems (KAIS) Journal*, 18, pp. 1-27, 2009.
18. Anne M. Denton, Jianfei Wu, Megan K. Townsend, Preeti Sule, and Birgit M. Prüß,“ Relating gene expression data on two-component systems to functional annotations in Escherichia coli,” *BMC Bioinformatics*, 9:294, pp. 1-19, 2008.
19. Dietmar H. Dorr and Anne M. Denton, "Generalised sequence signatures through symbolic clustering," *International Journal of Data Mining and Bioinformatics*, (in press).
20. Dietmar H. Dorr and Anne M. Denton, "Clustering sequences by overlap," *International Journal of Data Mining and Bioinformatics*, (in press).
21. Anne M. Denton, “Subspace Sums for Extracting Non-Random Data from Massive Noise,” *Knowledge and Information Systems (KAIS) Journal*, (in press). DOI: 10.1007/s10115-008-0176-9.
22. Dietmar H. Dorr and Anne M. Denton, “Establishing relationships among patterns in stock market data,” *Data & Knowledge Engineering* 68, pp. 318-337, 2009.
23. Anne M. Denton and Jianfei Wu, “Data Mining of Vector-Item Patterns Using Neighborhood Histograms,” *Knowledge and Information Systems (KAIS) Journal*, (in press).

Other scholarly activity during the last 5 years: grants, sabbaticals, software development, etc:

Funded research projects

TRPGR- Transformative research on the construction of high-resolution physical maps for large plant genomes
PI: Shahryar Kianian, Co-PIs: Anne Denton, Yong Qiang Gu, Ming-Cheng Gu, and Oscare Riera-Lizarazu
Funding Source: NSF-DBI
Amount: $ 952,211
Award Period: 03/01/2009 – 03/01/2010

Pattern discovery in high-throughput biofilm data
PIs: Anne Denton and Birgit Prüß
Funding Source: NDSU CSM/AES Small Grant Program
Amount: $6,200
Award period: 10/01/2008 – 9/15/2009

Semi-Global Computational Analysis of Gene Regulation
PIs: Anne Denton and Birgit Prüß
Funding Source: NDSU CSM/AES Small Grant Program
Amount: $9,928
Award Period: 01/01/2006 – 09/31/2006

Analytical Methods for Optically Stimulated Luminescence (OSL) Dating Techniques

PI: Kenneth Lepper, Co-PI: Anne Denton
Funding Source: NDSU-ECS Summer Support 2005 for Research Collaboration and Proposal Preparation
Amount: 0.5 month summer salary for each, PI and Co-PI
Award Period: 05/15/2005 – 06/01/2005

Data Mining in the Presence of Qualitatively and Quantitatively Diverse Information
PI: Anne Denton
Funding Source: NSF-IIS
Amount: $272,557
Award Period: 07/1/2005 – 07/01/2009

Tools and Applications of Gene-by-Gene Sequencing in Common Bean
PI: Phil McClean, Co-PI: Anne Denton
Funding source: USDA/NRI – Plant Genome, Bioinformatics, and Genetic Resources,
Amount: $ 200,000
Award period: 04/15/2005 – 04/14/2007

Enhancement of Online Learning in Introductory Physics and Computer Science
Funding Source: NDSU Instructional Development Program
PI: Alan Denton, Co-PI: Anne Denton
Funding Source: NDSU
Amount: $2370

Predicting Properties of Objects with Network Connectivity
PI: Anne Denton
Funding source: NDSU Research Development Support Program
Amount: $10,000
Award period: 02/01/2004 - 02/01/2005

Pending proposals

Environmental control of Escherichia coli biofilm formation
PI: Birgit Pruess, Co-PI: Anne Denton
Funding Source: NSF-MCB Genes and Genome Systems
Amount: $483,310
Award Period: 01/01/10 – 12/31/12

III:Small: Data mining of diverse data using vector attributes
PI: Anne Denton, Co-PIs: Birgit Pruess and Dean Webster
Funding Source: NSF-IIS
Amount: $496,685
Award Period: 07/01/09 – 06/30/2012

CDI-Type I: Significant Patterns in Diverse Microbiological Data
PI: Anne Denton, Co-PI: Birgit Pruess
Funding Source: NSF-CDI
Amount: $ 384,114
Award Period: 09/01/2009 – 08/31/2012
(preproposal accepted and full proposal invited)

Submitted declined proposals

32 grant proposals to federal agencies, and of those:
- 4 as PI (3 NSF, including 1 CAREER, and 1 DOE)
- 20 as Co-PI
- 8 as Senior Personnel

4 other grant proposals

Courses taught this and last academic year term-by-term. This year is the academic year in which this Self Study report is prepared; the last year was the year prior to this. If you were on sabbatical leave, please enter the information for the year prior to sabbatical. Please list each section of the same course separately.

Term/year	Fall 2007
Course #	CSci 366
Course Title	Files for Database Systems
Semester Hrs	3
Class size	51

Term/year	Fall 2007
Course #	CSci/Math/Stat 732
Course Title	Introduction to Bioinformatics
Semester Hrs	3
Class size	11

Term/year	Fall 2007
Course #	CSci 790
Course Title	Seminar Data Mining in Science
Semester Hrs	1
Class size	13

Term/year	Spring 2008
Course #	CSci 372
Course Title	Comparative Programming Languages
Semester Hrs	3
Class size	40

Term/year	Fall 2008
Course #	CSci 366
Course Title	Files for Database Systems
Semester Hrs	3
Class size	45

Term/year	Fall 2008
Course #	CSci 790
Course Title	Seminar Data Mining in Science
Semester Hrs	1
Class size	13

Term/year	Spring 2009
Course #	CSci 372
Course Title	Comparative Programming Languages
Semester Hrs	3
Class size	40

Term/year	Spring 2009
Course #	CSci/Math/Stat 732
Course Title	Introduction to Bioinformatics
Semester Hrs	3
Class size	20

Research

My research focus is on data mining of diverse data, in particular scientific data. I work closely together with graduate students on developing algorithms and testing them. Where possible, I collaborate with NDSU researchers in microbiology, plant sciences, and coatings on applying the newly developed algorithms on their real-world data. I present research at conference and also try to enable Ph.D. students

to attend about 1 conference per year. During the summer break I also try to involve undergraduate and/or high school students in my research.

Hyunsook Do

Name, current academic rank, and tenure status:

Name: Hyunsook Do
Rank : Assistant Professor
Tenure Status: Tenure track (the second year)

Date of original appointment to this faculty, followed by dates and ranks of advancement:

Title: Assistant Professor
Dates Held: 8/16/2007

Degrees with fields, institutions, and dates

Degree: Ph.D.
Field: Computer Science
Institution: University of Nebraska-Lincoln
Date: 5/5/2007

Degree: MS
Field: Computer Science
Institution: Tokyo Institute of Technology
Date: 6/30/1994

Degree: BS
Field: Computer Science
Institution: Sungshin Women's University
Date: February, 1989

Conferences, workshops, and professional development programs in which you have participated in the last 5 years to improve teaching and professional competence in the program area: Computer Science (software engineering, software testing, empirical studies)

- International Conference on Software Engineering (ICSE) 2005, 2006, 2007
- ACM SIGSOFT Symposium on Foundations of Software Engineering (FSE) 2006, 2008
- International Symposium on Software Reliability Engineering (ISSRE) 2004
- IEEE International Conference on Software Maintenance(ICSM) 2005
- International Symposium on Empirical Software Engineering (ESE) 2006
- International Conference on Software Testing and Analysis (ISSTA) 2004, 2006, 2008

Other related computing experience including teaching, industrial, governmental, etc. (where, when, description and scope of duties):

- Research Staff, Electronics and Telecommunication Research Institute (ETRI), Korea, 1994 - 1997.
- Research Staff, Electronics and Telecommunication Research Institute (ETRI), Korea, 1989 - 1991.

For the academic year in which the Self Study was written list your assigned duties other than for teaching, (community membership, advising, etc.) with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time or part time faculty, please indicate here which courses.

a. Graduate Students completing for whom you were the advisor
   - Don Nagahawatte, "An empirical study: effects of the residual faults cost on the cost benefit of regression testing," MS, 12/5/2008.
   - Daniel Aceituna, "Validating requirements models using SQ querying," MS, 2/19/2009.

b. Graduate Student Committees on which you serve
   - Arunkumar Balasubramaian, "Graphical user interface for sensor network simulation," MS, December 12/7/2007.
   - Faraz Katib, "Local spiral search in sensor coverage problems," MS, 3/26/2008.
   - Shanaka Herath, "Network storage sharing and file management tools,"MS, 10/7/2008.

c. Advising students
   - Aaron Marback, 2 hours per week
   - Daniel Aceituna, 1 hour per week
   - Don Nagahawatte, 1 hour per week

For the four years preceding the Self Study, list all department, college, and/or university committees of which you are/were a member including year(s) served:

- Comprehensive Exam Committee for Software Engineering
- Teaching–free semester plan committee
- Technical report coordinator
- Software Engineering faculty hiring committee

Principal publications during the last five years. Give in standard bibliographic format.

* Security Test Generation using Threat Trees. Aaron Marback, Hyunsook Do, Ke He, Samuel Kondamarri, and Dianxiang Xu. *Proceedings of the Automation of Software Test,* May, 2009 (to appear).
* An Empirical Study of the Effect of Time Constraints on the Cost-Benefits of Regression Testing. Hyunsook Do, Siavash Mirarab, Ladan Tahvildari, and Gregg Rothermel. *Proceedings of the ACM SIGSOFT Symposium on Foundations of Software Engineering (FSE),* November, 2008.
* Using Sensitivity Analysis to Create Simplified Economic Models for Regression Testing. Hyunsook Do and Gregg Rothermel, *Proceedings of the International Conference on Software Testing and Analysis (ISSTA),* July 2008.
* Using Component Metadata to Regression Test Component-Based Software. Alex Orso, Hyunsook Do, Gregg Rothermel, Mary J. Harrold, and David S. Rosenblum, *Journal of Software Testing, Verification, and Reliability,* Volume 17, No. 2, 2007, pages 61-94.
* An Empirical Study of Regression Testing Techniques Incorporating Context and Lifecycle Factors and Improved Cost-Benefit Models. Hyunsook Do, and Gregg Rothermel, *Proceedings of the ACM SIGSOFT Symposium on Foundations of Software Engineering,* November, 2006.
* On the Use of Mutation Faults in Empirical Assessments of Test Case Prioritization Techniques. Hyunsook Do, and Gregg Rothermel, *IEEE Transactions on Software Engineering,* Volume 32, No. 9, 2006, pages 733-752.
* Prioritizing JUnit Test Cases: An Empirical Assessment and Cost-Benefits Analysis. Hyunsook Do, Gregg Rothermel, and Alex Kinneer, *Empirical Software Engineering: An International Journal,* Volume 11, No. 1, 2006, pages 33-70.
* Supporting Controlled Experimentation with Testing Techniques: An Infrastructure and its Potential Impact. Hyunsook Do, Sebastian Elbaum, and Gregg Rothermel, *Empirical Software Engineering: An International Journal,* Volume 10, No. 4, 2005, pages 405-435.
* A Controlled Experiment Assessing Test Case Prioritization Techniques via Mutation Faults. Hyunsook Do, and Gregg Rothermel, *Proceedings of IEEE International Conference on Software Maintenance,* September, 2005.
* Empirical Studies of Test Case Prioritization in a JUnit Testing Environment. Hyunsook Do, Gregg Rothermel, and Alex Kinneer, *Proceedings of the International Symposium on Software Reliability Engineering,* November, 2004.

* Infrastructure Support for Controlled Experimentation with Software Testing and Regression Testing Techniques. Hyunsook Do, Sebastian Elbaum, and Gregg Rothermel, *Proceedings of the International Symposium on Empirical Software Engineering,* August, 2004.
* Building an infrastructure to support experimentation with software testing techniques. Hyunsook. Do, Sebastian Elbaum, and Gregg Rothermel, *Online Proceeding of the ISSTA Workshop on Empirical Research in Software Testing (WERST 2004),* July, 2004.

Other scholarly activity during the last 5 years: grants, sabbaticals, software development, etc:

i. Paper Reviewer:
   - Transactions on Software Engineering;
   - Journal of Software Testing, Verification, and Reliability;
   - Journal of Software Maintenance and Evolution;
   - Information and Software Technology;
   - Journal of Empirical Software Engineering,
   - International Conference on Software Engineering 2006,
   - ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA) 2006
   - Automated Software Engineering (ASE) 2005
   - ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA) 2002

ii. Conference Program Committee: TAICPART 2009.

iii. Software development:
   - Designing and constructing a software-artifact infrastructure repository (SIR), which supports controlled experimentation with software testing, regression testing, and program analysis techniques.

iv. Unfunded Research Proposals
   - NSF, Computing Process & Artifact (NSF 07-587), $280,183 for three years, PI, submitted 12/07/2007.
   - NSF, Cyber Trust, CT-ER: Automated generation of security test code, $196,133 for two years, Co-PI, submitted 3/14/2008.
   - ADD (Agency for Defense Development) in South Korea, Cost-effective risk-based testing strategy for safety-critical embedded systems, $179,517 for three years, PI, submitted 7/12/2008.
   - ND NASA EPSCoR Graduate Student Research, Context-sensitive evolution-aware testing techniques, $13,537 for ten months, PI, submitted October 2008.
   - ND NASA EPSCoR Faculty Seed Research, Model-based security testing and controlled experimentation, $15,315 for ten months, PI, submitted October 2008.
   - ONR Young Investigator Program, Evolution-centric, process-based, cost-effective regression testing, $507,562 for three years, PI, submitted 1/12/2009.

v. Pending Research Proposals
   - NSF, Computing Research Infrastructure, II-NEW: Infrastructure for model-based security testing, controlled experiments, and education, $284,912 for two years, PI, submitted 9/22/2008.
   - NSF, SHF: Small-Collaborative Research: Evolution-centric, process-based regression testing, $272,220 for three years, PI, submitted 12/17/2008.
   - ND EPSCoR IIP-Seed Program, Evolution-centric Regression Testing Incorporating Data Mining Techniques, $79,200 for two years, PI, submitted 4/20/2009

Courses taught this and last academic year term-by-term. This year is the academic year in which this Self Study report is prepared; the last year was the year prior to this. If you were on sabbatical leave, please enter the information for the year prior to sabbatical. Please list each section of the same course separately.

a. Fall, 2007
   - CS715, Software Requirements Definition and Analysis, 3 credits, 10 students, a new preparation.

b. Spring, 2008
   - CS783, Software Testing and Empirical Methodologies, 3 credits, 4 students, a new preparation.

c. Fall, 2008
   - CS715, Software Requirements Definition and Analysis, 3 credits, 9 students.
   - CS747, Software Complexity Metrics, 3 credits, 6 students, a new preparation.

d. Spring, 2009
   - CS345, Practical Approaches to Software Testing, 3 credits, 3 students, a new preparation.

Research

Publications, writing grants, and reviewing papers: details are listed in items 10 and 11.

James Du

Name, current academic rank, and tenure status:

Name: Xiaojiang (James) Du
Rank: Assistant Professor
Tenure Status: 5th year on tenure-track

Date of original appointment to this faculty, followed by dates and ranks of advancement:

Title: Assistant Professor
Dates Held: July 1, 2004

Degrees with fields, institutions, and dates

Degree:	Ph.D.
Field	Electrical Engineering
Institution	University of Maryland, College Park
Date	August 2003

Degree:	M.S.
Field	Electrical Engineering
Institution	University of Maryland, College Park
Date	May 2002

Degree	B.E. (Bachelor of Engineering)
Field	Electrical Engineering
Institution	Tsinghua University, Beijing, China
Date	July 1996

Conferences, workshops, and professional development programs in which you have participated in the last 5 years to improve teaching and professional competence in the program area:

- "Best Teaching Practices for Enhanced Learning", NDSU Teaching and Learning Conference, Wednesday, August 20, 2008, Memorial Union, NDSU.
  - "See no evil, Hear no evil, Speak no evil -- Using Technology to Deliver to all Learning Styles", Jeff Gerst and others.
  - "Utilizing multiple distance technologies for teaching and learning", Ron Stammen.

- "Engaging students in their learning", Dogan Comez.
- "There are no good teachers", Jim Coykendall, April 2006, Memorial Union, NDSU.
- "Measuring and Evaluating Student Motivation and Effort Related to the SROI Assessment Process at NDSU", University-wide Pedagogical Luncheon, Charlie McIntyre and Rhonda Magel, November, 2005, Memorial Union, NDSU.
- "Student Behavioral Issues: In and Out of the Classroom", Nona Wood, September 2005.
- A Conference on "Best Teaching Practices for Enhanced Learning", August 17, 2005, CME Auditorium, NDSU.
- "Engaging students in small and large classes", Karl Smith, May 20, 12:30 to 4:00 PM, Memorial Union, NDSU, 2005.
- "Cooperative Projects Instructor's role in assuring fairness and equity in the assessment of individual learning in a cooperative context", Karl Smith, May 20, 8:30 to 11:30 AM, 2005, Memorial Union, NDSU.
- "Making Assessment Simple and Effective", Bob Harrold, director of accreditation and assessment, University-wide Pedagogical Luncheon, March 10, 2005, Memorial Union, NDSU.
- "How Students Learn from Lectures and What Can Instructors do to Enhance Student Learning?" Lisa Montplaisir, University-wide Pedagogical Luncheon, February 23, 2005, Memorial Union, NDSU.
- "Scholarship of syllabus, teaching strategies, and evidences of student learning", Charlie McIntyre, January 2005, Memorial Union, NDSU.
- "An Analysis of Student Rating of Instruction Data at NDSU", Rhonda Magel and Micky Klocow, November 16, 2004, Memorial Union, NDSU.
- "Enhancing Teaching and Learning", University-wide Pedagogical Luncheon, August 12, 2004, Memorial Union, NDSU.

- Other related computing experience including teaching, industrial, governmental, etc. (where, when, description and scope of duties):
  - Date Aug. 1998 – July 1999
  - Where Huawei Technologies Co., Ltd., Shenzhen, China
  - Duties: Researcher. Worked on Global System for Mobile Communications.

- Consulting – list agencies and dates, and briefly describe each project:
  - Date
  - Agency
  - Project

For the academic year in which the Self Study was written list your assigned duties other than for teaching, (community membership, advising, etc.) with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time or part time faculty, please indicate here which courses.

- Journal Editorship - 3 hours per week
  - ✓ Editor, Wireless Communication and Mobile Computing, Wiley.
  - ✓ Editor, Security and Communication Networks, Wiley.
  - ✓ Editor, International Journal of Sensor Networks, InderScience.
  - ✓ Editor, Journal of Computer Systems, Networking, and Communications, Hindawi.

- Chair, Computer and Network Security Symposium, IEEE International Wireless Communications and Mobile Computing Conference (IWCMC 2009), Leipzig, Germany, June 21-24, 2009.

For the four years preceding the Self Study, list all department, college, and/or university committees of which you are/were a member including year(s) served:

- ✓ Student - Faculty Relations Committee, College of Science and Math, 2005 – 2008.
- ✓ Dean's Advisory Committee, College of Science and Math, 2007 – 2008.
- ✓ Computer Science Department Head Search Committee, 2006 – 2007.

Principal publications during the last five years. Give in standard bibliographic format.

Peer-Reviewed Journal Papers (24 Papers)

1. X. Du, "QoS Routing Based on Multi-Class Nodes for Mobile Ad Hoc Networks," *Ad Hoc Networks*, *Elsevier,* Vol. 2, Issue 3, pp 241–254, July 2004. Ranked as one of the ScienceDirect's TOP 25 Hottest Articles within the journal *Ad Hoc Networks*.
2. Y. Xiao, H. H. Chen, X. Du and M. Guizani, "Stream-based Cipher Feedback Mode in Wireless Error Channel," *IEEE Transactions on Wireless Communications,* accepted, to appear.
3. X. Du, M. Guizani, Y. Xiao and H. H. Chen, "A Routing-Driven Elliptic Curve Cryptography based Key Management Scheme for Heterogeneous Sensor Networks," *IEEE Transactions on Wireless Communications,* Vol. 8, No. 3, pp. 30-36, March 2009.
4. X. Du and H. H. Chen, "Security in Wireless Sensor Networks," *IEEE Wireless Communications Magazine,* Vol. 15, Issue 4, pp. 60-66, Aug. 2008.
5. X. Du, M. Guizani, Y. Xiao, and H. H. Chen, "Secure and Efficient Time Synchronization in Heterogeneous Sensor Networks," *IEEE Transactions on Vehicular Technology,* Vol. 57, Issue 4, pp. 2387-2394, July 2008.
6. D. Mandala, X. Du, F. Dai, and C. You, "Load Balance and Energy Efficient Data Gathering in Wireless Sensor Networks," *Wireless Communications and Mobile Computing*, Volume 8 Issue 5, pp. 645 – 659, June 2008.
7. X. Du, M. Shayman and R. Skoog, "Designing Fault Tolerant Networks to Prevent Poison Message Failure", *Security and Communication Networks, Wiley*, Vol. 1, Issue 1, pp. 1–17, Jan. 2008.
8. X. Du, Y. Xiao and F. Dai "Increasing Network Lifetime by Balancing Node Energy Consumption in Heterogeneous Sensor Networks," *Wireless Communications and Mobile Computing*, *Wiley,* Volume 8 Issue 1, pp. 125–136, Jan. 2008.
9. Y. Xiao, X. Du, J. Zhang, and S. Guizani, "Internet Protocol Television (IPTV): the Killer Application for the Next Generation Internet," *IEEE Communications Magazine,* Vol. 45, No. 11, pp. 126–134, Nov. 2007.
10. X. Du, M. Guizani, Y. Xiao, and H. H. Chen, "Two Tier Secure Routing Protocol for Heterogeneous Sensor Networks," *IEEE Transactions on Wireless Communications* Vol. 6, Issue 9, pp. 3395–3401, Sept. 2007.
11. Y. Xiao, H. Chen, X. Du, and M. Guizani, "Performance Analysis of Blanket Paging, Sequential Probability Paging, and Pipeline Probability Paging for Wireless Systems," *IEEE Transactions on Vehicular Technology,* Vol. 56, Issue 5, pp. 2745 – 2755, Sept. 2007.
12. Y. Xiao, V. Rayi, B. Sun, X. Du, F. Hu, and M. Galloway, "A Survey of Key Management Schemes in Wireless Sensor Networks," *Journal of Computer Communications*, Vol. 30, Issue 11-12, pp. 2314-2341, Sept. 2007.
13. X. Du, Y. Xiao, M. Guizani, and H. H. Chen, "An Effective Key Management Scheme for Heterogeneous Sensor Networks," *Ad Hoc Networks, Elsevier*, Vol. 5, Issue 1, pp 24–34, Jan. 2007.
14. Q. Wu, N. Rao, X. Du, *et al.*, "On Efficient Deployment of Sensors on Planar Grid," *Computer Communications, Elsevier*, Vol. 30, pp. 2721–2734, 2007.
15. X. Du, M. Zhang, K. Nygard, S. Guizani, and H. H. Chen, "Self-Healing Sensor Networks with Distributed Decision Making," *International Journal of Sensor Networks*, Vol. 2, Nos. 5/6, pp. 289 –298, 2007.
16. X. Du, and D. Wu, "Joint Design of Routing and Medium Access Control for Hybrid Mobile Ad Hoc Networks," *ACM Mobile Networks and Applications (MONET),* Vol. 12, No. 1, pp. 57–68, Feb., 2007.
17. X. Du, "Identifying Control and Management Plane Poison Message Failure by K-Nearest Neighbor Method," *Journal of Network and Systems Management,* Vol. 14, No. 2, pp. 243–259, June 2006.

18. X. Du, Y. Xiao, H. H. Chen, and Q. Wu, "Secure Cell Relay Routing Protocol for Sensor Networks," *Wireless Communications and Mobile Computing*, *Wiley,* Vol. 6, Issue 3, pp. 375–391, May 2006.
19. X. Du and D. Wu, "Adaptive Cell-Relay Routing Protocol for Mobile Ad Hoc Networks," *IEEE Transactions on Vehicular Technology*, Vol. 55, Issue 1, pp. 270–277, Jan. 2006.
20. X. Du, D. Wu, W. Liu, and Y. Fang, "Multi-Class Routing and Medium Access Control for Heterogeneous Mobile Ad Hoc Networks," *IEEE Transactions on Vehicular Technology*, Vol. 55, Issue 1, pp. 278–285, Jan. 2006.
21. X. Du and Y. Xiao, "Energy Efficient Chessboard Clustering and Routing in Heterogeneous Sensor Network," *International Journal of Wireless and Mobile Computing (IJWMC),* Vol. 1, No. 2, pp. 121 –130, Jan. 2006.
22. Y. Xiao, C. Bandela, X. Du, Y. Pan, and K. Dass, "Security Mechanisms, Attacks, and Security Enhancements for the IEEE 802.11 WLANs," *International Journal of Wireless and Mobile Computing (IJWMC),* Vol. 1, No. 3/4, pp. 276 – 288, Jan. 2006.
23. Y. Xiao, K. K. Leung, Y. Pan, and X. Du, "Architecture, Mobility Management and Quality of Service for Integrated 3G and WLAN Networks," *Wireless Communications and Mobile Computing*, *Wiley,* Vol. 5, Issue 7, pp 805–823, Nov. 2005.
24. X. Du and F. Lin, "Maintaining Differentiated Coverage in Heterogeneous Sensor Networks," *EURASIP Journal on Wireless Communications and Networking,* Vol. 5, Issue 4, pp. 565–572, Sept. 2005.

- Peer-Reviewed Conference Papers (40 Papers)

1. D. Mandala, F. Dai, X. Du, and C. You, "Load Balance and Energy Efficient Data Gathering in Wireless Sensor Networks," in Proc. of the First IEEE International Workshop on Intelligent Systems Techniques for Wireless Sensor Networks, in conjunction with IEEE MASS'06, Vancouver, Canada, Oct., 2006. Best Paper Award!
2. X. Du, X. Liu, Y. Xiao, and X. Fu, "Density-Varying High-end Sensor Placement in Heterogeneous Wireless Sensor Networks", to appear in *Proc. of the IEEE International Conference on Communications (ICC 2009),* Dresden, Germany, June 2009. (Acceptance rate: 30%)
3. A. Olteanu, Y. Xiao, K. Wu, and X. Du, "An Optimal Sensor Network for Intrusion Detection", to appear in *Proc. of the IEEE International Conference on Communications (ICC 2009),* Dresden, Germany, June 2009. (Acceptance rate: 30%)
4. W. Zhang and X. Du, "Self-protecting Networking using Dynamic p-cycle Construction within Link Capacity Constraint", to appear in *Proc. of the IEEE International Conference on Communications (ICC 2009),* Dresden, Germany, June 2009. (Acceptance rate: 30%)
5. Y. Xiao, A. Olteanu, K. Wu, and X. Du, "Weaving a Proper Net to Catch Large Objects," in *Proc. of IEEE GLOBECOM 2008*, New Orleans, Louisiana, USA, Dec. 2008. (Acceptance rate: 30%)
6. Y. Xiao, H. Chen, Y. Zhang, X. Du, *et al.*, "Intrusion Objects with Shapes under Randomized Scheduling Algorithm in Sensor Networks," in *Proc. of the 28th International Conference on Distributed Computing Systems (ICDCS 2008) Workshops*, Beijing, China, June 2008.
7. Y. Zhang, Y. Xiao, K. Wu, X. Du, and B. Sun, "Three Dimensional Intrusion Objects Detection under Randomized Scheduling Algorithm in Sensor Networks," in *Proc. of the 4th International Conference on Mobile Ad-hoc and Sensor Networks (MSN'08)*, Wuhan, China, Dec. 2008.
8. X. Du, "Detection of Compromised Sensor Nodes in Heterogeneous Sensor Networks," in *Proc. of IEEE International Conference on Communications (ICC 2008),* Beijing, China, May 2008. (Acceptance rate: 30%)
9. J. Brown, and X. Du, "Detection of Selective Forwarding Attacks in Heterogeneous Sensor Networks," in *Proc. of IEEE International Conference on Communications (ICC 2008),* Beijing, China, May 2008. (Acceptance rate: 30%)
10. X. Du, M. Guizani, Y. Xiao, and H. H. Chen, "Defending DoS Attacks on Broadcast Authentication in Wireless Sensor Networks," in *Proc. of IEEE International Conference on Communications (ICC 2008),* Beijing, China, May 2008. (Acceptance rate: 30%)
11. Y. Xiao, X. Du, F. Hu, and J. Zhang, "A Cross-layer Approach for Frame Transmissions of MPEG-4 over the IEEE 802.11e Wireless Local Area Networks," in *Proc. of IEEE Wireless Communications and Networking Conference (WCNC)* 2008, March 2008, Las Vegas, NV. (Acceptance rate: 30%)

12. J. Brown, X. Du, and K. Nygard, "An Efficient Public-Key-Based Heterogeneous Sensor Network Key Distribution Scheme," in *Proc. of IEEE GLOBECOM 2007*, Nov. 2007, Washington, D.C. (Acceptance rate: 30%)
13. X. Du, M. Guizani, Y. Xiao, and H. H. Chen, "A Secure Time Synchronization Scheme for Heterogeneous Sensor Networks," in *Proc. of IEEE GLOBECOM*, Nov. 2007, Washington, D.C. (Acceptance rate: 30%)
14. X. Du, H. H. Chen, Y. Xiao, and M. Guizani, "A Pseudo-Random Function based Key Management Scheme for Heterogeneous Sensor Networks," in *Proc. of IEEE GLOBECOM 2007*, Nov. 2007, Washington, D.C. (Acceptance rate: 30%)
15. Y. Xiao, H. Chen, X. Du, and M. Guizani, "Paging Schemes Performance for Wireless Systems," in *Proc. of IEEE GLOBECOM 2007*, Nov. 2007, Washington, D.C. (Acceptance rate: 30%)
16. X. Du, D. Mandala, C. You, and Y. Xiao, "A Boundary-Node based Localization Scheme for Heterogeneous Wireless Sensor Networks," in *Proc. of IEEE MILCOM 2007,* Oct. 2007, Orlando, FL. (Acceptance rate: 25%)
17. X. Du, M. Guizani, Y. Xiao, and H. H. Chen, "A Routing-Driven Key Management Scheme for Heterogeneous Sensor Networks," in *Proc. of IEEE International Conference on Communications (ICC 2007),* Glasgow, Scotland, June 2007. (Acceptance rate: 30%)
18. Y. Xiao, M. Nolen, X. Du, and J. Zhang, "Simulating MPEG-4 over the IEEE 802.11 Wireless Local Area Networks," in *Proc. of IEEE Wireless Communications and Networking Conference (WCNC)*, Hong Kong, March 2007. (Acceptance rate: 27%)
19. X. Du, Y. Xiao, S. Guizani, and H. H. Chen, "An Efficient Key Management Scheme for Heterogeneous Sensor Networks," in *Proc. of IEEE GLOBECOM 2006*, Nov. 2006, San Francisco, CA. (Acceptance rate: 30%)
20. X. Du, Y. Xiao, S. Guizani, and H. H. Chen, "A Secure Routing Protocol for Heterogeneous Sensor Networks," in *Proc. of IEEE GLOBECOM 2006*, Nov. 2006, San Francisco, CA. (Acceptance rate: 30%)
21. Y. Xiao, X. Zhang, X. Du, and J. Zhang, "Channel Allocation Algorithms for Three-tier Wireless Local Loop," to appear in *Proc. of IEEE GLOBECOM 2006*, Nov. 2006, San Francisco, CA. (Acceptance rate: 30%)
22. M. Naznin, X. Du, and K. Nygard, "Scheduling Duty Cycles in Differentiated Sensor Networks," in *Proc. of IASTED International Conference on Knowledge Sharing and Collaborative Engineering (KSCE)*, St. Thomas, Virgin Islands, USA, Nov. 2006.
23. X. Du, M. Zhang, K. Nygard, M. Guizani, and H. H. Chen, "Distributed Decision Making Algorithm for Self-Healing Sensor Networks," in *Proc. of IEEE ICC 2006*, Istanbul, Turkey, June 2006. (Acceptance rate: 30%)
24. H. H. Chen, J. Li, Y. Yang, X. Du, H. Liu and M. Guizani, "Challenges and Futuristic Perspective of CDMA Technologies: OCC-CDMA/OS for 4G Wireless Networks," in *Proc. of IEEE ICC 2006*, Istanbul, Turkey, June 2006. (Acceptance rate: 30%)
25. M. Zhang, X. Du, and K. Nygard, "Improving Coverage Performance in Sensor Networks by Using Mobile Sensors," in *Proc. of IEEE MILCOM 2005,* Atlantic City, NJ, Oct. 2005. (Acceptance rate: 28%)
26. X. Du and D. Wu, "Efficient Multi-Class Routing Protocol for Heterogeneous Mobile Ad Hoc Networks," in *Proc. of The Second IEEE International Conference on Broadband Networks(BroadNets 2005),* pp. 698–705, Boston, MA, Oct. 2005.
27. X. Du and F. Lin, "Efficient Energy Management Protocol for Target Tracking Sensor Network," in *Proc. of The Ninth IFIP/IEEE International Symposium on Integrated Network Management (IM 2005),* pp. 45–58, Nice, France, May 2005. (Acceptance rate: 23.5%)
28. X. Du, "Improving Routing in Sensor Networks with Heterogeneous Sensor Nodes," in *Proc. of IEEE VTC Spring 2005,* Stockholm, Sweden, May 2005. (Acceptance rate: 40.0%)
29. X. Du and F. Lin, "Designing Efficient Routing Protocol for Heterogeneous Sensor Networks," in *Proc. of The 24th IEEE International Performance, Computing, and Communications Conference (IPCCC),* April 2005, Phoenix, AZ. (Acceptance rate: 32.2%)
30. X. Du, and F. Lin, "Improving Sensor Network Performance by Deploying Mobile Sensors," in *Proc. of The 24th IEEE International Performance, Computing, and Communications Conference (IPCCC),* Apr. 2005, Phoenix, AZ. (Acceptance rate: 32.2 %)

31. X. Du, "Secure Cell Relay Routing Protocol for Sensor Networks," in *Proc. of First IEEE Workshop on Information Assurance in Wireless Sensor Networks (WSNIA 2005), in conjunction with IPCCC 2005,* Apr. 2005, Phoenix, AZ.
32. X. Du, "Using K-Nearest Neighbor Method to Identify Poison Message Failure," in *Proc. of IEEE GLOBECOM 2004*, pp. 2113–2117, Nov., 2004, Dallas, TX. (Acceptance rate: 30%)
33. X. Du, "Toward Efficient Distributed Network Monitoring," in *Proc. of The 23rd IEEE International Performance, Computing, and Communications Conference (IPCCC)*, Apr., 2004, Phoenix, AZ. (Acceptance rate: 28%)
34. X. Du, "A Simulation Study of An Energy Efficient Routing Protocol for Mobile Ad Hoc Networks," in *Proc. of The 37th Annual Simulation Symposium*, Apr., 2004, Arlington, VA.
35. X. Du, "Effective Fault Diagnosis in Communication Networks," in *Proc. of The 38th Annual Conference on Information Sciences and Systems (CISS)*, March 2004, Princeton University, NJ.
36. X. Du, M. Shayman and R.A. Skoog, "Distributed Fault Management to Prevent Network Instability from Control and Management Plane Poison Messages," in *Proc. of IEEE Military Communication (MILCOM) 2003,* pp. 458–463, Boston, MA, Oct. 2003. (Acceptance rate: 32%)
37. X. Du, M. Shayman and R. Skoog, "Using Neural Networks to Identify Control and Management Plane Poison Messages," in *Proc. of The Eighth IFIP/IEEE International Symposium on Integrated Network Management (IM 2003),* pp. 621-634, Colorado Spring, Colorado, Mar. 2003. (Acceptance rate: 27.5%)
38. X. Du, M. Shayman and R. Skoog, "Markov Decision Based Filtering to Prevent Network Instability from Control Plane Poison Messages," in *Proc. of Conference on Information Sciences and Systems (CISS) 2003,* Baltimore, Maryland, March 2003.
39. X. Du, M. Shayman and R. Skoog, "Preventing Network Instability Caused by Propagation of Control Plane Poison Messages," in *Proc. of IEEE Military Communication (MILCOM),* pp. 93–98, Anaheim, CA, Oct. 2002.
40. X. Du, M. Rozenblit and M. Shayman, "Implementation and Performance Analysis of SNMP on a TLS/TCP Base," in *Proc. of The Seventh IFIP/IEEE International Symposium on Integrated Network Management (IM 2001)*, pp. 453–466, Seattle, WA, May 2001. (Acceptance rate: 34.0 %)

Peer-Reviewed Book Chapters

1. X. Du, "Backbone Quality-of-Service Routing Protocol for Heterogeneous Mobile Ad Hoc Networks," *Advances in Wireless Networks and Mobile Computing*, M. Cheng and D. Li (Eds.), pp. 1-34, Springer, 2008.
2. V. K. Rayi, Y. Xiao, X. Du, B. Sun and F. Hu, "Key Management Schemes in Sensor Networks," *Wireless/Mobile Network Security*, *Y. Xiao, X. Shen, and D.-Z. Du* (Eds.), Springer, 2006.
3. X. Du and Y. Xiao, "A Survey on Sensor Network Security," *Wireless Sensor Networks and Applications, SECTION IV. Security,* pp. 594–626, Y. Li, M. Thai, and W. Wu (Eds.), Springer, 2005.

Other scholarly activity during the last 5 years: grants, sabbaticals, software development, etc:

External Grants

1. Title: Collaborative Research: Towards Robust and Self-Healing Heterogeneous Wireless Sensor Networks
   Source: Networking Technology and Systems (NeTS) Program, National Science Foundation
   Amount: Total amount: $350,000. Dr. Du's share: $264,520
   Duration: 09-01-2007 to 08-31-2010
   Role: Dr. Du is the lead PI.

2. Title: Designing Secure and Robust Heterogeneous Sensor Networks
   Source: DoD EPSCoR Program, Army Research Office
   Amount: $358,748
   Duration: 09-01-2008 to 08-31-2011
   Role: Dr. Du is the PI.

3. Title Collaborative for Scholarships in Computing, Information Sciences, and Engineering
   Source Scholarships in Science, Technology, Engineering and Math (S-STEM) Program National Science Foundation
   Amount $463,200
   Duration 10-01-2006 to 09-30-2010
   Role Dr. Du is a Co-PI. (The PI is Dr. Kendall Nygard. Other Co-PIs are Drs. Brian Slator, Rajendra Katti, and Bud Bowlin).

4. Title A Heterogeneous Sensor Network Laboratory for Integrated Research and Education
   Source Computing Research Infrastructure (CRI) Program, National Science Foundation
   Amount $88,370
   Duration 09-01-2007 to 08-31-2010
   Role Dr. Du is the PI.

5. Title A Testbed for Research and Education in Wireless Sensor Networks
   Source Defense University Research Instrumentation Program (DURIP)
   Army Research Office
   Amount $58,150
   Duration 05-01-2007 to 04-31-2009
   Role Dr. Du is the PI.

Grants from North Dakota and NDSU (10 Grants)

1. Title Smart Sensing and Decision Making for NASA Sensor Webs
   Source North Dakota NASA EPSCoR: Faculty Research Grants
   Amount $85,000
   Duration 08-08-2006 to 07-15-2007
   Role Dr. Du is a Co-PI in this project. The PI is Dr. Kendall Nygard.

2. Title Monitoring Control of Wheat Diseases using Wireless Sensor Networks
   Source ND Agricultural Experiment Station / College of Science and Math, NDSU
   Amount $10,000
   Duration 10-15-07 to 8-30-08
   Role Dr. Du is the PI.

3. Title Designing Secure and Efficient Communication Systems for NASA Sensor Webs
   Source North Dakota NASA EPSCoR: Faculty Research Grants
   Amount $5,478
   Duration 09-01-08 to 08-31-09
   Role Dr. Du is the PI.

4. Title Faculty Travel Award
   Source North Dakota NASA EPSCoR
   Amount $1,500
   Duration 10-15-08 to 04-30-09
   Role Dr. Du is the PI.

5. Title Effective Communication Systems for NASA Sensor Webs
   Source North Dakota NASA EPSCoR: Faculty Research Grants
   Amount $4,815
   Duration 10-15-07 to 04-30-08
   Role Dr. Du is the PI.

6. Title Faculty Travel Award
   Source North Dakota NASA EPSCoR
   Amount $1,000
   Duration 10-15-07 to 12-31-07

Role Dr. Du is the PI.

7. Title Instructional Development – A New Course: *Wireless Networks and Security*
   Source University Senate Faculty Development Committee, NDSU
   Amount $1,500
   Duration 1-15-2007 to 06-30-2007
   Role Dr. Du is the PI.

8. Title A Testbed for Heterogeneous Sensor Networks
   Source North Dakota EPSCoR
   Amount $2,500
   Duration 12-15-2006 to 06-01-2007
   Role Dr. Du is the PI.
9. Title Secure Communications for NASA Hybrid Satellite Networks
   Source North Dakota NASA EPSCoR: Faculty Research Grants
   Amount $16,773
   Duration 01-01-2005 to 06-30-2005
   Role Dr. Du is the PI.

10. Title Instructional Development – An Online Course: *Wireless Sensor Networks*
    Source University Senate Faculty Development Committee, NDSU
    Amount $2,000
    Duration 11-01-2004 to 02-28-2005
    Role Dr. Du is the PI.

Courses taught this and last academic year term-by-term. This year is the academic year in which this Self Study report is prepared; the last year was the year prior to this. If you were on sabbatical leave, please enter the information for the year prior to sabbatical. Please list each section of the same course separately.

Term/year Spring 2009
Course # CSCI 459
Course Title Foundations of Computer Networks
Semester Hrs 3 credits
Class size 28
Term/year Spring 2009
Course # CSCI 659
Course Title Foundations of Computer Networks
Semester Hrs 3 credits
Class size 10

Term/year Spring 2009
Course # CSCI 790
Course Title Seminar/Wireless Security
Semester Hrs 1 credit
Class size 11

Term/year Fall 2008
Course # CSCI 778
Course Title Computer Networks
Semester Hrs 3 credits
Class size 19

Term/year Fall 2008
Course # CSCI 469
Course Title Network Security
Semester Hrs 3 credits
Class size 8

Term/year	Fall 2008
Course #	CSCI 669
Course Title	Network Security
Semester Hrs	3 credits
Class size	24

Term/year	Spring 2008
Course #	CSCI 459
Course Title	Foundations of Computer Networks
Semester Hrs	3 credits
Class size	48

Term/year	Spring 2008
Course #	CSCI 659
Course Title	Foundations of Computer Networks
Semester Hrs	3 credits
Class size	28

Term/year	Fall 2007
Course #	CSCI 778
Course Title	Computer Networks
Semester Hrs	3 credits
Class size	34

Term/year	Fall 2007
Course #	CSCI 469
Course Title	Network Security
Semester Hrs	3 credits
Class size	16

Term/year	Fall 2007
Course #	CSCI 669
Course Title	Network Security
Semester Hrs	3 credits
Class size	16

Research

I have performed innovative research in various aspects of heterogeneous wireless sensor networks, wireless networks, security, mobile and secure computing, computer networks, systems and controls. Since joined NDSU, I have authored more than 60 papers in high-quality, peer-reviewed, referred journals and conferences, such as *IEEE Transactions on Wireless Communications, IEEE Transactions on Vehicular Technology, ACM Mobile Networks and Applications, Ad Hoc Networks (Elsevier), Computer Communications (Elsevier)*, and so on.

Wei Jin

Name, current academic rank, and tenure status:

Name: Wei Jin
Rank: Assistant Professor
Tenure Status: Tenure-track

Date of original appointment to this faculty, followed by dates and ranks of advancement:

Title: Assistant Professor
Dates Held: August 16, 2008

Degrees with fields, institutions, and dates

Degree: Ph.D
Field: Computer Science

Institution: State University of New York at Buffalo
Date: September 1, 2008

Degree: M.S.
Field: Computer Science
Institution: State University of New York at Buffalo
Date: June 1, 2007

Degree: M.S.
Field: Computer Science
Institution: Institute of Computing Technology, Chinese Academy of Sciences
Date: June, 2002

Degree: B.S.
Field: Computer Science
Institution: University of Science and Technology Beijing
Date: June, 1998

Conferences, workshops, and professional development programs in which you have participated in the last 5 years to improve teaching and professional competence in the program area:

The 7th IEEE International conference on Data Mining (ICDM-07), Omaha, USA, October, 2007

The 11th Pacific-Asia International conference on Knowledge Discovery and Data Mining (PAKDD-07), Nanjing, China, April, 2007

For the academic year in which the Self Study was written list your assigned duties other than for teaching, (community membership, advising, etc.) with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time or part time faculty, please indicate here which courses.

Department of Computer Science Faculty Recruiting Committee (Software Engineering)
Graduate student Committees on which I serve:
Swathi kondakindi Master Student

Principal publications during the last five years. Give in standard bibliographic format.

Wei Jin, Rohini K. Srihari and Abhishek Singh, "Generating Hypotheses from the Web", in Proceedings of *the 17th International World Wide Web Conference (WWW-08),* Beijing, China, 2008.

Wei Jin, Rohini K. Srihari, Hung Hay Ho and Xin Wu, "Improving Knowledge Discovery in Document Collections through Combining Text Retrieval and Link Analysis Techniques", in Proceedings of *the 7th IEEE International conference on Data Mining (ICDM-07),* Omaha, October, 2007. (Acceptance rate = 7.5%)

Wei Jin, Rohini K. Srihari and Hung Hay Ho, "A Text Mining Model for Hypothesis Generation", in Proceedings of *the 19th IEEE International conference on Tools with Artificial Intelligence (ICTAI-07)*, October, 2007. (Acceptance rate = 28.6%)

Wei Jin, Rohini K. Srihari and Xin Wu, "Mining Concept Associations for Knowledge Discovery through Concept Chain Queries", *Advances in Knowledge Discovery and Data Mining,* in Proceedings of *the 11th Pacific-Asia International conference on Knowledge Discovery and Data Mining (PAKDD-07),* Nanjing, China, 2007, LNAI 4426-2007. (Acceptance rate =17%)

Wei Jin and Rohini K. Srihari, "Graph-based Text Representation and Knowledge Discovery", in Proceedings of *the 22th Annual ACM Symposium on Applied Computing*, *(SAC-07), Seoul*, Korea, March, 2007. (Acceptance rate = 30%)

Wei Jin and Rohini K. Srihari, "Knowledge Discovery across Documents through Concept Chain Queries", in Proceedings of *ICDM workshop on Foundation of Data Mining and Novel Techniques in High Dimensional Structural and Unstructured Data, Hong Kong* , China, 2006. (acceptance rate = 24.7%*)*

Other scholarly activity during the last 5 years: grants, sabbaticals, software development, etc:

NSF Cyber-enabled Discovery and Innovation (CDI)-Type II review panel , Feb. 23-24, 2009, Arlington, VA.

a. Unfunded Research Proposals

NSF Cyber-enabled Discovery and Innovation (CDI)-Type I: Discovering Hidden Associations in Large Text Corpora and Heterogeneous Data (PI)

b. Pending Research Proposals

NSF Information and Intelligent Systems (IIS)-Core Programs: Discovering Hidden Associations in Large-Scale Distributed Text Corpora (PI)

NIH Challenge Grants in Health and Science Research: A secure and convenient genome information management system (co-PI)

Courses taught this and last academic year term-by-term. This year is the academic year in which this Self Study report is prepared; the last year was the year prior to this. If you were on sabbatical leave, please enter the information for the year prior to sabbatical. Please list each section of the same course separately.

Term/year: Fall 2008
Course #: CSci 372
Course Title: Comparative Languages
Semester Hrs: 3 credits
Class size: 53

Term/year: Spring 2009
Course #: CSCI 345 - 04
Course Title: Topics on Personal Computers: Information Retrieval and Web Search
Semester Hrs: 3 credits
Class size: 11

CSCI 783 Topic/Information Retrieval and Web Search; 3 credits; 8 students; new preparation

Term/year: Spring 2009
Course #: CSci783 - 03
Course Title: Topics in Software Systems: Information Retrieval and Web Search
Semester Hrs: 3 credits
Class size: 8

Estimate the percentage of your time devoted to scholarly and/or research activities:50%. Please give a brief description of your major research and scholarly activities:

My research interests mainly lie in:

- Data Mining and Knowledge Discovery (particularly Text and Web Mining)
- Information Retrieval and Extraction
- Social Network Analysis
- Medical Informatics and Bioinformatics

The scholarly and/or research activities include:

- Research paper writing and publication (highly refereed conferences and journals)
- Research paper presentation in conferences, workshops, and professional development programs.
- Research Proposal Writing
- Review Panel and Program Committee Service

Dean Knudson

Name, current academic rank, and tenure status:

Name: **Dean Knudson**
Rank: Associate Professor
Tenure Status: non-tenure

Date of original appointment to this faculty, followed by dates and ranks of advancement:

Title: Adjunct Professor
Dates Held: 2004 - 2005

Title: Associate Professor
Dates Held: fall 2005 - present

Degrees with fields, institutions, and dates

Degree: BA
Field: Math
Institution: Concordia College
Date: 1963

Degree: MS
Field: Math
Institution: Bowling Green University
Date: 1965

Degree: PhD
Field: Computer Science
Institution: Northwestern University
Date: 1972

Conferences, workshops, and professional development programs in which you have participated in the last 5 years to improve teaching and professional competence in the program area:

- *International Conference on Software Engineering Theory and Practice (SETP-07)*, July 9-12, 2007
- *SITE 2008 – Society for Information Technology & Teacher Education International Conference*, Las Vegas, NV, March 3-7, 2008
- *SEPG 09 North America*, a Software Engineering Institute sponsored conference, San Jose, CA, March 23-26, 2009

Other related computing experience including teaching, industrial, governmental, etc. (where, when, description and scope of duties):

1999 – 2004
Development Manager/Project Manager
Microsoft Business Solutions - Fargo, ND
1993 – 1999
Section Manager – Software Engineering Department
Northrop Grumman Corp. - Rolling Meadows, IL

1986 – 1993
Section Chief – Systems Architecture and Engineering Group
Systems and Research Center (SRC), Honeywell Inc. - Minneapolis, MN
1982 – 1986
Director of Engineering
CPT Corp. - Eden Prairie, MN
1978 – 1982
Assistant Technical Director
ITT – Advanced Technology Center - Shelton, CT
1965 – 1978
Member of Technical Staff
Bell Laboratories - Naperville, IL

For the four years preceding the Self Study, list all department, college, and/or university committees of which you are/were a member including year(s) served:

Principal publications during the last five years. Give in standard bibliographic format.

- Dean Knudson, Alan Braaten, Kenneth Magel, Kendall Nygard, "Software Engineering in Computer Science Capstone Projects", *2007 International Conference on Software Engineering Theory and Practice*, Orlando, FL, July 9-12, 2007.
- Keynote speaker, "Tales from 40 Years in the Software Industry Trenches", joint talk to the following conferences: *International Conference on Artificial Intelligence and Pattern Recognition (AIPR-07), International Conference on Enterprise Information Systems and Web Technologies (EISWT-07), International Conference on High Performance Computing Networking and Communication Systems (HPCNCS-07), International Conference on Software Engineering Theory and Practice (SETP-07)*, July 9-12, 2007.
- Dean Knudson, Kenneth Magel, "Comments on the Use of TWiki, Blackboard Portfolios and Trac to Share Proprietary Information in Student Projects", *SITE 2008 – Society for Information Technology & Teacher Education International Conference*, Las Vegas, NV, March 3-7, 2008
- Dean Knudson, Alan Braaten, "Industry/University Cooperation in Defining Software Processes for use in Real-world Computer Science Capstone Team Projects", *SEPG 09 North America*, a Software Engineering Institute sponsored conference, San Jose, CA, March 23-26, 2009

Other scholarly activity during the last 5 years: grants, sabbaticals, software development, etc:

* NSF – Collaborative for Scholarships in Computer, Information Science, and Engineering (CoCISE), awarded 2006 but scholarships were not awarded until 2007, and runs for four years, $463,000, PI – Dr. Kendall Nygard, my role is to help coordinate the program
* Instructional Development Grant Project, "Add Software Development Processes to CSci Capstone Course", January 2008 award, runs until June 30, 2008, $4500, PI – Dean Knudson

Courses taught this and last academic year term-by-term. This year is the academic year in which this Self Study report is prepared; the last year was the year prior to this. If you were on sabbatical leave, please enter the information for the year prior to sabbatical. Please list each section of the same course separately.

Term/year - spring 2009
Course # - CSci445
Course Title - CS Capstone Projects
Semester Hrs - 3
Class size - 43 (+5 in CS 716)

Term/year - spring 2008
Course # - CSci445
Course Title - CS Capstone Projects
Semester Hrs - 3
Class size - 44 (+11 in CS716)

Term/year - spring 2007
Course # CSci445
Course Title - CS Capstone Projects
Semester Hrs - 3
Class size - 15 (+20 in CS716)

Term/year - spring 2006
Course # - CSci445
Course Title - CS Capstone Projects
Semester Hrs - 3
Class size - 12 (+ 19 in CS716)

Research

Software Engineering and in particular how to move the Computer Science Capstone course to become an SEI Level 2 organization.

Jun Kong

Name, current academic rank, and tenure status:

Name: Jun Kong
Rank: Assistant Professor
Tenure Status: Tenure track

Date of original appointment to this faculty, followed by dates and ranks of advancement:

Title: Assistant Professor
Dates Held: 08-15-2006

Degrees with fields, institutions, and dates

Degree: BEng
Field: Computer Science
Institution: Huazhong University of
Date: 1998

Degree: MEng
Field: Computer Science
Institution: Shanghai Jiao Tong University
Date: 2001

Degree: Ph.D
Field: Compute Science
Institution: The University of Texas at Dallas
Date: Dec, 2005

Conferences, workshops, and professional development programs in which you have participated in the last 5 years to improve teaching and professional competence in the program area:

At NDSU, I have attended a series of seminars, organized by Dr. McCaul in the College of Science & Mathematics for improving the teaching skill of junior faculty. I also have attended the following two workshops:

- Best Teaching Practices for Enhanced Learning, NDSU, Aug. 15 2007
- Best Teaching Practices for Enhanced Learning, NDSU, Aug. 16 2006

For the academic year in which the Self Study was written list your assigned duties other than for teaching, (community membership, advising, etc.) with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time or part time faculty, please indicate here which courses.

Advise one undergraduate student

Advise eleven graduate students

For the four years preceding the Self Study, list all department, college, and/or university committees of which you are/were a member including year(s) served:

- College of Science & Mathematics
  - Student Progress Committee (2007-present)
- Department of Computer Science
  - CS Nomination Committee (2007-present)
  - CS Teaching Free Semester Committee (Chair, 2008)
  - Faculty Recruiting Committee (2007, 2009)

Principal publications during the last five years. Give in standard bibliographic format.

A. Referred Journal Publications:

W. Zhang, J. Kong, K. Nygard, and M. Li, "Adaptive Design of Pervasive Computing System Under QOS Constraints", Accepted by *International Journal of Computers and Applications*, 2008.

J. Kong, K. Zhang, J. Dong, and D. Xu, "Specifying Behavioral Semantics of UML Diagrams Through Graph Transformations", *Journal of Systems and Software*, Vol.82(2), 2009, 292-306.

J. Kong and C. Y. Zhao, "Visual Language Techniques for Software Development", *Journal of Software*, Vol.19(8), 2008, 1902-1919.

C. Y. Zhao, J. Kong, J. Dong, and K. Zhang, "Pattern Based Design Evolution Using Graph Transformation", *JVLC - Journal of Visual Languages and Computing*, Vol.18(4), 2007, 378-398.

J. Kong, K. Zhang, and X. Q. Zeng, "Spatial Graph Grammars for Graphical User Interfaces", *ToCHI - ACM Transactions on Computer-Human Interaction*, Vol.13(2), 2006, 268-307.

G. L. Song, J. Kong, and K. Zhang, "AutoGen: Easing Model Management through Two Levels of Abstraction", *JVLC - Journal of Visual Languages and Computing*, Vol.17(6), 2006, 508-527.

K. Zhang, J. Kong, M.K. Qiu, and G.L. Song, "Multimedia Layout Adaptation Through Grammatical Specifications", *ACM/Springer Multimedia Systems*, Vol.10(3), 2005, 245-260.

B. Book Chapters

K. Zhang, J. Kong, and J. Cao, "Visual Software Engineering", In B. Wah (Ed.) *Encyclopedia of Computer Science and Engineering*, Wiley & Sons, 2004.

C. Referred Conference Publications

W. Zhang, J. Kong, K. Nygard, and M. Li, *"Adaptive Configuration of Pervasive Computing System with QoS Consideration", Proc. 6th Annual IEEE Consumer Communications and Networking Conference*, 2009.

J. Kong, K.L. Ates, K. Zhang, and Y. Gu, "Adaptive Mobile Interfaces Through Grammar Induction", *Proc. 20th IEEE International Conference on Tools with Artificial Intelligence*, 2008, 133-140.

C. Zhao, K.L. Ates, J. Kong, and K. Zhang, "Discovering Programs Behavioral Patterns by Inferring Graph-Grammars from Execution Traces", *Proc. 20th IEEE International Conference on Tools with Artificial Intelligence*, 2008, 395-402.

H. Ahmadi and J. Kong, "Efficient Web Browsing on Small Screens", *Proc. ACM International Conference on Advanced Visual Interfaces*, 2008, 23-30.

J. Kong and D. Xu, "A UML-based Framework for Design and Analysis of Dependable Software", *Proc. Annual International Computer Software and Applications Conference,* 2008, 28-31.

C.Y. Zhao, K. Zhang, and J. Kong, "Design Pattern Evolution and Verification Using Graph Transformation", *Proc. 40th Hawaii International Conference on System Sciences*, 2007, 290-296.

J. Kong, G. L. Song, K. Zhang, and M. L. Huang, "A Collaborative Framework for Designers and Developers of Software-Intensive Systems", *Proc. 10th International Conference on Computer Supported Cooperative Work in Design*, 2006, 1-6.

J. Kong, G. L. Song, and J. Dong, "Specifying Behavioral Semantics through Graph Transformation", *Proc. IEEE VL/HCC'05 Workshop on Visual Modeling for Software Intensive Systems (VMSIS)*, 2005, 51-58.

G. L. Song, J. Kong, and K. Zhang, "Automatic Generation of Transformation Rules for Model Management", *Proc. IEEE VL/HCC'05 Workshop on Visual Modeling for Software Intensive Systems (VMSIS)*, 2005, 35-42.

X. Q. Zeng, K. Zhang, and J. Kong, and G.L. Song, "RGG+: An Enhancement to the Reserved Graph Grammar Formalism", *Proc. 2005 IEEE Symposium on Visual Languages and Human-Centric Computing*, 2005, 273-274.

K. Zhang, G. L. Song, and J. Kong, "Interoperating XML-Style of Digital Artifacts for Information Reuse", *Proc. 2005 IEEE International Conference on Information Reuse and Integration,* 2005, 126-131.

G. L. Song, K. Zhang, B. Thuraisingham, and J. Kong, "Secure Model Management Operations for the Web", *Proc. Data and Applications Security 2005*, LNCS 3654, 2005, 237-251.

J. Kong, K. Zhang, J. Dong, and G. L. Song, "A Generative Style Driven Framework for Software Architecture Design", *Proc. 29th Annual NASA/IEEE Software Engineering Workshop*, 2005, 173-182.

Invited Papers

J. Limke, J. Kong, and J. Dong, "Adaptation in a Pervasive Computing Environment", *International Conference on Software Engineering Theory and Practice*, 2008, 145-155.

2. Other scholarly activity during the last 5 years: grants, sabbaticals, software development, etc:

Grant: Cross-Layer Design for Reliable Communications in the InterPlaNetary Network
Source: NASA EPSCoR
Amount: $11,612

Courses taught this and last academic year term-by-term. This year is the academic year in which this Self Study report is prepared; the last year was the year prior to this. If you were on sabbatical leave, please enter the information for the year prior to sabbatical. Please list each section of the same course separately.

Term/year: Spring/2009
Course #: CSci 375
Course Title: Operating Systems Design
Semester Hrs: 3
Class size: 42

Term/year: Fall/2008
Course #: CSci 488
Course Title: Human Computer Interaction
Semester Hrs: 3
Class size: 23

Term/year: Fall/2008
Course #: CSci 688
Course Title: Human Computer Interaction
Semester Hrs: 3
Class size: 2

Term/year: Fall/2008
Course #: CSci 474
Course Title: Operating Systems Concepts
Semester Hrs: 3
Class size: 41

Term/year: Fall/2008

Course #: CSci 474
Course Title: Operating Systems Concepts
Semester Hrs: 3
Class size: 41

Term/year: Spring/2008
Course #: CSci 475
Course Title: Operating Systems Design
Semester Hrs: 3
Class size: 40

Estimate the percentage of your time devoted to scholarly and/or research activities:_50__%. Please give a brief description of your major research and scholarly activities:

My research focuses on pervasive computing, Human computer interaction on mobile devices, and visual software engineering. My research and scholarly activities are summarized as the following:

- Conduct research to publish peer-reviewed papers
- Seek external funding opportunities
- Supervise graduate students
- Organize conferences
- Serve as program committee member and reviewer

Juan Li

Name, current academic rank, and tenure status:

Name: Juan Li
Rank: Assistant Professor
Tenure Status: Tenure-track

Date of original appointment to this faculty, followed by dates and ranks of advancement:

Title: Assistant Professor
Dates Held: August 15, 2008

Degrees with fields, institutions, and dates

Degree: Ph.D.
Field: Computer Science
Institution: University of British Columbia
Date: June 2008

Degree: M.S.
Field: Computer Science
Institution: University of British Columbia
Date: November 2003

Degree: BS
Field: Computer Science
Institution: Northern Jiaotong University, Beijing, China
Date: July 1997

Conferences, workshops, and professional development programs in which you have participated in the last 5 years to improve teaching and professional competence in the program area:

International Teaching Assistant Workshop, 2004, University of British Columbia

For the academic year in which the Self Study was written list your assigned duties other than for teaching, (community membership, advising, etc.) with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time or part time faculty, please indicate here which courses.

Course coordinator for CSCI161.

For the four years preceding the Self Study, list all department, college, and/or university committees of which you are/were a member including year(s) served:

Comprehensive Examination Committee, 2009

Graduate Student Committee 2008-2009

Arijit Chatterjee, Durga Ramamurthy, Rajani Garimedi, Anshuman Manori, Satheesh, Chakravarthi

Principal publications during the last five years. Give in standard bibliographic format.

- Juan Li, "Building Distributed Index for Semantic Web Data", to appear in Proceedings of the *23rd IEEE International Conference on Advanced Information Networking and Applications (AINA-09),* Bradford, UK, 2009.
- Juan Li, "Improving Distributed Semantic Search with Hybrid Topology and Peer Recommendation", a Chapter in *Studies in Computational Intelligence*, *Springer Berlin / Heidelberg*, ISSN 1860-949X, 2009.
- Juan Li and Ying Su, "Bandwidth-Efficient Query Answering in Semantically Heterogeneous Grids", to appear in Proceedings of the *IEEE International Workshop on HPC and Grid Applications (IWHGA2009),* Sanya, China, April 2009.
- Juan Li and Son Vuong, "SOON: A Scalable Self-Organized Overlay Network for Distributed Information Retrieval", in Proceedings of *the 19th IFIP/IEEE International Workshop on Distributed Systems: Operations and Management Managing Large Scale Service Deployment (DSOM 2008),* Samos Island, Greece, September 2008.
- Juan Li, Billy Cheung, Son Vuong, "A Scheme for Balancing Heterogeneous Request Load in DHT-based P2P Systems", in Proceedings of *the Fourth International Conference on Quality of Service in Heterogeneous Wired/Wireless Networks (QShine 2007)*, Vancouver, British Columbia, August, 2007.
- Juan Li, Son Vuong, "An Ontological Framework for Large-Scale Grid Resource Discovery", in Proceedings of *the IEEE Symposium on Computers and Communications (ISCC'07),* Aveiro, Portugal, July, 2007.
- Juan Li, Son Vuong, "OntSum: A Semantic Query Routing Scheme in P2P Networks Based on Concise Ontology Indexing", in Proceedings of *the 21st IEEE International Conference on Advanced Information Networking and Applications (AINA-07),* Niagara Falls, Canada, May, 2007.
- Juan Li, Iulian Radu, Son Vuong, "GODIS: Ontology-Based Resource Discovery and Integration in Grids", in Proceedings of *the 18th IASTED International Conference: Parallel and Distributed Computing Systems*, Dallas, USA, November, 2006.
- Juan Li, Son Vuong, "Grid Resource Discovery Based on Semantic P2P Communities", in Proceedings of *the 21st Annual ACM Symposium on Applied Computing*, *(SAC-06)* Dijon, France, April, 2006.
- Juan Li, Son Vuong, "A Semantics-based Routing Scheme for Grid Resource Discovery", in Proceedings of the *1st IEEE International Conference on e-Science and Grid Computing*, (*eScience2005)*, Melbourne, Australia, December, 2005.

- Juan Li, Son Vuong, "Semantic Overlay Network for Grid Resource Discovery", in Proceedings of the *6th IEEE/ACM International Workshop on Grid Computing (Grid05)* , Seattle, USA, November, 2005.
- Juan Li, Son Vuong, "A Scalable Semantic Routing Architecture for Grid Resource Discovery", in Proceedings of the *the 11th IEEE International Conference on Parallel and Distributed Systems (ICPADS05)*, Fukuoka, Japan, July, 2005.
- Juan Li, Son Vuong, "Ontology-Based Clustering and Routing in Peer-to-Peer Networks", in Proceedings of the *6th International Conference on Parallel and Distributed Computing, Applications and Technologies*, Dalian, China, December, 2005.
- Juan Li, Son Vuong, "Grid Resource Discovery Using Semantic Communities", in Proceedings of the *4th International Conference on Grid and Cooperative Computing,* Beijing, China, November, 2005.
- Juan Li, Son Vuong, "An Efficient Clustered Architecture for P2P Networks", in Proceedings of *the 18th IEEE International Conference on Advanced Information Networking and Applications, (AINA2004)*, Fukuoka, Japan, March, 2004. (Best Paper)
- Son Vuong, Xiaojuan Cai, Juan Li, Sukanta Pramanik, Duncan Suttles, Reggie Chen, "FedGrid: An HLA Approach to Federating Grids", in Proceedings of the*Workshop on HLA-Based Distributed Simulation on the Grid,* Krakow, Poland, June, 2004.
- Juan Li, Son Vuong, "An Efficient Clustered Architecture for P2P Networks", *Journal of Interconnection Networks (JOIN),* Vol. 5, No. 3, 2004.

Courses taught this and last academic year term-by-term. This year is the academic year in which this Self Study report is prepared; the last year was the year prior to this. If you were on sabbatical leave, please enter the information for the year prior to sabbatical. Please list each section of the same course separately.

Term/year: Fall/2008
Course # CSCI426/626
Course Title: Introduction to Artificial Intelligence
Semester Hrs 3 credits
Class size 18 students

Term/year: spring/2009
Course # CSCI724
Course Title: Survey of Artificial Intelligence
Semester Hrs 3 credit
Class size: 38

Estimate the percentage of your time devoted to scholarly and/or research activities: 50%. Please give a brief description of your major research and scholarly activities:

My general research interests lie in the area of distributed system. My research work focuses on P2P networking, mobile ad hoc network, social network, and semantic web technologies.

Kenneth Magel

Name, current academic rank, and tenure status:

Name: Ken Magel
Rank: Professor and Associate Department Head
Tenure Status: tenured

Date of original appointment to this faculty, followed by dates and ranks of advancement:

Title: Associate Professor
Dates Held; August, 1983 – July 1, 1987

Title; Professor
Dates Held; July 1, 1987 - present

Degrees with fields, institutions, and dates

Degree: Sc.B.
Field Applied: Mathematics
Institution: Brown University
Date: June, 1972

Degree: Sc.M.
Field Applied: Mathematics
Institution: Brown University
Date: June, 1974

Degree: Ph.D.
Field: Computer Science
Institution: Brown University
Date: June, 1977

Other related computing experience including teaching, industrial, governmental, etc. (where, when, description and scope of duties):

Date: August 15, 1976 – May 15, 1978
Where: Wichita State University, Wichita, Kansas
Duties: Assistant Professor of Computer Science

Date: August 15, 1978 – August 15, 1982
Where: University of Missouri – Rolla
Duties: Assistant Professor of Computer Science

Date: August 15, 1982 – May 15, 1983
Where: University of Texas _ San Antonio
Duties: Associate Professor of Computer Science

Date: May 15, 1983 – August 15, 1983
Where: Lawrence-Livermore National Laboratory
Duties: Computer Scientist on project to introduce software complexity metrics to the Laboratory.

For the academic year in which the Self Study was written list your assigned duties other than for teaching, (community membership, advising, etc.) with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time or part time faculty, please indicate here which courses.

a. Associate Department Head, 23 hours per week, 2 summer months of salary
b. Software Engineering Coordinator, 2 hours per week
c. Advising graduate and undergraduate students, 4 hours per week
d. Research, 6 hours per week.

For the four years preceding the Self Study, list all department, college, and/or university committees of which you are/were a member including year(s) served:

Department

- Department Chair, August 15, 2005 – July 1, 2007
- Associate Department Head, July 1, 2007 - present
- Chair, Faculty Recruiting Committee, August 20, 2005 – present
- Software Engineering Coordinator, July 1, 2002 – present
- Developed distance education version of Software Engineering Graduate Certificate
- Developed proposal for Master of Software Engineering program (now before State Board of Higher Education)
- Developed and graded the Software Engineering section of the Computer Science Comprehensive/Qualifier examination each semester
- Developed and coordinated the group grading of the Software Engineering Comprehensive/Qualifier examination each semester
- Developed extensive accreditation and assessment materials

College

- Nominations and Awards Committee, October, 2005 – present; Chair August, 2007 - present
- Curriculum Committee, October, 1985 - present
- Policy Committee, July, 2006 – June, 2007.

University

- Faculty Personnel Committee, May, 2005 – May, 2009
- University Assessment Committee, July, 2006 – present

Profession

- Referee for numerous conferences and journals
- Institutional Representative, Computing Research Association

Principal publications during the last five years. Give in standard bibliographic format.

Refereed

- "Automated GUI Testing", with I. Alsmadi (graduate student), IEEE International Conference on Software Engineering Advances, Tahiti French Polynesia, October 29 – November 3, 2006.
- "Open Source Evolution Analysis", with I. Alsmadi, 22nd IEEE International Conference on Software Maintenance, Philadelphia, September 24 – 27, 2006.
- "Generating Test Cases from the GUI Model", with I. Alsmadi, IASTED International Conference on Human Computer Interaction, Chamonix, France, March 14 – 16, 2007.
- "GUI Path Oriented Test Generation Algorithms", with I. Alsmadi, International Conference on Software Engineering Theory and Practice, Orlando, Florida, July 9 – 12, 2007.
- "Software Localization: The Challenging Aspects of Arabic to the Localization Process", with S. Abufardeh, IASTED International Congerence on Software Engineering, Innsbruck, Austria, Febrary 12 – 14, 2008.
- "Software Internationalization: Crosscutting Concerns Across the Development Lifecycle", with S. Abufardeh, IEEE International Conference on New Trends in Information and Service Sciences, Beijing, China, June 30 – July 2, 2009.

Other Publications

- "An Object Oriented Framework for User Interface Test Automation", with I. Alsmadi, Midwest Instruction and Computing Symposium, Grand Forks, April 20 – 21, 2007.

Courses taught this and last academic year term-by-term. This year is the academic year in which this Self Study report is prepared; the last year was the year prior to this. If you were on sabbatical leave, please enter the information for the year prior to sabbatical. Please list each section of the same course separately.

Term/year: **Fall/2007**
Course # CSCI 713
Course Title: Introduction to Artificial Intelligence
Semester Hrs 3 credits
Class size 36 students

Course # CSCI 713 DCE
Course Title: Introduction to Artificial Intelligence
Semester Hrs 3 credits
Class size 3 students

Course # CSCI 716 DCE
Course Title: Software Design
Semester Hrs 3 credits
Class size 2 students

Course # CSCI 790
Course Title: Semenar
Semester Hrs 1 credits
Class size 14 students

Course # CSCI 793
Course Title: Individual Study – Software Development
Semester Hrs 3 credits
Class size 3 students

Term/year: **Spring/2008**
Course # CSCI 716
Course Title: Software Design
Semester Hrs 3 credits
Class size 29 students

Course # CSCI 716 DCE
Course Title: Software Design
Semester Hrs 3 credits
Class size 4 students

Course # CSCI 790
Course Title: Semenar
Semester Hrs 1 credits
Class size 11 students

Term/year: **Fall/2008**
Course # CSCI 713
Course Title: Introduction to Artificial Intelligence
Semester Hrs 3 credits
Class size 22 students

Course # CSCI 713 DCE

Course Title: Introduction to Artificial Intelligence
Semester Hrs 3 credits
Class size 5 students

Course # CSCI 790
Course Title: Semenar
Semester Hrs 1 credits
Class size 7 students

Term/year: Spring/2009
Course # CSCI 374
Course Title: Computer Organization
Semester Hrs 3 credits
Class size 36 students

Course # CSCI 716
Course Title: Software Design
Semester Hrs 3 credits
Class size 4 students

Course # CSCI 716 DCE
Course Title: Software Design
Semester Hrs 3 credits
Class size 6 students

Course # CSCI 790
Course Title: Semenar
Semester Hrs 1 credits
Class size 4 students

Kendall Nygard

Name, current academic rank, and tenure status:

Name: Kendall E. Nygard
Rank: Professor
Tenure Status: Tenured

Date of original appointment to this faculty, followed by dates and ranks of advancement:

Title: Assistant Professor
Dates Held: 1997 - 1983

Title: Associate Professor
Dates Held: 1983 - 1992

Title: Professor
Dates Held: 1992 - date

Degrees with fields, institutions, and dates

Degree: Bachelor of Arts
Field: Mathematics and Physics
Institution: Moorhead State College, Moorhead, MN
Date: 1969

Degree: Master of Arts
Field: Mathematics
Institution: Mankato State University, Mankato, MN
Date: 1973

Degree: PhD
Field: Operations Research
Institution: Virginia Polytechnic Institute and State University, Blacksburg, VA
Date: 1978

Conferences, workshops, and professional development programs in which you have participated in the last 5 years to improve teaching and professional competence in the program area:

* I have participated in several workshops on the NDSU campus that are aimed at teaching improvement. I Have been PI for several federal grants in the educational area, including a $250,000 award for developing an ecommerce graduate certificate program, a $500,000 NSF award for scholarships in the S-STEM area, and three $15,000 grants in the area of course development for computer technologies in logistics. While department chair I also worked with the NDSU teaching support center to initiate activities to facilitate improvement of teaching in the department. I have also served as a senior faculty mentor to several Assistant Professors while they were new in the department, including sitting in on classes and advising on teaching methodologies.

Other related computing experience including teaching, industrial, governmental, etc. (where, when, description and scope of duties):

Date: Summer, 2000
Where: Air Force Research Lab, Wright-Patterson AFB, Ohio
Duties: Develop models and software for cooperative control of Unmanned Air Vehicles. The software that I developed and delivered in the summer of 2000 is still widely used by Air Force scientists

For the academic year in which the Self Study was written list your assigned duties other than for teaching, (community membership, advising, etc.) with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time or part time faculty, please indicate here which courses.

* I serve as graduate program coordinator for the department. This is large commitment of time. I act on all applications for graduate school (on the order of 225 per year), sign off on plans of study, approve international student paperwork, assign graduate assistants, and myriad other duties.

For the four years preceding the Self Study, list all department, college, and/or university committees of which you are/were a member including year(s) served:

- Faculty recruiting committees, 2005 - 2009
- College PT & E committee (Chair 2007, member 2008)
- Department Curriculum committee, 2005 - 2009
- Department Assessment/accreditation committee, 2006 -2009
- MIS Program Management Committee
- Graduate Program Management Committee (chair)
- Award nominations committee, 2008 – 2009

Principal publications during the last five years. Give in standard bibliographic format.

Journal Articles

- Zhang, W., J. Kong, and K. Nygard, Adpaptive Pervasive Computing System Configuration under QOS Constraints, International Journal of Computers and Applications, 2009.
- Altenburg, K., M.Hennebry, J.Pikalek, and K. Nygard, Simian: A Multi-agent Simulation Framework for Decentralized UAV Task Allocation, ISAST Transactions on Intelligent Systems, 2008.

- Knudson, Dean, Alan Braaten, Kenneth Magel and Kendall E. Nygard, Software Engineering in Computer Science Capstone Projects, International Conference on Software Engineering Theory and Practice (SETP-07), 2007
- Lundell, M, D. Xu, D. Tolliver, and K. Nygard, A Multi-agent Design for Sense and Respond Logistics Simulation, World Review of Intermodal Transportation Research, Vol 1(4), 2007
- Du, Xiaojiang, M. Zhang, K. Nygard, M. Guizani, and H. H. Cen, "Self-Healing Sensor Networks with Distributed Decision Making," International Journal of Sensor Networks, 2007
- Xu, Dianxiang, Vivek Goel, Kendall Nygard and Eric Wong, "Aspect-Oriented Specification of Threat-Driven Security Requirements." International Journal of Computer Applications in Technology (IJCAT) Special Issue on: "Concern-Oriented Software Evolution," 2007
- Xu, Dianxiang and Kendall E. Nygard, "Threat-Driven Modeling and Verification of Secure Software Using Aspect-Oriented Petri Nets," IEEE Transactions on Software Engineering, 32(4), pp. 265-278, 2006.
- Dianxiang Xu, Priti Borse, Karl Altenburg, and Kendall E. Nygard, Distributed Control of Self-organizing Systems with Petri Nets, WSEAS Transactions on Systems, 5 (4), April, 2006
- Martin Lundell, Jingpeng Tang, Thaddeus Hogan, and Kendall E. Nygard, Agent-oriented Simulation of Cooperative UAV Missions,WSEAS Transactions on Systems, 5(4), April, 2006
- Ray, Sisir, Chris Besemann, Anne Denton, and Kendall E.Nygard, Learning Theory and Styles in Online Computer Science Courses, Transactions on Advances in Engineering Education 1(1), 2005

Book Chapters

- Patterson, Jared, and Kendall E. Nygard, "Market-based Adaptive Task Allocations for Autonomous Agents," Chapter 14 in Cooperative Systems Control and Optimization, Springer, Lecture Notes in Economics and Mathematical Systems , Vol. 588, Grundel, D.; Murphey, R.; Pardalos, P.; Prokopyev, O. (Eds.), 2007
- Nygard, K., K. Altenburg, J. Tang, D. Schesvold, J. Pikalek, and M. Hennebry, Alternative Control Methodologies for Patrolling Assets with Unmanned Air Vehicles, in Prokopyev, Oleg, D. Grundel, R. Murphy, and P. Pardalos, Eds World Scientific Series on Computers and Operations Research, Vol. 5, 2006
- Hennebry, Michael, Ahmed Kamel, and Kendall E. Nygard, An Integer Programming Model for Assigning Unmanned Air Vehicles to Tasks, in Recent Developments in Cooperative Control and Optimization, Kluwer publishing, Sergei Butenko and Robert Murphy, Eds, 2004

Fully Refereed Proceedings

- Zhang, Weiyi, Xiaojiang Du, Kendall Nygard, and Tie Wang, "Dynamic p-cycle Construction within Link Capacity Constraint", Proceedings of the IEEE International Conference on Communications 2009, Dresden, June, 2009
- Zhang, Weiyi, J. Kong, K. Nygard, and M. Li, " Adaptive Pervasive Computing System Configuration Under QOS Constraints", Proceedings of the 6th IEEE Consumer Communications and Networking Conference, Las Vegas, January, 2009.
- Nygard, K., and M. Lundell, Research Directions for Cooperative Autonomous Systems, In Proceedings of the 11th International Conference on Humans and Computers, Nagaoka, Japan, November, 2008
- Xiaojiang Du, Kendall Nygard, and Tie Wang, "Dynamic p-cycle Construction within Link Capacity Constraint", Proceedings of the IEEE International Conference on Communications 2009, Dresden, June, 2009
- W. Zhang, J. Kong, K. Nygard, and M. Li, " Adaptive Pervasive Computing System Configuration Under QOS Constraints", Proceedings of the 6th IEEE Consumer Communications and Networking Conference, Las Vegas, January, 2009.
- Nygard, K., M. Lundell, D. Xu, and J. Pikalek, "Multi-agent Designs for Ambient Systems," in the Proceedings of the First International Conference on Ambient Media and Systems, 2008
- Brown, J., X. Du, and K. Nygard, "An Efficient Public-Key-Based Heterogeneous Sensor Network Key Distribution Scheme," in the Proceedings of the 2007 IEEE GLOBECOM Conference, 2007.

- Xu, Dianxiang, Vivek Goel, and Kendall Nygard. An Aspect-Oriented Approach to Security Requirements Analysis. In Proc. of the 30th IEEE International Computer Software and Applications Conference (COMPSAC'06), Chicago, Sept. 2006.
- Xu, Dianxiang, and Kendall Nygard. A Threat-Driven Approach to Modeling and Verifying Secure Software. Proceedings of the IEEE/ACM International Conference on Automated Software Engineering (ASE 2005), California, November, 2005.
- Lundell, Martin, Jingpeng Tang, Thaddeus Hogan, and Kendall E. Nygard, An Agent-based Heterogeneous UAV Simulator Design, Proceedings of the 5th International Conference on Artificial Intelligence, Knowledge Engineering, and Databases (AIKED), February, 2006.
- Zhang, Ming, Xiaojiang Du, Hsiao-Hwa Chen and Kendall Nygard, Distributed Decision Making Algorithm for Self-Healing Sensor Networks, IEEE International Conference on Communications, 2006.
- Zhang, Ming, Xiaojiang Du, Kendall Nygard, Improving Coverage Performance in sensor Networks by using Mobile Sensors, in Proceedings of the IEEE Military Communication Conference (MILCOM 2005), Atlantic City, 2005.
- Xu, Dianxiang; Weifeng Xu and Kendall E. Nygard, *A State-Based Approach to Testing Aspect-Oriented Programs, in Proceedings of the* 17th International Conference on Software Engineering and Knowledge Engineering (SEKE'05), July, 2005.
- Ramaswamy, Sanjay, Huirong Fu, and Kendall E. Nygard, Simulation Study of Multiple Black Holes Attack on Mobile Ad Hoc Networks, in Proceedings of the 2005 International Conference on Wireless Networks, Las Vegas, June, 2005.
- Lundell, Martin, Tang, Jingpeng, and Kendall E. Nygard, Fuzzy Petri Net for UAV Decision Making, in Proceedings of the 2005 International Symposium on Collaborative Technologies and Systems, May 15-20, 2005, Saint Louis, Missouri, USA
- Najadat, Hassan , Kendall E. Nygard, and Doug Schesvold, Clustering-Based Method for Data Envelopment Analysis, in Proceedings of the International Conference on Modeling, Simulation and Visualization Methods, Las Vegas, June, 2005
- Ramaswamy, S., H. Fu, and K. Nygard, Effect of Cooperative Black Hole Attack on Mobile Ad Hoc Networks, 1st IEEE International Conference on Mobile Ad-hoc and Sensor Systems, Florida, October, 2004
- Nygard, Kendall E., K. Altenburg, J. Tang, D. Schesvold, and J. Pikalek, Alternative Control Methodologies for Patrolling Assets with Unmanned Air Vehicles, IEEE Conference on Decision and Control, December, 2004
- Xu, D., P. Borse, K. Grigsby, and K. Nygard, A Petri Net Based Software Architecture for UAV Simulation, 2004 International Conference on Software Engineering Research and Practice, June, 2004

Other scholarly activity during the last 5 years: grants, sabbaticals, software development, etc:

- 41 grants and contracts at NDSU totaling $4,117,593
- Designing Robust and Secure Heterogeneous Sensor Networks, DEPSCoR ARO, 9/08 – 8/11, $358,497, 2008 (Co-PI)
- S-Stem Scholarship Program, National Science Foundation, 10-01-2006 to 09-30-2010, $463,200 (PI)
- Smart Sensing and Decision Making for NASA Sensor Webs, NASA EPSCoR, 8/06 – 7/07, $85,000 (PI)
- Swarm Intelligence for Cooperative Control in Spacecraft Constellations, NASA EPSCoR, 4/1/04 – 7/15/04, $8,500 (PI)
- Near-real Time Mission Planning for Autonomous Air Vehicles, Office of Naval Research (DOD DEPSCoR), 4/1/02 – 3/30/05, $351,944 (PI)
- Cooperative Control of Multiple Autonomous Vehicles, Air Force Office of Scientific Research (DOD DESPCoR), 5/31/01 – 10/30/04, $345,000 (PI)

Courses taught this and last academic year term-by-term. This year is the academic year in which this Self Study report is prepared; the last year was the year prior to this. If you were on sabbatical leave, please enter the information for the year prior to sabbatical. Please list each section of the same course separately.

Term/year:	Fall 2007
Course:	# 790
Course Title:	Research Seminar
Semester Hrs:	1
Class size	10

Term/year:	Spring 2008
Course #	418/618, 489/689, 783
Course Title:	Simulation Models, Social Implications of Computers, Computer Technologies in Logistics
Semester Hrs:	3, 3, 3
Class size	19, 5, 67, 8, 3

Term/year:	Fall 2008
Course #	453/653, 790
Course Title:	Linear Programming and Network Flows, Research Seminar
Semester Hrs:	3
Class size	6, 5, 10

Term/year:	Spring 2009
Course #	489/689,783
Course Title:	Social Implications of Computers, Computer Technologies in Logistics
Semester Hrs:	3
Class size	63, 12, 2

Estimate the percentage of your time devoted to scholarly and/or research activities: 35 %. Please give a brief description of your major research and scholarly activities:

Serve as major advisor for a large numbers of graduate students, and, in some cases, publish with them. Carry out an active research program involving a variety of topics, including unmanned air vehicle control, artificial intelligence, networks, security, and data envelopment analysis. Publish regularly in refereed professional media. Regularly write proposals for external funding and regularly receive research awards.

William Perrizo

Name, current academic rank, and tenure status:

Name: William Perrizo
Rank: Professor
Tenure Status: tenure

Date of original appointment to this faculty, followed by dates and ranks of advancement:

Title Assistant Professor
Dates Held 1973-1978

Title Associate Professor
Dates Held 1978-1986

Title Professor
Dates Held 1986-present

Degrees with fields, institutions, and dates

Degree:	B. A.
Field	mathematics
Institution	St. John's University
Date	1965

Degree:	M.S.
Field	mathematics
Institution	University of Wisconsin, Madison
Date	1967

Degree:	Ph.D.
Field	mathematics
Institution	University of Minnesota, Minneapolis
Date	1972

Conferences, workshops, and professional development programs in which you have participated in the last 5 years to improve teaching and professional competence in the program area: Database and Data Mining

- "Lossless Image Compression Technique Using Generic Peano Pattern Mask Trees", Proc. of 11th Int'l Conference On Computer Info. Tech. (ICCIT-2008), Dhaka, Bangeladesh, Dec. 2008. (with H. Kabir, S. Imam, and K. Hasan).

- "Lossless Image Compression using Generic Peano Pattern Mask Tree", Conference Proceedings of ICCIT-2008 (Int'l Conf. on Computer and Info. Technology), Khulna, Bangeladesh, Dec. 25, 2008, (with Mohammad Hossein).

- "Data Mining Classification Using Parisot Correlation", 17th Internation Conference on Software Engineering and Data Engineering (SEDE-2008), Los Angeles, June 30-July2, 2008.

- "Parisot Correlation in Business Intelligence", 17th Internation Conference on Software Engineering and Data Engineering (SEDE-2008), Los Angeles, June 30-July2, 2008.

- "Parameter Optimized, Vertical, Nearest Neighbor Vote and Boundary-Based Classification", 2007 Int'l Conference on Computers and Their Apps., Honolulu, A. Perera, W. Perrizo, March, 2007 (conf. "Best Paper Award").

- "Visualization of High-Dimensional Space", 2007 International Conference on Computers and Their Applications, M. Canton, W. Perrizo, Honolulu, March, 2007.

- "Spatial Proximity of Structural Attributes in Analysing Remotely Sensed Imagery", 2007 International Conference on Computers and Their Applications, M. Canton, W. Perrizo, Honolulu, March, 2007.

- "Biological, Intelligent Text-Based Ranking of Genes", Intenational Conference on Software Engineering and Data Eng., Los Angeles, I. Rahal, W. Saeed, A. Srivastava, P. Kotala, R. Syamala, C. Carvalho, W. Perrizo, July, 2006.

- "A Predicate-based Incremental Refresh Method for a Data Warehouse", Proceedings of the International Conference on Software Engineering and Data Engineering, Los Angeles, D. Ren, G. Zhang, W. Perrizo, July, 2006.
- "A Hierarchical Approach for Clusters in Different Densities", Proceedings of the International Conference on Software Engineering and Data Engineering, Los Angeles, B. Wang, W. Perrizo, July, 2006.
- "Statistic Preserving Steganography using Database Tables", 2006 International Conference on Computers and Their Applications, Seattle, G. Hamer, W. Perrizo, March, 2006.
- "Efficient Image Classification on Vertically Decomposed Data", IEEE Multimedia Databases and Data Management (MDDM'06), Atlanta, GA, April, 2006, T. Abidin, A. Dong, H. Li, W. Perrizo.
- "SMART-TV: A Fast and Scalable Nearest Neighbor Based Classifier for Data Mining", Association of Computing Machinery, Symposium on Applied Computing, April, 2006, Dijon, France, T. Abidin, W. Perrizo.
- "Vertical K-Median Clustering". International Conference on Computers and Their Applications, A. Perera, W. Perrizo, Seattle, March, 2006.

- "An Alternative Arrangement of Symmetric Datasets for Vertical Clustering Algorithms". Proceedings of International Conference on Computers and Their Applications, T. Abidin, W. Perrizo, Seattle, March, 2006.
- "Aggregate Function Computation and Iceberg Querying in Vertical Databases", International Conference on Computers and Their Applications, Y. Cui, W. Perrizo, Seattle, March, 2006.
- "Clustering Microarray Data based on Density and Shared Nearest Neighbor Measures", International Conference on Computers and Their Applications, Seattle, March, 2006, R. Syamala, W. Perrizo.
- "A Unified Theory of Data Mining based on Unipartite and Bipartite Graphs". Proceedings of International Conference on Computers and Their Applications, Seattle, March, 2006, W. Perrizo.
- "Improved Versions of Lossless Image Compression using PPM-trees", International Conference on Computer and Information Technology (ICCIT), Dhaka, Bangeladesh, December, 2005, K. Hussain, W. Perrizo
- "Algorithm for Shifting Images Stored in Peano Mask Trees", International Conference on Computer and Information Technology (ICCIT), Dhaka, Bangeladesh, December, 2005, K. Hussain, W. Perrizo.
- "Steganography-1", International Conference on Intelligent and Adaptive Systems and Software Engineering, Toronto, July, 2005, G. Hamer, W. Perrizo.
- "Steganography-2", International Conference on Intelligent and Adaptive Systems and Software Engineering, Toronto, July, 2005, G. Hamer, W. Perrizo.
- "Vertical Set Square Distance Based Clustering without Prior Knowledge", Conference on Intelligent and Adaptive Systems and Software Engineering, Toronto, 2005, A. Perera, T. Abidin, M. Serazi, G. Hamer, W. Perrizo.
- "An API for Transparent Distributed Vertical Data Mining", International Conference on Intelligent and Adaptive Systems and Software Engineering, Toronto, July, 2005, M. Serazi, A. Perera, T. Abidin, G. Hamer, W. Perrizo
- "Vertical Set Square Distance: A Fast and Scalable Technique to Compute Total Variation", International Conference on Computers and Apps, New Orleans, March, 2005, T. Abidin, A. Perera, M. Serazi, W. Perrizo.
- "Sub-Cellular Ex. of Species Cytoplasm Specific Gene in Different Stages of Wheat Devel.", Plant and Animal Genome Conference Poster ,2004, San Diego, K. Hussain, D. Laudencia, O. Lizarazu, S. Kianian, W. Perrizo.
- "Invisible Digital Watermarking of Remotely Sensed Satellite Images – A New Approach", ISCA Conference on Computer Applications in Industry and Engineering, Orlando, FL, Nov., 2005, S. Krebsbach, W. Perrizo.
- "Incremental Interactive Mining of Constrained Association Rules from Biological Annotation Data" Association of Comp. Machinery, Symposium on Applied Comp., ACM SAC 2005, Mar., Santa Fe, NM, I. Rahal, W. Perrizo.
- "A Comprehensive Hierarchical Clustering Method for Gene Expression Data" Association of Computing Machinery, Symposium on Applied Computing, ACM SAC 2005, Mar., Santa Fe, NM, B. Wang, W. Perrizo.
- "Primer Design for Wheat Reverse Genetics from Triticum Monococcum ESTs", Plant and Animal Genome Conference Poster 2004, Jan., 04, San Diego, CA (w R. Syamala, A. Rishi, K. Hussain, R. Yadigari, S. Kianian).
- "Bayesian Classification for Spatial Data using P-trees", IEEE International Multi-Topics Conference, IEEE INMIC, Lahore, Pakistan, Dec., 2004, (with Md. K. Hossain, R. Alam, A. Reaz)
- "A P-tree-based Outlier Detection Algorithm", International Society of Computer Applications Conference on Applications. in Industry and Engineering., ISCA CAINE 2004, Orlando, FL, Nov., 2004 (with B. Wang, D. Ren)
- "A Cluster-based Outlier Detection Method with Efficient Pruning", International Society of Computer Applications Conf. on Applics. in Industry and Eng., ISCA CAINE, Nov., 2004 (with B. Wang, D. Ren)

- "A Density-based Outlier Detection Algorithm using Pruning Techniques", International Society of Computer Applications Conf. on Applics. in Industry and Eng., ISCA CAINE 2004, Nov., 2004 (w B. Wang, K. Scott, D. Ren)
- "Parameter Reduction for Density-based Clustering on large Data Sets", International Society of Computer Applications Conference on Applications in Industry and Engineering, ISCA CAINE 2004, Nov., 2004 (w B. Wang)
- "Outlier Detection with Local Pruning", Association of Computing Machinery Conference on Information and Knowledge Management, ACM CIKM 2004, Nov., 2004, Washington, D.C., (with D. Ren).
- "Bioinformatics Involving Vertical Data", Fourth Virtual Conference on Genomics and Bioinformatics, VCGB 2004, September, 2004.
- "RDF: A Density-based Outlier Detection Method using Vertical Data Representation", IEEE International Conference On Data Mining, IEEE ICDM 2004, Nov., 2004, Brighton, U.K., (with D. Ren, B. Wang).
- "A Vertical Outlier Detection Method with Clusters as a By-Product", IEEE International Conf. On Tools in Artificial Intelligence, IEEE ICTAI 2004, Nov., 2004, Boca Raton, FL, (with D. Ren).
- "Mining Confident Minimal Rules with Fixed-Consequent", IEEE International Conference On Tools in Artificial Intelligence, IEEE ICTAI 2004, Nov., 2004, Boca Raton, FL, (with I. Rahal).
- "Properties of Universal and Existential Predicates on Predicate-Bushes", Rushmore Regional Conference on Biocomplexity, August, 2004, Sioux Falls, SD, (with D. Akimov)
- "DataMIME™", Proceedings of Association of Computing Machinery, Management of Data, ACM SIGMOD 2004, Paris, June 2004. (with I. Rahal, M. Serazi, A. Perera, Q. Ding, F. Pan, D. Ren, W. Wu, and V. Malakhov)
- "Efficient Ranking of Keyword Queries Using P-Trees", Proceedings of the 19th International Conference on Computers and Their Applications (CATA-04), Seattle, WA, March 2004. (with F. Pan, I. Rahal, Y. Cui)
- "A Kernel-Based Semi-Naïve Bayesian Classifier Using P-Trees", Proceedings of SIAM Data Mining Conference, SIAM DM 2004, Lake Buena Vista, FL, April 2004. (with A. Denton).
- "Decision Tree Induction for Dynamic, High-Dimensional Data Using P-Trees", Proceedings of International Conference on Computers and Their Applications (CATA-04), Seattle, WA, March 2004. (with A. Denton)
- "Rapid and Accurate KNN/PSVM for Microarray Gene Expression Analysis", Proceedings of SIAM Bioinformatics Workshop, Lake Buena Vista, FL, April 2004. (with F. Pan, B. Wang, X. Hu)
- "Efficient Density Clustering Analysis for Gene Expression Data", Proceedings of SIAM Workshop, Lake Buena Vista, FL, April 2004. (with F.Pan, B.Wang, X.Hu).
- "An optimized Approach for KNN Text Categorization using P-trees", Proceedings of the ACM Symposium on Applied Computing, Nicosia, Cyprus, March 2004. (with I. Rahal)
- "Efficient Density Clustering for Spatial Data", ECML PKDD 2003. (with F. Pan, B. Wang, Y. Zhang, D. Ren, X. Hu).

Other related computing experience including teaching, industrial, governmental, etc. (where, when, description and scope of duties):

Date 2005-2008
Duties: Vice President of International Society for Computers and Their Applications

Date: 2005-present
Duties: Editor, The Journal of Computational Intelligence in Bioinformatics (JCIB)

Date: 2005-present
Duties: Editor, The Bioinformation Journal

For the academic year in which the Self Study was written list your assigned duties other than for teaching, (community membership, advising, etc.) with average hours per week. Indicate which, if any, carry extra

compensation. If you are course coordinator for courses taught by other than full-time or part time faculty, please indicate here which courses.

I am assuming that "teaching" includes the research I do as part of my job.

I advised between 30 and 50 students each year. I received no additional compensation for that.

For the four years preceding the Self Study, list all department, college, and/or university committees of which you are/were a member including year(s) served:

2008-present Center for High Performance Computing Ptree1 System Research Director
2007-present University Distinguished Professors Council
2005-06 Chair, Computer Science Department Head Recruiting Committee
2005-06 Computer Science Department Headship Recruiting Committee
2005-06 College of Science and Mathematics Rules Committee
2005-06 College of Science and Mathematics Dean Search Committee
2005-07 Computer Science Department Recruiting Committee
2005-06 Chair, Computer Science Department Recruiting Committee
2005-06 Computer Science Department Information Assurance Curriculum Committee
2005-06 Presidential Professorships Committee (Gehrts/Engberg/Hogoboom)
2004-07 Computer Science Department Bioinformatics Curriculum Committee
2004-present University Multidisciplinary Graduate Program in Genomics and Bioinformatics Board
2004-present Center for High Performance Computing Advisory Board
2004-05 Computer Science Department Recruiting Committee
2003-05 College of Science and Mathematics Rules Committee
2001-04 University Multidisciplinary Genomics and Bioinformatics Program Development Committee
2000-present NSF Virtual Conferences on Genomics and Bioinformatics Organizing Committee (Chair since 2002)
2000-present NSF Virtual Conferences on Genomics and Bioinformatics Program Committee (Chair since 2004)

Principal publications during the last five years. Give in standard bibliographic format.

* "Vertical Data Mining on Very Large Database Systems", Information Science Journal, Volume IV, IGI Global Publishing Company, QA76.9D37E52, 2008, pp2036-2041, W. Perrizo, Qiang Ding, Qin Ding, Taufik Abidin.

* "PARM - An Efficient Algorithm to Mine Association Rules from Spatial Data" has been accepted by Institute of Electrical and Electronic Engineering (IEEE) Transactions of Systems, Man, and Cybernetics, Volume 38, Number 6, ISSN 1083-4419), pp. 1513-1525, December, 2008 (with Qin Ding and Qiang Ding)..

* "Support-less Association Rule Mining using Tuple Count Cubes", Journal of Information and Knowledge Management (JIKM), . iKMS & World Scientific Pub., Dec., 2007 Volume 6, No. 4, pp. 271-280, (with Q. Ding).

* "A Hybrid Clustering Method for Evaluating and Classifying Gene Expression Data", International Journal of Computers and Their Applications, Volume 14, Number 4, ISSN 1076-5204, B. Wang and W. Perrizo, Dec., 2007.

* "Parameter Optimized, Vertical, Nearest Neighbor-Vote and Boundary-Based Classification", Association of Computing Machinery Knowledge Discovery and Datamining Explorations, Volume 8, Issue 2, December, 2006, pp. 63-69, A. Perera and W. Perrizo.

* "The Role of Data Mining in Turning Biological Data into Biological Information", The International Journal of Bioinformation, 2007; Volume 1, Number 9, pp. 351–355, December, 2007.

* "CARIBIAM: Constrained Association Rules using Interactive Biological IncrementAl Mining.", Int'l Journal of Bioinformatics Research and Apps., w. I. Rahal, R Rahal, B.Wang, W. Perrizo, 2008, Vol. 4, No. 1, pp. 28-48

* "An Efficient Weighted Nearest Neighbor Classifier using Vertical Data Representation", International Journal of Business Intelligence and Data Mining, Q. Ding, M. Khan, A. Denton, Qi. Ding, W. Perrizo, Vol.2, No. 1, March, 2007, pp 64-78, ISSN: 1743-8195.

* "Efficiency Considerations for k-Nearest Neighbor Text Categorization", Journal of Information & Knowledge Management, Volume 5, No. 3, 211-222. iKMS & World Scientific Pub., I. Rahal, H. Najadat, W. Perrizo, 2006.

* "An Efficient Vertical Quantitative Frequent Pattern Mining System", The International Journal on Computers and Their Applications (ISCA), Volume 12, Number 4, pp 233-240, B. Wang, F. Pan, Y. Cui, W. Perrizo, 2005.

* "A Scalable Vertical Model for Mining Association Rules", Journal of Information and Knowledge Management (JIKM), . iKMS & World Scientific Pub. Co., Dec., 2007 Volume 3, No. 4, pp. 317-331, w. I. Rahal and D. Ren.

* "Exploiting edge semantics in citation graphs using efficient, vertical ARM," International Journal of Business Intelligence and Data Mining, Volume 2, Number 1, 2006, (with Qin Ding, Maleq Kahn, Qiang Ding, Anne Denton.

* "A Vertical Approach to Computing Set Squared Distance" The International Journal of Computers and Their Applications, ISSN 1076-5204, Volume 13, No. 22, pp. 94-102, T. Abidin, A. Perera, M. Serazi, W. Perrizo, 2006.

* "Exploiting Edge Semantics in Citation Graph Data Using an Efficient Vertical Association Rule Mining Model", Knowledge and Information Systems Journal (KAIS), Volume 10, Number 1, pp. 57-91, Springer-Verlag, London ISSN 0219-1377, (w I. Rahal, D. Ren, W. Wu, A. Denton, C. Besemann), 2006.

* "A Predicate-tree based Framework for Accelerating Multilevel Secure Database Queries", International Journal of Computer Applications, Volume 11, Number 4, December, 2004, pp 262-270, (with I. Rahal).

* "Comprehensive Vertical Sample-based K-Nearest Neighbor and Local Support Vector Machine Classification for Gene Expression Analysis", Journal of Biomedical Informatics, Elsevier, Volume 37, pp. 240-248, F. Pan, B. Wang, X. Hu, W. Perrizo, 2004

* "Multimedia Data Mining using Peano Trees", Springer Verlag LNCS#2797, ISBN3-540-20305-2, (with W. Jockheck, A. Perera, D. Ren, W. Wu Y. Zhang), 2003

* "Evaluating Performability of Tactical Communications Networks", Institute of Electronic and Electrical Engineering, Transactions on Vehicular Technology, Volume 53, Number 1, (with Victor Shi), 2004.

* "Read-Commit Order for Concurrency Control in Centralized High Performance Database Systems", Information: An International Journal, Volume 7, Number 1, pp 95-106, (with Victor Shi), 2004.

* "Cluster Analysis of Spatial Data Using Peano Count Trees", Information: An International Journal, Volume 7, Number 1, pp.15-26, Q. Ding, W. Perrizo, 2004.

* "A Lossless Image Compression Technique Using Generic Peano Pattern Mask Trees", Proceedings of the 11th International Conference On Computer Information Technology (ICCIT-2008), Dhaka, Bangeladesh, Dec. 2008. (with H. Kabir, S. Imam, and K. Hasan).

* "Lossless Image Compression using Generic Peano Pattern Mask Tree", Conference Proceedings of ICCIT-2008 (Int'l Conf. on Computer and Info. Technology), Khulna, Bangeladesh, Dec. 25, 2008, (with Mohammad Hossein)..

* "Data Mining Classification Using Parisot Correlation", 17th Internation Conference on Software Engineering and Data Engineering (SEDE-2008), Los Angeles, June 30-July2, 2008.

* "Parisot Correlation in Business Intelligence", 17th Internation Conference on Software Engineering and Data Engineering (SEDE-2008), Los Angeles, June 30-July2, 2008.

* "Parameter Optimized, Vertical, Nearest Neighbor Vote and Boundary-Based Classification", 2007 International Conference on Computers and Their Applications, Honolulu, A. Perera, W. Perrizo, March, 2007 (received the "Best Paper Award" for the entire conference).
* "Visualization of High-Dimensional Space", 2007 International Conference on Computers and Their Applications, M. Canton, W. Perrizo, Honolulu, March, 2007.
* "Spatial Proximity of Structural Attributes in Analysing Remotely Sensed Imagery", 2007 International Conference on Computers and Their Applications, M. Canton, W. Perrizo, Honolulu, March, 2007
* "Biological, Intelligent Text-Based Ranking of Genes", Intenational Conference on Software Engineering and Data Eng., Los Angeles, I. Rahal, W. Saeed, A. Srivastava, P. Kotala, R. Syamala, C. Carvalho, W. Perrizo, July, 2006.
* "A Predicate-based Incremental Refresh Method for a Data Warehouse", Proceedings of the International Conference on Software Engineering and Data Engineering, Los Angeles, D. Ren, G. Zhang, W. Perrizo, July, 2006.
* "A Hierarchical Approach for Clusters in Different Densities", Proceedings of the International Conference on Software Engineering and Data Engineering, Los Angeles, B. Wang, W. Perrizo, July, 2006.
* "Statistic Preserving Steganography using Database Tables", 2006 International Conference on Computers and Their Applications, Seattle, G. Hamer, W. Perrizo, March, 2006.
* "Efficient Image Classification on Vertically Decomposed Data", IEEE Multimedia Databases and Data Management (MDDM'06), Atlanta, GA, April, 2006, T. Abidin, A. Dong, H. Li, W. Perrizo.
* "SMART-TV: A Fast and Scalable Nearest Neighbor Based Classifier for Data Mining", Association of Computing Machinery, Symposium on Applied Computing, April, 2006, Dijon, France, T. Abidin, W. Perrizo.
* "Vertical K-Median Clustering". International Conference on Computers and Their Applications, A. Perera, W. Perrizo, Seattle, March, 2006.
* "An Alternative Arrangement of Symmetric Datasets for Vertical Clustering Algorithms". Proceedings of International Conference on Computers and Their Applications, T. Abidin, W. Perrizo, Seattle, March, 2006.
* "Aggregate Function Computation and Iceberg Querying in Vertical Databases", International Conference on Computers and Their Applications, Y. Cui, W. Perrizo, Seattle, March, 2006.
* "Clustering Microarray Data based on Density and Shared Nearest Neighbor Measures", International Conference on Computers and Their Applications, Seattle, March, 2006, R. Syamala, W. Perrizo.
* "A Unified Theory of Data Mining based on Unipartite and Bipartite Graphs". Proceedings of International Conference on Computers and Their Applications, Seattle, March, 2006, W. Perrizo.
* "Improved Versions of Lossless Image Compression using PPM-trees", International Conference on Computer and Information Technology (ICCIT), Dhaka, Bangeladesh, December, 2005, K. Hussain, W. Perrizo
* "Algorithm for Shifting Images Stored in Peano Mask Trees", International Conference on Computer and Information Technology (ICCIT), Dhaka, Bangeladesh, December, 2005, K. Hussain, W. Perrizo.
* "Steganography-1", International Conference on Intelligent and Adaptive Systems and Software Engineering, Toronto, July, 2005, G. Hamer, W. Perrizo.
* "Steganography-2", International Conference on Intelligent and Adaptive Systems and Software Engineering, Toronto, July, 2005, G. Hamer, W. Perrizo.
* "Vertical Set Square Distance Based Clustering without Prior Knowledge", Conference on Intelligent and Adaptive Systems and Software Engineering, Toronto, 2005, A. Perera, T. Abidin, M. Serazi, G. Hamer, W. Perrizo.
* "An API for Transparent Distributed Vertical Data Mining", International Conference on Intelligent and Adaptive Systems and Software Engineering, Toronto, July, 2005, M. Serazi, A. Perera, T. Abidin, G. Hamer, W. Perrizo

* "Vertical Set Square Distance: A Fast and Scalable Technique to Compute Total Variation", International Conference on Computers and Apps, New Orleans, March, 2005, T. Abidin, A. Perera, M. Serazi, W. Perrizo.
* "Sub-Cellular Ex. of Species Cytoplasm Specific Gene in Different Stages of Wheat Devel.", Plant and Animal Genome Conference Poster ,2004, San Diego, K. Hussain, D. Laudencia, O. Lizarazu, S. Kianian, W. Perrizo.
* "Invisible Digital Watermarking of Remotely Sensed Satellite Images – A New Approach", ISCA Conference on Computer Applications in Industry and Engineering, Orlando, FL, Nov., 2005, S. Krebsbach, W. Perrizo.
* "Incremental Interactive Mining of Constrained Association Rules from Biological Annotation Data" Association of Comp. Machinery, Symposium on Applied Computing, ACM SAC 2005, Mar., Santa Fe, NM, I. Rahal, W. Perrizo.
* "A Comprehensive Hierarchical Clustering Method for Gene Expression Data" Association of Computing Machinery, Symposium on Applied Computing, ACM SAC 2005, Mar., Santa Fe, NM, B. Wang, W. Perrizo.
* "Primer Design for Wheat Reverse Genetics from Triticum Monococcum ESTs", Plant and Animal Genome Conference Poster, Jan., 2004, San Diego, CA (w. R. Syamala, A. Rishi, K. Hussain, R. Yadigari, S. Kianian).
* "Bayesian Classification for Spatial Data using P-trees", IEEE International Multi-Topics Conference, IEEE INMIC, Lahore, Pakistan, Dec., 2004, (with Md. K. Hossain, R. Alam, A. Reaz)
* "A P-tree-based Outlier Detection Algorithm", International Society of Computer Applications Conference on Applications. in Industry and Engineering., ISCA CAINE 2004, Orlando, FL, Nov., 2004 (with B. Wang, D. Ren)
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* "A Density-based Outlier Detection Algorithm using Pruning Techniques", International Society of Computer Applications Conf. on Applics. in Industry and Eng., ISCA CAINE, Nov., 2004 (with B. Wang, K. Scott, D. Ren)
* "Parameter Reduction for Density-based Clustering on large Data Sets", International Society of Computer Applications Conference on Applications in Industry and Eng., ISCA CAINE 2004, Nov., 2004 (with B. Wang)
* "Outlier Detection with Local Pruning", Association of Computing Machinery Conference on Information and Knowledge Management, ACM CIKM 2004, Nov., 2004, Washington, D.C., (with D. Ren).
* "Bioinformatics Involving Vertical Data", Fourth Virtual Conference on Genomics and Bioinformatics, VCGB 2004, September, 2004.
* "RDF: A Density-based Outlier Detection Method using Vertical Data Representation", IEEE International Conference On Data Mining, IEEE ICDM 2004, Nov., 2004, Brighton, U.K., (with D. Ren, B. Wang).
* "A Vertical Outlier Detection Method with Clusters as a By-Product", IEEE International Conf. On Tools in Artificial Intelligence, IEEE ICTAI 2004, Nov., 2004, Boca Raton, FL, (with D. Ren).
* "Mining Confident Minimal Rules with Fixed-Consequent", IEEE International Conference On Tools in Artificial Intelligence, IEEE ICTAI 2004, Nov., 2004, Boca Raton, FL, (with I. Rahal).
* "Properties of Universal and Existential Predicates on Predicate-Bushes", Rushmore Regional Conference on Biocomplexity, August, 2004, Sioux Falls, SD, (with D. Akimov)
* "DataMIME™", Proceedings of Association of Computing Machinery, Management of Data, ACM SIGMOD 2004, Paris, June 2004. (with I. Rahal, M. Serazi, A. Perera, Q. Ding, F. Pan, D. Ren, W. Wu, and V. Malakhov)
* "Efficient Ranking of Keyword Queries Using P-Trees", Proceedings of the 19th International Conference on Computers and Their Applications (CATA-04), Seattle, WA, March 2004. (with F. Pan, I. Rahal, Y. Cui)

- "A Kernel-Based Semi-Naïve Bayesian Classifier Using P-Trees", Proceedings of SIAM Data Mining Conference, SIAM DM 2004, Lake Buena Vista, FL, April 2004. (with A. Denton).
- "Decision Tree Induction for Dynamic, High-Dimensional Data Using P-Trees", Proceedings of International Conference on Computers and Their Applications (CATA-04), Seattle, WA, March 2004. (with A. Denton)
- "Rapid and Accurate KNN/PSVM for Microarray Gene Expression Analysis", Proceedings of SIAM Bioinformatics Workshop, Lake Buena Vista, FL, April 2004. (with F. Pan, B. Wang, X. Hu)
- "Efficient Density Clustering Analysis for Gene Expression Data", Proceedings of SIAM Workshop, Lake Buena Vista, FL, April 2004. (with F.Pan, B.Wang, X.Hu).
- "An optimized Approach for KNN Text Categorization using P-trees", Proceedings of the ACM Symposium on Applied Computing, Nicosia, Cyprus, March 2004. (with I. Rahal)

Other scholarly activity during the last 5 years: grants, sabbaticals, software development, etc:
Grants:

2007-present NDSU University Distinguished Professorship Research Award, P.I., ($5,000 per year).
2007-2012 National Institute of Health COBRE grant, Senior Mentor (a $10,5000,000 grant, M. Sibi P.I.)
2006-2007. NSF BIO DBI, 6th Virtual Genomics and Bioinformatics Conference, PI ($17,684).
2005-2007. NSF EPSCoR, Dissertation Fellowship Grant, #FAR0010789, P.I. ($35,424).
2004-2006. NSF BIO DBI-0417190, 4th Virtual Genomics and Bioinformatics Conference, PI ($27,968).
2004-2006. NSF EPSCoR, Dissertation Fellowship Grant, #FAR0010793, P.I. ($29,520).
2003-2005. NSF BIO DBI-0313953, 3rd Virtual Genomics and Bioinformatics Conference, PI ($27,968).
2003-2008. NSF 0321462, Diploid Wheat Deletion Lines for Reverse Genetics, Co-PI ($427,471).
2003-2008. NSF 0321462, Diploid Wheat Deletion Lines for Reverse Genetics CS component, PI ($31,260).
2001-2006. GSA Virtual Archive Storage Terminal II (VAST): ACT#K96130308, PI, ($1,300,000)
2002-2009. IBM-RSI, Residual Value Surrogates-II, #3341-5512, PI, ($26,225)
2002-2003. NSF DBI-0313953, 2nd Virtual Genomics and Bioinformatics Conference, Co-PI ($27,968).
2001-2004. NSF NSDL Digital Archiving for Anthropology, NSF, Co-PI, ($712,846)

Software Patents:

- United States Patent and Trademark Office Patent Number 6,941,303 B2 (NDSU-RFT-75), issued September 6, 2005, "System and Method for Organizing, Compressing and Structuring Data for Data Mining Readiness", Inventor: William K. Perrizo, Application, No. 957637 filed on 2001-09-20, Abstract: A system and method to take data, which is in the form of an n-dimensional array of binary data where the binary data is comprised of bits that are identified by a bit position within the n-dimensional array, and create one file for each bit position of the binary data while maintaining the bit position identification and to store the bit with the corresponding bit position identification from the binary data within the created filed. Once this bit-sequential format of the data is achieved, the formatted data is structured into a tree format that is data-mining-ready. The formatted data is structured by dividing each of the files containing the binary data into quadrants according to the bit position identification and recording the count of 1-bits for each quadrant on a first level. Then, recursively dividing each of the quadrants into further quadrants and recording the count of 1-bits for each quadrant until all quadrants comprise a pure-1 quadrant or a pure-0 quadrant to form a basic tree structure.

- United States Patent and Trademark Office Patent Number 7,051,028 B2 (NDSU RFT-79), issued May 23, 2006, "Read-Commit Order Concurrency Control (ROCC)", Inventors: Victor T. Shi and William K. Perrizo, North Dakota State University, Abstract: A system and method for concurrency control in high performance database systems. Generally includes receiving a database access request message from a transaction. Then, generating an element that corresponds to the access request message. The element type is that of a read element, commit element, validated element, or restart element. The element is then posted to a read-commit (RC) queue. If the element is a commit element, an intervening validation of the transaction is performed. Upon the transaction passing validation the requested database access is performed.

- United States Patent and Trademark Office Patent Number 7,089,244 B2 (NDSU-RFT-99), issued August 8, 2006, "Multiversion read-commit order concurrency control", Inventors: Victor T. Shi and William K. Perrizo, North Dakota State University, Application No. 10440442 filed on 2003-05-16, Abstract: A system and method for multi-version concurrency control in high performance database systems. Generally includes receiving a database access request message from a transaction. Then, generating an element that corresponds to the access request message. The element type is that of a read element, commit element, validated element, or restart element. The element is then posted to a read-commit (RC) queue. If the element is a commit element, an intervening validation of the transaction is performed. Upon the transaction passing validation the requested database access is performed.

Three software patents pending:

- A divisional patent application related to PCM (6,941,303 B2) (NDSU-RFT-94), Similar Function Data Mining with P-trees – similar to System and Method for Organizing, Compressing and Structuring Data for Data Mining Readiness", Inventor: William K. Perrizo.

- Vertical Set Inner Product (VSIP) (NDSU-RFT-159) This novel algorithm provides at least a 10-fold increase in clustering and classifying numeric data by providing a horizontal calculation across a vertical P-tree dataset. It is related to but distinct from RFT-75 (PCM). A U.S. provisional application was filed on November 17, 2004 and a PCT patent application was filed November 17, 2005.

- Parameter Optimized, Vertical, Nearest Neighbor Vote and Boundary Based Classification (NDSU RFT-203). This invention involves a Computer Aided Detection (CAD) model that is designed to diagnose Pulmonary Embolisms (PE) from CT image information data sheets. This high performance classification system, includes a Local Decision Boundary based classification combined with an evolutionary algorithm for parameter optimization and a vertical data structure for efficient processing. The invention was developed as a solution for the ACM KDD Cup competition in 2006, and won task 3 of that competition. A U.S. Provisional Patent application was filed August 4, 2007.

Courses taught this and last academic year term-by-term. This year is the academic year in which this Self Study report is prepared; the last year was the year prior to this. If you were on sabbatical leave, please enter the information for the year prior to sabbatical. Please list each section of the same course separately.

Term/year	Fall / 2007
Course #	CSCI 765
Course Title	Introduction to Database Systems
Semester Hrs	3
Class size	57

Term/year	Spring / 2008
Course #	CSCI 479
Course Title	Introduction to Data Mining
Semester Hrs	3
Class size	2

Term/year	Spring / 2008
Course #	CSCI 679
Course Title	Introduction to Data Mining
Semester Hrs	3
Class size	12

Term/year	Fall / 2008
Course #	CSCI 765
Course Title	Introduction to Database Systems
Semester Hrs	3
Class size	56

Term/year	Spring / 2009
Course #	CSCI 479

Course Title	Introduction to Data Mining
Semester Hrs	5
Class size	2

Term/year	Spring / 2009
Course #	CSCI 679
Course Title	Introduction to Data Mining
Semester Hrs	3
Class size	17

Term/year	Spring / 2009
Course #	CSCI 766
Course Title	Advanced Database Internals
Semester Hrs	3
Class size	5

Estimate the percentage of your time devoted to scholarly and/or research activities:_50_%. Please give a brief description of your major research and scholarly activities:
My research is centered in Database Systems, Data Mining, Bioinformatics and Computer Networks.
The publications and patents listed in other sections of this report describe the specific topics, scope and quantities.
I have also won 2 major research contests sponsored by our manin Professional Society (The Association of Computing Machinery):
2002 Association of Computing Machinery (ACM) Knowledge Discovery and Data Mining (KDD) Cup Winning Team Leader of the Broad Class, Task 2. Yeast Gene Regulation Prediction: There are now experimental methods that allow biologists to measure some aspect of cellular "activity" for thousands of genes or proteins at a time. A key problem that often arises in such experiments is in interpreting or annotating these thousands of measurements. This KDD Cup task focused on using data mining methods to capture the regularities of genes that are characterized by similar activity in a given high-throughput experiment. To facilitate objective evaluation, this task did not involve experiment interpretation or annotation directly, but instead it involved devising models that, when trained to classify the measurements of some instances (i.e. genes), can accurately predict the response of held aside test instances. The training and test data came from recent experiments with a set of S. cerevisiae (yeast) strains in which each strain is characterized by a single gene being knocked out. Each instance in the data set represents a single gene, and the target value for an instance is a discretized measurement of how active some (hidden) system in the cell is when this gene is knocked out. The goal of the task is to learn a model that can accurately predict these discretized values. Such a model would be helpful in understanding how various genes are related to the hidden system http://www.acm.org/sigs/sigkdd/kddcup/index.php?section=2002&method=res.

2006 Association of Computing Machinery (ACM) Knowledge Discovery and Data Mining (KDD) Cup Winning Team Leader Task 3. Negative Prediction of Computer Aided Detection (CAD) of Pulmonary Embolism from Computer Aided Tomography (CAT) data. Our team score was twice as high as the next closest competitor score), see http://www.cs.unm.edu/kdd_cup_2006, http://www.cs.unm.edu/files/kdd-cup-2006-task-spec-final.pdf. The following description was lifted from these pages:

> **Task 3**: One of the most useful applications for CAD would be a system with very high (100%?) Negative Predictive Value. In other words, if the CAD system had zero positive candidates for a given patient, we would like to be *very* confident that the patient was indeed free from PE's. In a very real sense, this would be the "Holy Grail" of a PE CAD system.

Brian Slator

Name, current academic rank, and tenure status:

Name:	Brian M. Slator
Rank:	Professor
Tenure Status:	Tenured

Date of original appointment to this faculty, followed by dates and ranks of advancement:

Title:	Assistant Professor
Dates Held:	8/15/88 – 5/15/90
Title:	Associate Professor
Dates Held:	8/15/96 – 8/15/01
Title:	Professor
Dates Held:	8/15/01 – Present

Degrees with fields, institutions, and dates

Degree:	BS
Field:	Computer Science
Institution:	University of Wisconsin – La Crosse
Date:	1983
Degree:	MS
Field:	Computer Science
Institution:	New Mexico State University
Date:	1985
Degree:	PhD
Field:	Computer Science
Institution:	New Mexico State University
Date:	1988

Conferences, workshops, and professional development programs in which you have participated in the last 5 years to improve teaching and professional competence in the program area:

- 2007 CCAS Seminar for Department Chairs October 4-6 San Diego California

Other related computing experience including teaching, industrial, governmental, etc. (where, when, description and scope of duties):

Date	8/15/90 – 8/15/96
Where	Northwestern University – Institute for the Learning Sciences
Duties	Research Assistant Professor

For the academic year in which the Self Study was written list your assigned duties other than for teaching, (community membership, advising, etc.) with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time or part time faculty, please indicate here which courses.

- Research, Committee Service, Department Head

For the four years preceding the Self Study, list all department, college, and/or university committees of which you are/were a member including year(s) served:

- CS-MIS (1998-present). Committee member, Management Information Sciences (MIS) Steering Committee, Jospeph Latimer, Chair.
- NDSU-CS (2002-2004, Chair, 2005-2006, Member), Department of Computer Science Faculty Search Committee
- NDSU-RCC (2003-2006). College of Science and Mathematics representative on the NDSU Research and Consulting Committee
- CLW-04 (2004). Workshop Invitee, National Science Foundation Cyberlearning Workshop. Washington, DC, September 28-29.
- NAS-05 (2005). Presented an invited paper at the National Academies of Science
- CAA-06 (2006). Conference Organization. Computer Applications and Quantitative Methods in Archaeology Annual meeting and Conference, Digital Discovery: Exploring New Frontiers in Human Heritage. Fargo, ND, April 18-21, 2006. Jeffrey T. Clark, Chair, Organizing Committee.
- HAR-06 (2006). Invited speaker at the Harvard Symposium on Technology in Undergraduate Science Education.

- NSF-SBIR (2006). Invited member of an NSF review panel of SBIR proposals (one Phase I panel)
- CSM Chairs Council (2007-present). Monthly meeting of the College and Science and Mathematics department heads/chairs with the Dean
- CS-NOM (2007-present), Department of Computer Science Award Nomination Committee.
- Graduate Leaders Forum (2007-present). Monthly meeting of the NDSU department heads/chairs with the Dean of the Graduate School
- NSF-SBIR (2007). Invited member of an NSF review panel of SBIR proposals (two Phase I panels, one Phase II panel)
- Provost's Chairs Council (2007-present). Monthly meeting of the NDSU department heads/chairs with the Provost

Principal publications during the last five years. Give in standard bibliographic format.

* Slator, Brian M., Richard Beckwith, Lisa Brandt, Harold Chaput, Jeffrey T. Clark, Lisa M. Daniels, Curt Hill, Phil McClean, John Opgrande, Bernhardt Saini-Eidukat, Donald P. Schwert, Bradley Vender, Alan R. White. (2006). *Electric Worlds in the Classroom: Teaching and Learning with Role-Based Computer Games*. New York: Teachers College Press. Columbia University. 192 pages.
* Brandt, Lisa, Otto Borchert, Kimberly Addicott, Bob Cosmano, Justin Hawley, Guy Hokanson, Dan Reetz, Bernhardt Saini-Eidukat, Donald P. Schwert, Brian M. Slator, Shannon Tomac (2006). Roles, Culture, and Computer Supported Collaborative Work on Planet Oit. Journal of Advanced Technology for Learning. 3(2), pp. 89-98. (Expanded Revision of CATE-05, below)
* Slator, Brian M., Harold Chaput, Robert Cosmano, Ben Dischinger, Christopher Imdieke and Bradley Vender (2006). A Multi-User Desktop Virtual Environment for Teaching Shop-Keeping to Children. Virtual Reality Journal, 9, pp. 49-56. Springer-Verlag.
* McClean, Phil E, Christina Johnson, Roxanne Rogers, Lisa M. Daniels, John Reber, Brian M. Slator, Jeff Terpstra, and Alan R. White (2005). Molecular and cellular biology animations: development and impact on student learning. Cell Biology Education. 4(2) pp. 169-179.
* Slator, Brian M., Curt Hill, Dayna Del Val (2004). Teaching Computer Science with Virtual Worlds. IEEE Transactions on Education, 47(2), May, pp. 269-275.
* Daniels, Lisa, Otto Borchert, Guy Hokanson, Jeff Clark, Bernhardt Saini-Eidukat, Don Schwert, Brian Slator, Jeff Terpstra (2009). Effects of Immersive Virtual Environments on Student Achievement and Confidence. Proceedings of the American Educational Resarch Association Annual Meeting (AERA-09). April 13-17. San Diego. 10 pg.
* Hokanson, Guy, Otto Borchert, Brian M. Slator, Jeff Terpstra, Jeffrey T. Clark, Lisa M. Daniels, Heather R. Anderson, Aaron Bergstrom, Thomas A. Hanson, John Reber, Dan Reetz, Kari L. Weis, Ryan White, Lauren Williams (2008). Studying Native American Culture in an Immersive Virtual Environment. Proceedings of the IEEE International Conference on Advanced Learning Technology (ICALT-2008). IEEE Computer Society Press. Santander, Spain. July 1-5. Pg. 788-792
* Borchert, Otto, Brian M. Slator, Guy Hokanson, Lisa M. Daniels, John Reber, Dan Reetz, Bernhardt Saini-Eidukat, Donald P. Schwert, Jeff Terpstra (2008). Computer Supported Collaborative Learning in the Geology Explorer. Midwest Instructional Computing Symposium (MICS-08). La Crosse, Wi. April 10-11. Pg. 532-546.
* Hill, Curt, Brian M. Slator, and Vijayakumar Shanmugasundaram. (2007). ProgrammingLand: A Visualization Enhanced Hypertextbook. 37th ASEE/IEEE Frontiers in Education Conference. October 10-13, Milwaukee, WI.
* Hill, Curt, Brian M. Slator, Vijayakumar Shanmugasundaram. (2007). Measuring the Effectiveness of ProgrammingLand. IASTED International Conference on Web Based Education (WBE-07), Chamonix, France, February 14-16.
* Hill, Curt, Brian M. Slator, Vijayakumar Shanmugasundaram and Lisa M. Daniels. (2006). An Online Computer Science Instructional Resource. IASTED International Conference on Web Based Education (WBE 2006), Puerto Vallarta, Mexico, January 23-25, pp. 332-336.
* Slator, Brian M., Aijuan Dong, Kellie Erickson, Deb Flaskerud, Jacob Halvorson, Oksana Myronovych, Phil McClean, Bernhardt Saini-Eidukat, Donald P. Schwert, Alan R. White, Jeff Terpstra (2005). Comparing Two Immersive Virtual Environments for Education. Proceedings of E-Learn 2005, World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education, Edited by Griff Richards, October 24-28, Vancouver BC, Canada, pp. 2394-2401.
* Brandt, Lisa, Otto Borchert, Kimberly Addicott, Bob Cosmano, Justin Hawley, Guy Hokanson, Dan Reetz, Bernhardt Saini-Eidukat, Donald P. Schwert, Brian M. Slator, Shannon Tomac (2005). Roles, Culture, and Computer Supported Collaborative Work on Planet Oit. Proceedings of the Eighth

* Bergstrom, Aaron, J. T. Clark, Douglas G. Snider, Richard Frovarp, Dan Reetz, Brian Slator, James Landrum, Ryan White. (2005). On-A-Slant Virtual Village: Constructing a 3D Stereo Imaging Exhibit. The World Is in your Eyes. Proceedings, Computer Applications and Quantitative Methods in Archaeology, Tomar, Portugal, March 21-24, 2005. Edited by Gono Leite Velho and Alexandra Figueiredo.
* Hill, Curt, Brian M. Slator, Lisa M. Daniels (2005). The Grader in ProgrammingLand. Proceedings of the National ACM Computer Science Education Conference. St. Louis, MO: Sheridan Publishing. February, 23-27.
* McClean, P., Daniels, L., Slator, B., Terpstra, J., White, A. (2005) *Effects of Molecular and Cellular Biology Animations on Student Learning.* Proceedings of the Hawaii International Conference on Education, January 4-7, Honolulu, HI, pp. 2898-2904
* Clark, J. T., D.G. Snider, A. Bergstrom, R. Frovarp, D. Reetz, B. Slator, R. White. 2004. On-a-Slant: A Mandan Village in Virtual Time and Space. In, Interdisciplinarity or The Best of Both Worlds, VAST2004, pp. 57-58. Edited by K. Cain, Y. Chrysanthou, F. Niccolucci, D. Pletinckx, N. Silberman. Brussels: EPOCH.
* Hill, Curtis D., Brian M. Slator, and Lisa M. Daniels (2004). Using and Validating ProgrammingLand. Proceedings of the 7th IASTED International Conference on Computers and Advanced Technology in Education (CATE-04), V. Uskov (Ed.), August 16-18, Kauai, HI, pp. 291-296.
* Hill, Curt, Brian M. Slator, Lisa M. Daniels (2004), An Online Resource for the Introductory Programming Class. In Proceedings of the 2nd International Conference Information Technology Research and Education (ITRE '04), (London Metropolitan University, London, UK, June 28 -July 1). T. Boyle, P. Oriogun and A. Pakstas (Eds.), pp. 101-105.

Other scholarly activity during the last 5 years: grants, sabbaticals, software development, etc:

2006-2009	National Science Foundation (CCLI) No. DUE-0618766 to Dr. Phil McClean, PI, Lisa Daniels, Brian M. Slator, Jeff Terpstra, and Alan R. White, Visualization in Biology Education, 3 years, $452,355
2006-2008	National Science Foundation (Geo-Ed) No. GEO-0608082 to Dr. Brian M. Slator, PI, Lisa Daniels, Bernhardt Saini-Eidukat, Donald P. Schwert, and Jeff Terpstra, Pilot Project: Research on Serious Games for Geoscience Education, 2 years, $149,984.00
2005-2008	National Science Foundation (IMD) No. ESI-0454767, to Dr. Lisa M. Daniels, PI, Jeffrey T. Clark, Donald P. Schwert, Brian M. Slator, and Jeff Terpstra, Instructional Materials for Teaching Science through Virtual Environments, 3 years, $727,282
2004	NDSU Peltier Award for Innovation in Teaching. $2,500
2003-2006	US. Department of Education (FIPSE) # P116B030120, to Dr. Alan White, PI, Dr. Lisa Daniels, Dr. Phil McClean, and Dr. Brian Slator. Virtual Cell Dissemination; 3 years, $495,000
2003-2006	National Science Foundation (ITR). No. EIA-0313154, to Curt Hill, PI, Dr. Brian Slator, Dr. Lisa Daniels Accelerating Computer Science Education, 3 years, $266,403
2002-2005	National Science Foundation (CCLI-EMD) No. DUE-0127521, to Dr. Jeffrey Clark, PI, and Dr. Brian Slator Research on Learning through Virtual Archaeology 3 years, $420,000;

Courses taught this and last academic year term-by-term. This year is the academic year in which this Self Study report is prepared; the last year was the year prior to this. If you were on sabbatical leave, please enter the information for the year prior to sabbatical. Please list each section of the same course separately.

Term/year	Spring/2009
Course #	CSci 345

Course Title	Topics in Computing: Network Applications
Semester Hrs	3
Class size	20

Term/year	Spring/2009
Course #	CSci 790
Course Title	Seminar: Instructional Media
Semester Hrs	1
Class size	15

Term/year	Spring/2009
Course #	CSci 345
Course Title	Topics in Computing: Network Applications
Semester Hrs	3
Class size	28

Term/year	Spring/2009
Course #	CSci 790
Course Title	Seminar: Instructional Media
Semester Hrs	1
Class size	13

Estimate the percentage of your time devoted to scholarly and/or research activities: 40%. Please give a brief description of your major research and scholarly activities:

Most recent book is "*Electric Worlds in the Classroom: Teaching and Learning with Role-Based Computer Games" described at* http://store.tcpress.com/0807746754.shtml *as* "a diverse collection of lively and engaging virtual spaces where students engage in role-based learning. The context might be a gigantic imaginary plant cell, where students learn the role of a biologist, or it might be a shallow valley where they learn to act like a geologist. Students learn to conduct experiments, analyze results, draw conclusions, and ultimately, write their own story as they experienced it."

Vasant Ubhaya

Name, current academic rank, and tenure status:

Name:	Vasant Ubhaya
Rank:	Professor
Tenure Status:	Tenured

Date of original appointment to this faculty, followed by dates and ranks of advancement:

Original Appointment: 1981	
Title:	Associate Professor
Dates Held:	1981-1990
Title:	Professor
Dates Held:	1990- Present

Degrees with fields, institutions, and dates

Degree:	Ph.D.
Field:	Engineering (Operations Research)
Institution:	University of California at Berkeley
Date:	1971
Degree:	M.A.
Field:	Mathematics
Institution:	University of California at Berkeley
Date:	1971
Degree:	B.E. Honors
Field:	Mechanical Engineering

Institution: University of Bombay, Bombay
Date: 1964

Conferences, workshops, and professional development programs in which you have participated in the last 5 years to improve teaching and professional competence in the program area:

- Presented the invited paper "Best approximation by Integer valued Functions" at the Eleventh International Conference in Approximation Theory held at Gatlinburg, Tennessee, May 18-22, 2004. This conference was hosted by the Center for Constructive Approximation at Vanderbilt University, Nashville, Tennessee.

Other related computing experience including teaching, industrial, governmental, etc. (where, when, description and scope of duties):

Date: 1971-1975
Where: Department of Computer Science, Washington University, St. Louis, MO
Duties: Assistant Professor, Teaching and Research

Date: 1975-1978
Where: Department of Operations Research, Case Western Reserve University, Cleveland, OH
Duties: Assistant Professor, Teaching and Research

Date: 1978-1979 (Sabbatical)
Where: Department of Computer Science, Carnegie-Mellon University, Pittsburgh, PA
Duties: Research

Date: 1979-1981
Where: Bell Telephone Laboratories, Naperville, IL
Duties: Member of Technical Staff, Performance Evaluation

For the four years preceding the Self Study, list all department, college, and/or university committees of which you are/were a member including year(s) served:

Departmental committees and other service.

- Computer Science Head Search Committee, chair (7/06-6/07), member (7/05-6/06)
- Faculty Recruiting Committee, sometimes chair, sometimes member (4 years)
- Departmental PT&E Committee, sometimes chair, sometimes member (4 years)
- Curriculum Committee, member (2 years)
- Bioinformatics courses and program committee (2 years)
- Graduate Admissions Committee member (2 years)
- Supervisory Committee member for several graduate students (4 years)
- Departmental liaison with the library for acquisition of Comp. Sc. and Operations Res. books and journals (4 years)
- Advisor to undergraduate and graduate students (4 years)
- Grader for the English Language Proficiency Tests (LPT) (1 year)
- Organizer of summer school grading and tutoring support (1 year)
- Development of courses

3. Principal publications during the last five years. Give in standard bibliographic format.

   a. An O(n) algorithm for weighted least squares regression by integer quasi-convex and unimodal or umbrella functions. (with M.-H. Liu), Computers and Mathematics with Applications, An International Journal, Invited paper, accepted for publication.

   b. Lipschitzian operators in best approximations by bounded or continuous functions, Encyclopedia of Optimization, Springer-Verlag, New York, Berlin, September 2008.

c. Regression by special functions, Encyclopedia of Optimization, Springer-Verlag, New York, Berlin, September 2008.

d. Best approximation by Integer-valued Functions, Applied Mathematics Letters, Vol. 18, 2005, p. 475-478.

e. An O(n) algorithm for discrete approximation by quasi-convex functions on R^m, Computers and Mathematics with Applications, An International Journal, Vol. 47, 2004, p. 1707-1712.

Other scholarly activity during the last 5 years: grants, sabbaticals, software development, etc:

Grant proposals:

Funded:

f. Non-Research: "Collaborative for Scholarships in Science, Information Systems, and Engineering", NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM), $463,200, 10/1/2006 – 9/30/2010, PI: Kendall Nygard, Other Participants: Charles (Bud) Bowlin, Xiaojiang Du, Rajendra Katti, Dean Knudson, Joseph Latimer, Pratap Kotala, Brian Slator, Vasant Ubhaya.

Submitted but not funded:

g. Research: "Discovering Computational Structures in Architecture", National Science Foundation, IIS – Division of Information and Intelligent Systems, $369,780, 6/5/2007 – 8/14/2009, PI: Ganapathy Mahalingam, Co-PI: Vasant Ubhaya.

h. Non-research: "Computer Science Graduate Assistantships in Bioinformatics and Software Engineering", Department of Education, GAANN Program, $501,864, 7/1/2006 – 6/30/2009, PI: Kendall Nygard, Co-PIs: Anne Denton, Xiaojiang Du, Kenneth Magel, Sung Kim, Vasant Ubhaya and Dianxiang Xu.

i. Non-research: "Computer Science Graduate Assistantships in Bioinformatics and Software Engineering", Department of Education, GAANN Program, $506,688, 7/1/2007 – 6/30/2010, PI: Kendall Nygard, Co-PIs: Anne Denton, Xiaojiang Du, Kenneth Magel, Jun Kong, Vasant Ubhaya and Dianxiang Xu.

j. Research: "Discovering Computational Structures in Architecture", Preliminary proposal, National Science Foundation, DMR – Division of Materials Research, $456,506, 6/5/2008 – 8/14/2010, PI: Ganapathy Mahalingam, Co-PI: Vasant Ubhaya.

Courses taught this and last academic year term-by-term. This year is the academic year in which this Self Study report is prepared; the last year was the year prior to this. If you were on sabbatical leave, please enter the information for the year prior to sabbatical. Please list each section of the same course separately.

Term/year: Fall 2007
Course #: CSci 222
Course Title: Discrete Mathematics
Credit Hrs: 3
Class size: 43

Term/year: Fall 2007
Course #: CSci 373
Course Title: Assembly Programming
Credit Hrs: 3
Class size: 40

Term/year: Spring 2008
Course #: CSci 222
Course Title: Discrete Mathematics
Credit Hrs: 3

Class size: 39

Term/year: Summer 2008
Course #: CSci 760
Course Title: Dynamic Programming
Credit Hrs: 3
Class size: 3

Term/year: Fall 2008
Course #: CSci 222
Course Title: Discrete Mathematics
Credit Hrs: 3
Class size: 40

Term/year: Fall 2008
Course #: CSci 373
Course Title: Assembly Programming
Credit Hrs: 3
Class size: 42

Term/year: Spring 2009
Course #: CSci 222
Course Title: Discrete Mathematics
Credit Hrs: 3Class size: 33

Term/year: Spring 2009
Course #: CSci 373
Course Title: Assembly Programming
Credit Hrs: 3
Class size: 34

Estimate the percentage of your time devoted to scholarly and/or research activities: 30 %. Please give a brief description of your major research and scholarly activities:

- Research in efficient curve fitting algorithms and their computational complexity: This involves development, implementation and testing of efficient algorithms for obtaining solutions to a class of curve fitting problems. Various constraints (e.g. isotonicity, convexity, and quasi-convexity) may be imposed on the approximating curves, if needed. Different distance functions are used as a measure of the distance between the data points and a best fit. Computational complexity of the algorithms is analyzed. Applications of mathematical programming are investigated.

- Research in optimization and approximation theory: This involves analysis of a broad class of optimization problems on function spaces that may be infinite or finite dimensional. Principal interest lies in establishing existence and characterization of optimal solutions and determining their properties.

- Technical Referee for several journals such as the Journal of Approximation Theory, Constructive Approximation, Computers and Mathematics with Applications, Journal of Computer and System Sciences, Annals of Statistics, Computational Statistics and Data Analysis, International Journal of Mathematics and Mathematical Sciences, International Journal of Computer Mathematics, Journal TEST.

Dianxiang Xu

Name, current academic rank, and tenure status:

Name: Dianxiang Xu
Rank: Assistant Professor
Tenure Status: Granted Tenure for Fall 2009

Date of original appointment to this faculty, followed by dates and ranks of advancement:

Title	Assistant professor
Dates Held	July 2003

Degrees with fields, institutions, and dates

Degree:	Ph.D.
Field	Computer Science
Institution	Nanjing University
Date	1995

Degree:	M.S.
Field	Computer Science
Institution	Nanjing University
Date	1992

Degree:	B.S.
Field	Computer Science
Institution	Nanjing University
Date	1989

Conferences, workshops, and professional development programs in which you have participated in the last 5 years to improve teaching and professional competence in the program area:

- Best Teaching Practices for Enhanced Learning Workshops, August 2006 and August 2007

For the four years preceding the Self Study, list all department, college, and/or university committees of which you are/were a member including year(s) served:

- Faculty recruiting committee, NDSU Computer Science Department, 2003-2004
- Faculty recruiting committee, NDSU Computer Science Department, 2005-2006
- Faculty recruiting committee, NDSU Computer Science Department, 2006-2007
- Faculty recruiting committee, NDSU Computer Science Department, 2008-2009

Principal publications during the last five years. Give in standard bibliographic format.

- Dianxiang Xu, Weifeng Xu and W. Eric Wong, Automated Test Code Generation from Class State Models, *International Journal of Software Engineering and Knowledge Engineering*, In press. (one of the top rated SEKE'07 papers invited for journal submission)
- Jun Kong, Kang Zhang, Jing Dong, and Dianxiang Xu, Specifying Behavioral Semantics of UML Diagrams Through through Graph Transformations, *Journal of Systems and Software*, 82(2): 292-306 (2009).
- Dianxiang Xu, Weifeng Xu and W. Eric Wong, Testing Aspect-Oriented Programs with UML Design Models, *International Journal of Software Engineering and Knowledge Engineering*, Vol. 18, No. 3, pp. 413-437, May 2008.
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- Dianxiang Xu and Kendall E. Nygard. Threat-Driven Modeling and Verification of Secure Software Using Aspect-Oriented Petri Nets. *IEEE Transactions on Software Engineering*. Vol. 32, No. 4, pp. 265-278, April 2006.
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- Junhua Ding, Dianxiang Xu, Xudong He, and Yi Deng. Modeling and Analyzing a Mobile Agent-based Clinical Information System. *International Journal of Intelligent Control and Systems*. Vol. 10, No. 2, pp. 143-151, June 2005.
- Weifeng Xu and Dianxiang Xu, Automated Evaluation of Runtime Object States Against Model-Level States for State-Based Test Execution, *The 5th Workshop on Advances in Model Based Testing (A-MOST'09)*, in conjunction with ICST'09, Denver, Colorado, USA, April 1st, 2009.
- Aaron Marback, Hyunsook Do, Ke He, Samuel Kondamarri, Dianxiang Xu, Security Test Generation using Threat Trees, *Fourth International Workshop on the Automation of Software Test (AST'09)*, in conjunction with ICSE'09, Vancouver, Canada, May 18-19, 2009.
- Zhanqi Cui, Linzhang Wang, Xuandong Li, and Dianxiang Xu. Modeling and Integrating Aspects with UML Activity Diagrams, *Proc. of the 24th ACM Symposium on Applied Computing (SAC'09)*, Software Engineering Track, March 8-12, 2009, Hawaii, USA.
- Omar El-Ariss, Dianxiang Xu, W. Eric Wong, Yuting Chen, Yann-Hang Lee, A Systematic Approach for Integrating Fault Trees into System Statecharts, *Proc. of the 32nd IEEE Computer Software and Applications Conference (COMPSAC 2008)*, pp. 120-123, July 2008, Turku, Finland.
- Jun Kong and Dianxiang Xu. A UML-based Framework for Design and Analysis of Secure Software, *Proc. of the 32nd IEEE Computer Software and Applications Conference (COMPSAC 2008)*, pp. 28-31, July 2008, Turku, Finland.
- Kendall E. Nygard, Dianxiang Xu, Jonathan Pikalek, and Martin Lundell, Multi-agent Designs for Ambient Systems, *Proc. of the First International Conference on Ambient Media and Systems (Ambi-sys'08)*, Quebec City, Canada, Feb. 2008.
- Dianxiang Xu, Weifeng Xu, and W. Eric Wong. Automated Test Code Generation from UML Protocol State Machines, *Proc. of the 19th International Conference on Software Engineering and Knowledge Engineering (SEKE'07)*, pp. 99-104, Boston, July 2007. One of the top rated SEKE'07 papers invited for journal submission.
- Dianxiang Xu, Izzat Alsmadi, and Weifeng Xu, Model Checking Aspect-Oriented Design Specification, *Proc. of the 31st IEEE International Computer Software and Applications Conference (COMPSAC'07)*, Vol. 1. pp. 491-500, Beijing, July 2007. (Acceptance rate: 18%)
- Linzhang Wang, W. Eric Wong, and Dianxiang Xu. A Threat Model Driven Approach for Security Testing, *The 3rd International Workshop on Software Engineering for Secure Systems (SESS07),* in conjunction with ICSE'07. Minneapolis, May 2007.
- Dianxiang Xu and Xudong He. Generation of Test Requirements from Aspectual Use Cases. *Proc. of the Third Workshop on Testing of Aspect-Oriented Programs (WTAOP'07)*. In conjunction with AOSD'07, pp. 17-22, March 2007, Vancouver, Canada.
- Dianxiang Xu, Vivek Goel, and Kendall Nygard. An Aspect-Oriented Approach to Security Requirements Analysis. *Proc. of the 30th IEEE International Computer Software and Applications Conference (COMPSAC'06)*, pp. 79-82, Chicago, Sept. 2006.
- Josh Pauli and Dianxiang Xu. Integrating Functional and Security Requirements with Use Case Decomposition. *Proc. of the 11th IEEE International Conference on Engineering of Complex Computer Systems (ICECCS'06)*, pp. 57-66, Stanford University, CA, USA, 14-18 August 2006.

- Weifeng Xu and Dianxiang Xu. State-Based Testing of Integration Aspects. *Proc. of the Second Workshop on Testing of Aspect-Oriented Programs (WTAOP'06)*. In conjunction with ISSTA'06, pp. 7-14, July 2006, USA.
- Josh Pauli and Dianxiang Xu. Ensuring Consistent Use/Misuse Case Decomposition for Secure Systems. *Proc. of the 18th International Conference on Software Engineering and Knowledge Engineering (SEKE'2006)*, pp. 392-397, CA., USA, July 2006.
- Dianxiang Xu and Weifeng Xu. State-Based Incremental Testing of Aspect-Oriented Programs. *Proc. of the 5th International Conference on Aspect-Oriented Software Development (AOSD' 2006),* March 20-24, 2006, pp. 180-189. Bonn, Germany. ACM Press. (Acceptance rate: 20/95=21%)
- Dianxiang Xu, Priti Borse, Karl Altenburg, and Kendall E. Nygard, A Petri Net Simulator for Self-organizing Systems, *Proc. of the 5th International Conference on Artificial Intelligence, Knowledge Engineering, and Databases (AIKED'06)*, Madrid, February, 2006.
- Dianxiang Xu and Kendall Nygard. A Threat-Driven Approach to Modeling and Verifying Secure Software. *Proc. of the 20th IEEE/ACM International Conference on Automated Software Engineering (ASE 2005),* pp. 342-346, November 7-11, 2005. California, USA. ACM Press. (Acceptance rate: (28+35)/291=21.7%)
- Dianxiang Xu, Weifeng Xu, and Kendall Nygard. A State-Based Approach to Testing Aspect-Oriented Programs. *Proc. of the 17th International Conference on Software Engineering and Knowledge Engineering (SEKE'2005),* pp. 366-371, July 14-16, Taiwan. (Acceptance rate: 115/225 = 51.1%).
- Junhua Ding, Dianxiang Xu, Yi Deng, Peter J. Clarke, Xudong He. Design an Interoperable Mobile Agent System Based on Predicate Transition Net Models. *Proc. of the 17th International Conference on Software Engineering and Knowledge Engineering (SEKE'2005),* pp. 560-565, July 14-16, Taiwan. (Acceptance rate: 115/225 = 51.1%).
- Josh Pauli and Dianxiang Xu. Threat-Driven Architectural Design of Secure Information Systems. *Proc. of the 7th International Conference on Enterprise Information Systems (ICEIS'05)*, Miami, May 2005, pp. 136-143. (Acceptance rate of full papers: 89/459 = 19.4%).
- Josh Pauli and Dianxiang Xu. Trade-off Analysis of Misuse Case-based Secure Software Architectures: A Case Study. *Proc. of the 3rd International Workshop on Modeling, Simulation, Verification and Validation of Enterprise Information Systems (MSVVEIS'05)*, pp. 89-95, Miami, May 2005. NSTICC Press. (Acceptance rate: 17/25=68%)
- Wujun Li, Chongjun Wang, Dianxiang Xu, Bin Luo, and Zhaoqian Chen. A Study on Illumination Invariant Face Recognition Methods Based on Multiple Eigenspaces. *Proc. of the Second International Symposium on Neural Networks (ISNN'05)*, LNCS 3497, Springer-Verlag, May 2005. (Acceptance rate: 483/1425=33.9%)
- Dianxiang Xu and Vivek Goel. An Aspect-Oriented Approach to Mobile Agent Access Control. *Proc. of the International Conference on Information Technology: Coding and Computing (ITCC'05)*, Vol. I, pp. 668-673. IEEE Computer Society, Las Vegas, April 2005. (Acceptance rate: 260/524=49.6%)
- Josh Pauli and Dianxiang Xu. Misuse Case-Based Design and Analysis of Secure Software Architecture. *Proc. of the International Conference on Information Technology: Coding and Computing (ITCC'05)*, Vol. II, pp. 398-403, IEEE Computer Society. Las Vegas, April 2005. (Acceptance rate: 260/524=49.6%)
- Weifeng Xu and Dianxiang Xu. A Model-Based Approach to Test Generation for Aspect-Oriented Programs. *First Workshop on Testing Aspect-Oriented Programs (WTAOP'05)*, in conjunction with *AOSD'05,* Chicago, March 2005.
- Wujun Li, Chongjun Wang, Dianxiang Xu, and Shifu Chen. Illumination Invariant Face Recognition Based on Neural Network Ensemble. *Proc. of the 16th IEEE International Conference on Tools with Artificial Intelligence (ICTAI04),* pp.486-490, IEEE Computer Society, Nov. 2004. (Acceptance rate: (54+47)/205=49.3%)
- Dianxiang Xu, Priti Borse, Ken Grigsby, and Kendall. E. Nygard. A Petri Net Based Software Architecture for UAV Simulation. *Proc. of the International Conference on Software Engineering*

Other scholarly activity during the last 5 years: grants, sabbaticals, software development, etc:

- "A Multi-User Virtual Biology Environment for Discovery-Oriented Science Education", NIH SBIR Phase I, $100,000, April 15, 2008 – Sept. 14, 2008, Bradley Vender (PI) and Brian Slator (WoWiWe Instruction Co.), Phillip McClean and Dianxiang Xu (NDSU).
- "Testing for Software Safety", NASA OSMA/SARP Grant, $407,500, PI: Ken Chen (Johnson Space Center), Co-PIs: Yann-Hang Lee (Arizona State University), W. Eric Wong (University of Texas at Dallas), Dianxiang Xu (North Dakota State University). Cancelled in Jan. 2008.
- "Automated Generation of Safety Tests", ND NASA EPSCoR through NASA grant# NNXO7AK91A, $18,729 (including $5,676 match), November 2007–August 2008, PI: Dianxiang Xu
- "Model-Checking Aspect-Oriented Design Specifications", ND EPSCoR IIP-SG through NSF Grant EPS-047679, $15,000, October 2006 – April 2007. PI: Dianxiang Xu
- "Model-Based Testing of Aspect-Oriented Software", ND NASA EPSCoR through NASA Grant NCC5-582. $13,750 (including $2,750 match). April 2006 – July 2006. PI: Dianxiang Xu

Courses taught this and last academic year term-by-term. This year is the academic year in which this Self Study report is prepared; the last year was the year prior to this. If you were on sabbatical leave, please enter the information for the year prior to sabbatical. Please list each section of the same course separately.

Term/year	Spring 2009
Course #	CSci 718
Course Title	Software Testing and Debugging
Semester Hrs	3
Class size	16

Term/year	Spring 2009
Course #	CSci 717
Course Title	Software Construction
Semester Hrs	3
Class size	9

Term/year	Spring 2009
Course #	CSci 790
Course Title	Secure Software Engineering
Semester Hrs	1
Class size	9

Term/year	Fall 2008
Course #	CSci 413
Course Title	Principles of Software Engineering
Semester Hrs	3
Class size	26

Term/year	Fall 2008
Course #	CSci 790
Course Title	Aspect-Oriented Software Development
Semester Hrs	1
Class size	10

Estimate the percentage of your time devoted to scholarly and/or research activities: 45%. Please give a brief description of your major research and scholarly activities:

My research focuses on software testing and software security

Weiyi Zhang

Name, current academic rank, and tenure status:

Name: Weiyi (Max) Zhang
Rank: Assistant Professor
Tenure Status: Tenure-track

Date of original appointment to this faculty, followed by dates and ranks of advancement:

Title: Assistant Professor
Dates Held: August 25, 2007

Degrees with fields, institutions, and dates

Degree: PhD
Field: Computer Science and Engineering
Institution: Arizona State University
Date: April 2007

Degree: M.E
Field: Computer Science and Engineering
Institution: Southeast University, Nanjing, China
Date: June 2002

Degree: B.E
Field: Computer Science and Engineering
Institution: Southeast University, Nanjing, China
Date: July 1999

Conferences, workshops, and professional development programs in which you have participated in the last 5 years to improve teaching and professional competence in the program area:

- Best Teaching Practices for Enhanced Learning, Aug 15 2007
- IEEE INFOCOM'2005, IEEE GLOBECOM'2007, IEEE GLOBECOM'2008, IEEE CCNC'2009, IEEE ICC'2009

For the academic year in which the Self Study was written list your assigned duties other than for teaching, (community membership, advising, etc.) with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time or part time faculty, please indicate here which courses.

- Advise one undergraduate student
- Advise eleven graduate students

For the four years preceding the Self Study, list all department, college, and/or university committees of which you are/were a member including year(s) served:

- Department of Computer Science
  - CS Teaching Free Semester Committee (2008)
  - Student Course Fee Committee (Chair, 2008, 2009)

Principal publications during the last five years. Give in standard bibliographic format.

Referred Journal Publications

- Weiyi Zhang, Jun Kong, Kendall Nygard, and Ming Li, "Adaptive Design of Pervasive Computing System Under QOS Constraints", Accepted by International Journal of Computers and Applications, 2008.
- Weiyi Zhang, Guoliang Xue, Jian Tang, and Krishnaiyan Thulasiraman; Faster Algorithms for Constructing Recovery Trees Enhancing QoP and QoS; IEEE/ACM Transactions on Networking; Vol. 16 (2008), pp. 642-655.

- Guoliang Xue, Weiyi Zhang, Jian Tang, and Krishnaiyan Thulasiraman; Polynomial Time Approximation Algorithms for Multi-Constrained QoS Routing; IEEE/ACM Transactions on Networking; Vol. 16 (2008), pp. 656-669.
- Guoliang Xue, Arunabha Sen,Weiyi Zhang, Jian Tang, and Krishnaiyan Thulasiraman; Finding a Path Subject to Many Additive QoS Constraints; IEEE/ACM Transactions on Networking; Vol. 15(2007), pp. 201-211.
- Jian Tang, Guoliang Xue, and Weiyi Zhang; Cross-layer optimization for end-to-end rate allocation in multi-radio wireless mesh networks; ACM Wireless Networks (WINET); Vol. 15, Issue 1, January 2009, pp. 53-64.
- Guoliang Xue, Weiyi Zhang, Jian Tang, and Krishnaiyan Thulasiraman; An Improved Algorithm for Optimal Lightpath Establishment on a Tree Topology; IEEE Journal on Selected Areas in Communications, Optical Communications and Networking series; Vol. 24, No. 8, 2006, pp. 45--56.
- Jian Tang, Guoliang Xue, Chris Chandler, and Weiyi Zhang; Link Scheduling with Power Control for Throughput Enhancement in Multihop Wireless Networks; IEEE Transactions on Vehicular Technology; Vol. 5, No. 3, 2006, pp. 733--742.
- Guoliang Xue, Weiyi Zhang, Tie Wang and Krishnaiyan Thulasiraman; On the partial path protection scheme for WDM optical networks and polynomial time computability of primary and secondary paths; Journal of Industrial and Management Optimization; Vol. 3, No. 4, 2007, pp. 625-643.
- Jian Tang, Guoliang Xue, and Weiyi Zhang; Reliable Ad Hoc Routing Based on Mobility Prediction; Kluwer Journal of Combinatorial Optimization , special issue on Wireless Network Applications; Vol. 11, No. 1, 2006, pp. 71--85.
- Jian Tang, Guoliang Xue, and Weiyi Zhang; Cross-layer Design for End-to-End Throughput and Fairness Enhancement in Multi-Channel Wireless Mesh Networks; IEEE Transactions on Wireless Communications; Vol.6, No. 10, 2007, pp. 1--5.

Referred Conference Papers

- Weiyi Zhang, Xiaojiang Du, Kendall Nygard and Tie Wang; Self-protecting Networking using Dynamic p-cycle Construction within Link Capacity Constraint; IEEE ICC'2009: IEEE International Conference on Communications; Accepted for publication.
- Weiyi Zhang, Jun Kong, Kendall Nygard and Ming Li; Adaptive Configuration of Pervasive Computing System with QoS Consideration; IEEE CCNC'2009: 6th Annual IEEE Consumer Communications and Networking Conference; Las Vegas, Nevada, USA.
- Weiyi Zhang, Guoliang Xue, Jian Tang, and Krishnaiyan Thulasiraman; Dynamic Wavelength Routing in WDM Networks under Multiple Signal Quality Constraints; IEEE Globecom'2008: IEEE Global Telecommunications Conference; New Orleans, LA, USA.
- Guoliang Xue and Weiyi Zhang; Multiconstrained QoS routing: Greedy is good; IEEE GLOBECOM' 2007, pp. 1866-1871.
- Satyajayant Misra, Weiyi Zhang, and Guoliang Xue; A Technique to Enhance Localization in the Presence of NLOS Errors; IEEE GLOBECOM'2007, pp. 1070-1075.
- Xiaojiang Du, Devendar Mandala, Weiyi Zhang, Chao You, Yang Xiao; A Boundary-Node based Localization Scheme for Heterogeneous Wireless Sensor Networks; IEEE MILCOM'2007.
- Weiyi Zhang, Guoliang Xue, and Satyajayant Misra; Fault-tolerant Relay Node Placement in Wireless Sensor Networks: Problems and Algorithms; IEEE INFOCOM'2007: IEEE Conference on Computer Communications (acceptance ratio:18%), May 2007, pp. 1649 -- 1657.
- Jian Tang, Guoliang Xue, and Weiyi Zhang; Maximum Throughput and Fair Bandwidth Allocation in Multi-channel Wireless Mesh Networks; IEEE INFOCOM'2006: IEEE Conference on Computer Communications (acceptance ratio:18%), April 2006, pp. 1 -- 10.
- Weiyi Zhang, Guoliang Xue, Jian Tang, and Krishnaiyan Thulasiraman; Linear Time Construction of Redundant Trees for Recovery Schemes Enhancing QoP and QoS; IEEE INFOCOM'2005: IEEE Conference on Computer Communications (acceptance ratio:17%), March 13-17 2005, Miami, FL. pp. 2702--2710.

- Jian Tang, Guoliang Xue, Chris Chandler, and Weiyi Zhang; Interference-aware Routing in Multihop Wireless Networks Using Directional Antennas; IEEE INFOCOM'2005: IEEE Conference on Computer Communications (acceptance ratio:17%), March 13-17 2005, Miami, FL. pp. 751--760.
- Jian Tang, Guoliang Xue, and Weiyi Zhang; Interference-Aware Topology Control and QoS Routing in Multi-Channel Wireless Mesh Networks; MobiHoc'2005: ACM International Symposium on Mobile Ad Hoc Networking and Computing (acceptance ratio:14%), May 25-28 2005, Urbana-Champaign, IL. pp. 68--77.
- Weiyi Zhang, Guoliang Xue, Jian Tang, and Krishnaiyan Thulasiraman; Dynamic Light Trail Routing and Protection Issues in WDM Optical Network; IEEE GLOBECOM'2005: IEEE Global Communications Conference, Nov. 28- Dec. 2, St. Louis, MO. pp. 1963--1967.
- Guoliang Xue, Weiyi Zhang, Jian Tang, and Krishnaiyan Thulasiraman; Establishment of Survivable Connections in WDM Networks Using Partial Path Protection; IEEE ICC'2005: IEEE International Conference on Communications, pp. 1756--1760.
- Jian Tang, Guoliang Xue, and Weiyi Zhang; Power Efficient Broadcasting and Multicasting in Wireless Networks with Directional Antennas; IEEE ICC'2005: IEEE International Conference on Communications, pp. 1438--1442.
- Jian Tang, Guoliang Xue, and Weiyi Zhang; End-to-End Rate Allocation in Multi-Radio Wireless Mesh Networks: Cross-Layer Schemes; QShine'2006: International Conference on Quality of Service in Heterogeneous Wired/Wireless Networks, August 2006, Waterloo, Ontario, Canada.
- Jian Tang, Guoliang Xue, Chris Chandler, and Weiyi Zhang; Link Scheduling with Power Control for Throughput Enhancement in Multihop Wireless Networks; QShine'2005: International Conference on Quality of Service in Heterogeneous Wired/Wireless Networks, pp. 1--8.
- Tie Wang, Jeff Touchman, Weiyi Zhang, and Guoliang Xue; A Parallel Algorithm for Extracting Transcriptional Regulatory Network Motifs; BIBE'2005: IEEE Symposium on Bioinformatics and Bioengineering, pp. 193--200.
- Jian Tang, Guoliang Xue, and Weiyi Zhang; Energy Efficient Survivable Broadcasting and Multicasting in Wireless Ad Hoc Networks; IEEE MILCOM'2004: IEEE Military Communications Conference, pp. 1165--1171.
- Jian Tang, Guoliang Xue, and Weiyi Zhang; Reliable Routing in Mobile Ad Hoc Networks Based on Mobility Prediction; IEEE MASS'2004: IEEE International Conference on Mobile Ad-hoc and Sensor Systems, pp. 466--474.

Other scholarly activity during the last 5 years: grants, sabbaticals, software development, etc:

Grant:	Cross-Layer Design for Reliable Communications in the InterPlaNetary Network
Source:	NASA EPSCoR
Amount:	$11,612

Courses taught this and last academic year term-by-term. This year is the academic year in which this Self Study report is prepared; the last year was the year prior to this. If you were on sabbatical leave, please enter the information for the year prior to sabbatical. Please list each section of the same course separately.

Term/year:	Spring 2009
Course #:	CSci 476
Course Title:	Computer Forensics
Semester Hrs:	3
Class size:	20

Term/year:	Spring 2009
Course #:	CSci 676
Course Title:	Computer Forensics
Semester Hrs:	3
Class size:	20

Term/year:	Spring 2009

Course #: CSci 785
Course Title: Wireless Networks and Mobile Computing
Semester Hrs: 3
Class size: 40

Term/year: Fall 2008
Course #: CSci 477
Course Title: Object-oriented Systems
Semester Hrs: 3
Class size: 20

Term/year: Fall 2008
Course #: CSci 677
Course Title: Object-oriented Systems
Semester Hrs: 3
Class size: 20

Term/year: Spring 2008
Course #: CSci 785
Course Title: Wireless Networks and Mobile Computing
Semester Hrs: 3
Class size: 10

Term/year: Fall 2007
Course #: CSci 714
Course Title: Software Planning and Estimation
Semester Hrs: 3
Class size: 40

Estimate the percentage of your time devoted to scholarly and/or research activities: 50%. Please give a brief description of your major research and scholarly activities:

- My research interests include Routing, Scheduling and Cross-Layer Design in Wireless Networks Localization, Placement and Coverage Issues in Wireless Sensor Networks, Pervasive and Ubiquitous Computing, Survivable Design of Communication Networks, QoS Provisioning in Communication Networks.

C. OUTREACH

1. Professional Service:

The Department continues to be very active in service to the profession. Most faculty regularly review for conferences and journals. Seven faculty review for national funding agencies. Three faculty review Ph.D. dissertations internationally.

2. Alumni Events and other community related activities:

The Department continues to expand our efforts to reach alumni.. We have a web site that we hoped would be a resource for alumni, but it is not used very much. We created a new Departmental Web Site which has gotten rave reviews, especially by those who remember our previous web site.

At the urging of our College Dean, the Department started a newsletter during 2007-08. We have received some favorable comments from alumni and hope to continue to expand on relationships with our alumni.

The department continues to foster relations with area businesses, in particular Microsoft Great Plains. Two social/technical events were held in the past year, one at each site.

3. Fund-raising accomplishments and other outreach activities:

We received a little over $2,800 from alumni and friends this academic year in money and equipment. We need to do better. During the next academic year, we will make an effort to contact successful alumni. Our goal is to increase alumni giving to $25,000 per year within five years.

4. Cooperative Education:

Placement Summary Fall 2008

Student	Employer	Job Type
Addy, Noah	Microsoft; Fargo, ND	Full-time Coop
Addy, Sydney	NAVTEQ, Fargo, ND	Part-time Coop
Albee, Chris	IBM – Rochester, MN	Full-time Coop
Bhargava, Anirudh	H2M, Fargo, ND	Part-time Coop
Chintapalli, Veera	Thomson Reuters – Eagan MN	Full-time Coop
Chowdhury, Amanul	H2M, Fargo, ND	Full-time Coop
Emmadi, Praveen	Oberon IT, Inc – Irving, TX	Full-time Coop
Ganti, Annaji	Microsoft, Fargo, ND	Part-time Coop
Garimedi, Rajani	Blue Cross Blue Shield, Fargo, ND	Full-time Coop
Kadam, Ramchandra	Blue Cross Blue Shield, Fargo, ND	Part-time Coop
Kondakindi, Swathi	Pedigree Technologies, Fargo, ND	Part-time Coop
Lanke, Ramesh	ObjectWin Technology – Houston, TX	Full-time Coop
Mahoo, Christopher	Bobcat Company, Gwinner ND	Part-time Coop
Mehrotra, Anand	DoApp, Inc – Minneapolis, MN	Full-time Coop
Mehrotra, Surbhit	DoApp, Inc – Minneapolis, MN	Part-time Coop
Moses, Joseph	InfoNERO, Fargo, ND	Full-time Coop
Nayak, Gaurav	Agri ImaGIS Teachnologies, Fargo, ND	Full-time Coop
Pullagurala, Praveen	Genuine IT, Houston, TX	Full-time Coop
Ramamurthy, Durga	ObjectWin Technology – Houston, TX	Full-time Coop
Sehgal, Ankita	Protech Associates, Fargo, ND	Part-time Coop
Tirupathi, Ambika	Rocket Lawyer.com, CA	Full-time Coop
Yadav, Arun	Agri ImaGIS	Full-time Coop

	Teachnologies, Fargo, ND	
Bhogadi, Manu	Tecton Product LLC – Fargo, ND	Full-time Coop
Shrestha, Bickrant	Blue Cross Blue Shield – Fargo, ND	Part-time Coop
Thalloji, Pramodh	Advanced Software Systems, - Sterling VA	Full-time Coop
Upadhyay, Rajat	Blue Cross Blue Shield – Fargo, ND	Full-time Coop

Placement Summary Spring 2009

Student	Employer	Job Type
Addy, Sydney	NAVTEQ, Fargo, ND	Part-time Coop
Bhargava, Anirudh	H2M, Fargo, ND	Part-time Coop
Dandey, Santosh	Kronsys Inc., Cary, NC	Full-time Coop
DeSoysa, Shanaka	Frontier Trust Company/Ascensus; Fargo, ND	Full-time Coop
Devina, Laiphangbam	Semafor Technologies, Norcross, GA	Full-time Coop
Emmadi, Praveen	Oberon IT, Inc – Irving, TX	Full-time Coop
Fazal, Kareemullah	CompSys Technologies, Inc. – Bellevue, WA	Full-time Coop
Garimedi, Rajani	Blue Cross Blue Shield, Fargo, ND	Full-time Coop
Kadam, Ramchandra	Blue Cross Blue Shield, Fargo, ND	Full-time Coop
Kondakindi, Swathi	Pedigree Technologies, Fargo, ND	Full-time Coop
Lee, Ryan	NDSU Information Technology Services, Fargo, ND	Full-time Coop
Mahoo, Christopher	Bobcat Company, Gwinner ND	Full-time Coop
Moses, Joseph	InfoNERO, Fargo, ND	Full-time Coop
Poreddy, Sandeep	Pedigree Technologies, Fargo, ND	Full-time Coop
Pullagurala, Praveen	Genuine IT, Houston, TX	Full-time Coop
Tirupathi, Ambika	Rocket Lawyer.com, CA	Full-time Coop
Vellaswamy Chelaiah	ERP Analysis Inc, Dublin, OH	Full-time Coop
Yadav, Arun	Agri ImaGIS	Full-time Coop

	Teachnologies, Fargo, ND	
Yamparala, Sri Harsha	ND Office of Attorney General, Bismarck, ND	Full-time Coop
Bhogadi, Manu	Tecton Product LLC – Fargo, ND	Full-time Coop
Bhowmick, Dibakar	NAVTEQ, Fargo, ND	Full-time Coop
Kallan, Lakshmi	Kronsys Inc., Cary, NC	Full-time Coop
Manori, Anshuman	NAVTEQ, Fargo, ND	Full-time Coop
Pradhan,. Basudha	Phoenix International, Fargo, ND	Full-time Coop
Shrestha, Bickrant	Blue Cross Blue Shield – Fargo, ND	Part-time Coop
Thalloji, Pramodh	Advanced Software Systems, - Sterling VA	Part-time Coop
Upadhyay, Rajat	Blue Cross Blue Shield – Fargo, ND	Full-time Coop

D. SPECIAL INITIATIVES

Fall 2008 and Spring 2009 CoCISE Awards

Last Name	First Name	Award-Spring-2009	Gender	Race	Major	Standing
Hoffert	Adam	$1,500	male	White	Computer Engr	Sophomore
Baumler	Christopher	$1,500	male	White	Computer Engr	Sophomore
Lindberg	Peder	$1,500	male	White	Computer Engr	Senior
Krebsbach	Nickolas	$1,500	male	Native American Indian	Computer Engr	Sophomore
Mayer	David	$1,500	male	White	Computer Engr	Junior
Seefeldt	Jon	$1,500	male	White	Computer Engr	Junior
Massmann	Aaron	$1,500	male	White	Computer Engr	Senior
Hacker	Brandon	$1,500	male	White	Computer Engr	Sophomore
Rensberger	John	$1,500	male	White	Computer Engr	Freshman
Ewert	Shane	$1,500	male	White	Computer Science	Senior
Smith	Matthew	$1,500	male	White	Computer Science	Senior
Delaney	Michael	$1,500	male	White	Computer Science	Freshman
Alic	Edin	$1,500	male	White	Computer Science	Sophomore
Christian	Benjamin	$1,500	male	White	Computer Science	Freshman
Helmer	Brady	$1,500	male	White	Computer Science	Junior
Rasmussen	Kevin	$1,500	male	White	Computer Science	Sophomore
Frueh	Ryan	$1,500	male	White	Computer Science	Freshman
Grendahl	Jacob	$1,500	male	White	Computer Science	Freshman
Bredahl	Joseph	$1,500	male	White	Computer Science	Sophomore
Conway	Darren	$1,500	male	White	MIS	Senior

Quast	Michael	$1,500	male	White	MIS	Junior
Malloy	Cody	$1,500	male	White	MIS	Senior
Ecklund	Matthew	$1,500	male	White	MIS	Junior
Anderson	Kirby	$1,500	male	White	MIS	Junior
Woodfall	Ryan	$1,500	male	White	MIS	Senior
Abdi	Yusuf	$1,500	male	African American/Black	MIS	Junior
Novotny	Judi	$1,500	female	Native American Indian	MIS	Senior
Jansen	Brian	$1,500	male	White	MIS	Junior
Leischner	Landon	$1,500	male	White	Pre-MIS	Sophomore
Maslesa	Moamer	$1,500	male	Hispanic/Non-Black	Pre-MIS	Freshman
Ellingson	Katie	$1,500	female	White	Pre-MIS	Freshman
Esala	Kyle	$1,500	male	White	Pre-MIS	Junior
Peterson	Daniel	$1,500	male	White	Pre-MIS	Junior
Mohamed	Omran	$1,500	male	African American/Black	Pre-MIS	Sophomore

1. Cooperation programming/Interinstitutional activities:

We are active participants in several interdisciplinary efforts. Our faculty are significant members of the interdisciplinary graduate program in Genomics and Bioinformatics. One of our largest research groups, Use of Technology in Education, involves faculty and students from departments across this campus. Our cooperation with Electrical and Computer Engineering in offering three undergraduate courses continues well into its third decade.

2. International activities:

We continue to build relationships with Chinese academics. For the third straight year, Chinese faculty will visit the Department for three weeks during the summer. We are an active participant in the effort to offer academic programs for hundreds of Chinese students in Fergus Falls. We developed a proposal for a 2 and 2 twinning program with Chinese universities.

Our existing twinning relationships with the Ansal Institute in India and with Cairo University in Egypt continue. In 2008-09, we started a graduate student exchange program with the International Institute for Information Technology in India.

3. Interdisciplinary activities:

The NDSU Computer Science Department is the largest and most prominent department of its kind over a wide geographical area that includes all of North and South Dakota and much of Manitoba, Montana and Minnesota. Given the increasingly prominent role of computing and information technology in our society, it is also of high importance for the Department to grow and thrive, producing well-educated computing professionals. We believe that our graduates do leave the university well prepared and that they are competitive anywhere in the country.

The Department fully participates and supports the goal of the university to become a Carnegie research extensive university. During 2008-09, the Department awarded two Ph.D. and twenty-five M.S. degrees (September 1, 2008 through June 30, 2009 only). If summer is counted as well, the totals should increase significantly in both M.S. and Ph.D. graduates.

4. Economic Development Efforts:

The Department faculty met with several companies during 2008-09. As mentioned above, Microsoft visited campus on a number of occasions, and continues to fund undergraduate and

graduate scholarships and fellowships for several students. Dr. Magel and Dr. Knutson attended meetings with Microsoft Business Solutions.

E. PLANNING

The fundamental strength of the Department lies in the rigor of its academic programs. The BS degree, in particular, is by far the most rigorous in the region. Although difficult, the programs are well supported by faculty and open opportunity for our graduates. Major future plans have been basically described elsewhere in the report, but are succinctly summarized as follows:

- In research and within graduate programs, strengthen and expand in network security, information assurance, bioinformatics, and software engineering,. Continue to maintain excellence in core areas of computer science.
- At the undergraduate level, develop a program that is a more applied alternative to the BS degree in computer science for students intending to enter the job market with a bachelor's degree. The program would expand existing elements of software engineering and information systems.
- Improve the quality of M.S. and Ph.D. students while reducing the total number of graduate students
- Diversify funding sources and the number of faculty receiving external funding
- Continue to foster international programs, such as the ones underway with Egypt and India.
- Expand departmental research funding and reputation
- Take steps to become a designated Center of Excellence in Information Assurance and security.

F. Enrollment and FTE Data

Student Credit Hours and FTEs Generated

	2004-2005		2005-2006		2006-2007		2007-2008		2008-2009	
	Credit hours	**FTE**	**Credit hours**	**FTE**	**Credit hours**	**FTE**	**Credit hours**	**FTE**	**Credit hours**	**FTE**
100-200	7098	8.87	7769	9.71	8468	10.59	9128	11.42	8911	11.14
300-400	2307	4.24	1806	3.32	2172	3.99	2638	4.85	2697	4.96
600-700	2095	7.27	1791	6.22	1743	6.05	2005	6.96	2004	6.96
TOTAL	11500	20.39	11366	19.25	12383	20.63	13773	23.23	13612	23.06

SUMMER II SCHEDULE
2008

COURSE HOURS	CLASS TITLE	INSTRUCTOR	ENROLL	STUDENT CREDIT
774	Topics of Digital Enterprise	K. Nygard	6	3
760	Dynamic Programming	V. Ubhaya	16	3
797	Master Paper	Staff	9	1-10
797R	Master Paper – *cont registration*	Staff	4	R
798	Master Thesis	Staff	4	1-10
798R	Master Thesis – *cont registration*	Staff	4	R
799	Doctoral Dissertation	Staff	1	1-15
799R	Doctoral Dissertation – *cont registration*	Staff	1	R

FALL SEMESTER SCHEDULE
2007

COURSE HOURS	CLASS TITLE	INSTRUCTOR	ENROLL	STUDENT CREDIT
114	Microcomputer Packages	W. Voorhees	55	3
114	Microcomputer Packages	S. Addy	56	3
114	Microcomputer Packages	D. Bindra	55	3
114	Microcomputer Packages	B. Garg	55	3
114	Microcomputer Packages	S. Kaliki	54	3
114	Microcomputer Packages	S. Kaliki	49	3
114	Microcomputer Packages	D. Johnson **(Cont Edu)**	94	3
114	Microcomputer Packages	U. Chakraborty	26	3
116	Business Use of Computers	B. Falah	55	4
116	Business Use of Computers	A. Sathiaseelan	55	4
116	Business Use of Computers	S. Sikharam	55	4
116	Business Use of Computers	D. Nagawatte	55	4
116	Business Use of Computers	C. Kapoor	55	4

116	Business Use of Computers	C. Kapoor	55	4
116	Business Use of Computres	P. Kotala **(Cont. Edu)**	68	4
122	Program in BASIC	R. Sharma	41	3
122	Program in BASIC	N. Addy	40	3
155	Immigration (JAVA)	Cancelled	0	2
159	CS Problem Solving	B. Bengfort	40	3
160	Computer Science I	R. Rummelt	39	4
160	Computer Science I	O. Myronovych	40	4
160	Computer Science I	R. Rummelt	44	4
161	Computer Science II	S. Abufardeh	28	4
161	Computer Science II	S. Abufardeh	18	4
172	Intermediate Basic/Visual	S. Cimic	9	3
222	Discrete Mathematics	V. Ubhaya	40	3
227	Computing Fund. I	O. Myronvych	28	3
277	Introduction to UNIX	J. Latimer	13	3
315	System Anal & Design	P. Kotala	43	3
335	Theoretical CS I	J. Martin	29	3
366	Files/Database System	A. Denton	47	3
372	Comparative Languages	W. Jin	50	3
373	Assembly Programming	V. Ubhaya	40	3
413	Principles of Software Eng.	D. Xu	27	3
426	Introduction to Artificial Intelligence	J. Li	18	3
453	Linear Program Network	K. Nygard	4	3
458	Microcomputer Graphics	Cancelled	0	3
469	Network Security	J. Du	7	3
474	Operating Systems Conc.	J. Kong	40	3
474	Operating Systems Conc.	S. Abufardeh	23	3
477	Object Oriented Systems	W. Zhang	20	3
488	Human-Computer Interaction	J. Kong	22	3
626	Introduction to Artificial Intelligence	J. Li	1	3
653	Linear Program Network	K. Nygard	3	3
658	Microcomputer Graphics	Cancelled	0	3
669	Network Security	J. Du	23	3
677	Object Oriented Systems	W. Zhang	3	3
688	Human-Computer Interaction	J. Kong	2	3
708	Foundations of Programming	J. Martin	34	3
713	Software Engineering I	K. Magel	33	3
713	Software Engineering I- *cont ed*	K. Magel	2	3
715	Software Req/Definition/Analys	H. Do	9	3
715	Software Req/Definition/Analys	K. Magel **(Cont. Edu)**	3	3
718	Software Testing and Debugging	D. Xu	2	3
747	Software Complexity Metrics	H. Do	7	3
765	Intro to Database Systems	B. Perrizo	53	3

778	Computer Networks	J. Du	19	3
783	ST/Parallel & Distributed Simulation	Y. Gu	10	3
790	Sem/Artifical Intelligence	Cancelled	0	1
790	Sem/Aspect-Oriented Soft. Dev.	D. Xu	8	1
790	Sem/Data Mining in Science	A. Denton	12	1
790	Sem/Educational Media	B. Slator	10	1
790	Sem/Software Engineering	K. Magel	2	1
790	Sem/Combinatorial Optimization	K. Nygard	15	1
797	Masters Paper	Staff	28	1-10
797R	Masters Paper	Staff	35	R
798	Master Thesis	Staff	6	1-10
798R	Master Thesis	Staff	11	R
799	Doctoral Dissertation	Staff	11	1-15
799R	Doctoral Dissertation	Staff	7	R

SPRING SEMESTER SCHEDULE
2009

COURSE HOURS	CLASS TITLE	INSTRUCTOR	ENROLL	STUDENT CREDIT
114	Microcomputer Packages	W. Voorhees	55	3
114	Microcomputer Packages	S. Addy	55	3
114	Microcomputer Packages	U. Chakraborty	55	3
114	Microcomputer Packages	B. Garg	55	3
114	Microcomputer Packages	S. Kaliki	55	3
114	Microcomputer Packages	S. Kaliki	56	3
114	Microcomputer Packages	D. Johnson **(Cont Edu)**	120	3
116	Business Use of Computers	S. Sikharam	55	4
116	Business Use of Computers	S. Sikharam	55	4
116	Business Use of Computers	S. Rehman	55	4
116	Business Use of Computers	B. Falah	55	4
116	Business Use of Computers	S. Mukhami	55	4
116	Business Use of Computers	S, Mukhami	55	4
116	Business Use of Computers	P. Kotala **(Cont Edu)**	108	4
122	Beginning BASIC/Visual BASIC	D. Bindra	40	3
122	Beginning BASIC/Visual BASIC	N. Takahashi	40	3
159	Computer Sc. Problem Solving	B. Bengfort	39	3
159	Computer Sc. Problem Solving	B. Bengfort	27	3
160	Computer Science I	R. Rummelt	42	4
160	Computer Science I	O. Myronvych	34	4
160	Computer Science I	R. Rummelt	14	4
161	Computer Science II	S. Abufardeh	39	4
161	Computer Science II	S. Abufardeh	31	4

222	Discrete Mathematics	V. Ubhaya	29	3
228	Computing Fundamentals II	O. Myronvych	28	3
316	System Testing & Maintenance	O. Myronvych	33	3
336	Theoretical CS II	J. Martin	23	3
345	Topics on Personal Computers	B. Slator	23	3
345	Topics on Practical Approaches	H. Do	5	3
345	Topics on Distributed Systems to Software Testing	W. Jin	9	3
371	Web Scripting Language	O. Myronvych	18	3
372	Comparative Prog Languages	A. Denton	33	3
373	Assembly Programming	V. Ubhaya	31	3
374	Computer Organization	K. Magel	43	3
445	Software Projects Capstone	D. Knudson	41	3
459	Found/Computer Networks	X. Du	27	3
467	Algorithm Analysis	J. Martin	45	3
475	Operating Systems Design	J. Kong	41	3
476	Computer Forensics	W. Zhang	15	3
479	Intro to Data Mining	W. Perrizo	4	3
489	Social Implications of Comp	K. Nygard	63	3
659	Found/Computer Networks	J. Du	12	3
676	Computer Forensics	W. Zhang	19	3
679	Intro to Data Mining	W. Perrizo	13	3
689	Social Implications of Comp	K. Nygard	12	3
716	Software Design	K. Magel	5	3
716	Software Design – *Dist. Ed*	K. Magel	6	3
717	Software Construction	D. Xu	10	3
718	Software Testing/Debugging	D. Xu	16	3
718	Software Test/Debugging *Dist Ed*	D. Xu	0	3
724	Survey/Artificial Intelligence	J. Li	39	3
732	Intro to Bioinformatics	A. Denton	21	3
766	Database Systems Internals	W. Perrizo	6	3
783	Topics/Adv. Tech. Logistics	K. Nygard	2	3
783	Topics/Info Retrieval & Web Search	W. Jin	8	3
785	Wireless Networks/Mobile Compt.	W. Zhang	11	3
790	Sem/Educational Media	B. Slator	15	1
790	Sem/Formal Methods in Software Engr.	K. Magel	4	1
790	Sem/Building Secure Softwre	D. Xu	10	1
790	Sem/Optimization in Sensor Networks	K. Nygard	21	1
790	Sem/Wireless Security	J. Du	11	1
797	Masters Paper	Staff	32	1-10
797R	Masters Paper	Staff	43	R
798	Master Thesis	Staff	9	1-10
798R	Master Thesis	Staff	9	R
799	Doctoral Dissertation	Staff	12	1-15

799R	Doctoral Dissertation	Staff	8	R

SUMMER I SCHEDULE
2009

COURSE HOURS	CLASS TITLE	INSTRUCTOR	ENROLL	STUDENT CREDIT
114	Microcomputer Packages	D. Johnson **(Cont Edu)**	55	4
116	Business Use of Computers	P. Kotala(Cont Edu)	49	4
122	Programming in Basic VB.NET	O. Myronvych	44	3
473	Foundations of Digital Enter	K. Nygard	14	3
488	Human-Computer Interaction	Cancelled	0	3
688	Human-Computer Interaction	Cancelled	0	3
713	Software Engineering	K. Magel	1	3
716	Software Design	K. Magel	2	3
773	Foundations of Digital Enter	K. Nygard	26	3
785	Wireless Networks/Mobile Compt.	W. Zhang	3	3

STUDENT RATING OF INSTRUCTION RESULTS 2008-2009

FALL, 2008 and SPRING 2009

Questions	VG	G	IB	P	VP	OMIT	DEPARTMENT LEVEL Mean	S.D.	#R
100 TO 200 LEVEL									
1. Your satisfaction with the instruction in this course.	35.1	44.5	14.3	4.5	1.3	0.2	4.154	0.885	1845
2. The instructor as a teacher.	36.7	41.4	16.1	4.5	1.1	0.2	4.182	0.885	1848
3. The ability of the instructor to communicate effectively	30.3	39.1	20.6	7.3	2.4	0.3	4.022	0.972	1847
4. The quality of this course	27.9	46.9	19.4	4.2	1.2	0.4	4.055	0.879	1845
5. The fairness of procedures for grading this course.	43.1	39.7	12.6	3.0	1.3	0.4	4.285	0.845	1846
6. Your understanding of the course content.	30.0	46.6	18.3	3.9	1.1	0.1	4.073	0.858	1849
300 TO 400 LEVEL									
1. Your satisfaction with the	16.7	33.3	16.7	16.7	16.7	0.0	3.167	1.472	6

instruction in this course.									
2. The instructor as a teacher.	16.7	50.0	33.3	0.0	0.0	0.0	3.833	0.753	6
3. The ability of the instructor to communicate effectively	16.7	33.3	16.7	33.3	0.0	0.0	3.333	1.211	6
4. The quality of this course	33.3	33.3	16.7	16.7	0.0	0.0	3.833	1.169	6
5. The fairness of procedures for grading this course.	33.3	33.3	33.3	0.0	0.0	0.0	4.000	0.894	6
6. Your understanding of the course content.	33.3	33.3	16.7	16.7	0.0	0.0	3.833	1.169	6
600 TO 700 LEVEL									
1. Your satisfaction with the instruction in this course.	61.7	27.8	6.5	1.8	1.4	0.7	4.154	0.885	1845
2. The instructor as a teacher.	63.9	27.8	5.8	0.7	1.4	0.4	4.182	0.885	1848
3. The ability of the instructor to communicate effectively	59.9	28.5	7.9	1.8	1.4	0.4	4.022	0.972	1847
4. The quality of this course	56.0	30.7	10.8	0.7	1.4	0.4	4.055	0.879	1845
5. The fairness of procedures for grading this course.	61.4	26.7	7.6	1.1	2.5	0.7	4.285	0.845	1846
6. Your understanding of the course content.	49.5	35.4	11.9	1.1	1.4	0.7	4.073	0.858	1849

Department Employment of graduates:

Fall 2008
Graduate Teaching Assistants - 17
Graduate Assistants (Graders) - 32

Spring 2009
Graduate Teaching Assistants - 16
Graduate Assistants (Graders) – 23

GRADUATE STUDENTS 2008-2009

Masters Students:

Aakula, Srikanth
Addy, Noah
Addy, Sydney
Amaran, Pradeep
Amuge, Betty
Annapureddy, Anupama
Bapanpally, Pavan
Basu, Samdip
Bouret, Megan
Brown, Jeremy
Chakraborty, Ushashi
Chakravarthi, Satheesh
Chatterjee, Arijit
Chintamaneni, Venkata Santosh
Chintapalli, Veera Venkata
Chinthakayala, Krishna
Dandey, Santosh
Dass, Pranav
DeSoysa, Shanaka
Devina, Laiphangbam
Dischinger, Benjamin
Dumpala, Chaitanya
Emmadi, Praveen
Fazal, Kareemullah
Feist, Matthew
Frovarp, Richard
Ganapa, Sireesha
Ganesan, Arjun

Ganti, Annaji Sharma
Gangannagari, Rajendar
Garg, Bandana
Garimedi, Rajani
Ginjupalli, Siva
Gooduru, Ramkrishnareddy
Guduru, Vasumathi
Gupta, Divya
Gurram, Kiran
Gurram, Samyuktha
Helsene, Adam
Hoff, Garrett
Hokanson, Guy Eric
Huff, Nathan
Huq, Shamima
Jaidev, Akanksha
Jian, Harsh
Jensen, Per-Olaf
Jha, Tarun
Joseph, Priya
K.C. Puja
Kadam, Ramchandra
Kapoor, Chetan
Kar, Angshu
Khanchandani, Kavita
Koganti, Nikhil
Kondakindi, Swathi
Kondamarri, Samuel
Kondoor, Dinesh
Kroshus, John
Kunala, Santosh
Landin, Michael
Lanke, Ramesh
Li, Yi
Loree, Paul
Lu, Tingda
Maddi, Sunil
Mandala, Narendar
Manori, Anshuman
Mattaparthy, Harika
Moses, Joseph
Mudgal, Akshay
Mukhami, Sudesh
Mukka, Hari Krishna
Narayanan, Vasanth
Inagareddy , Krishnakanth
Nayakam, Ghanashyam
Njos, Robby
Osmani, MD
Pachva,. Srikar
Padmanabhan, Ganesh
Pandey, Shivendushital
Param, Sowjanya
Paturu, Suresh
Phadke, Swapna
Podagatlapalli, Chaitanya
Pinagapani, Sathish
Poreddy, Sandeep
Potla, Yaswanth
Pullagurala, Praveen
Raavi Sandeep
Radermacher, Alex
Raidu, Venkata
Rajaraman, Thilak
Ramaurthy, Durga
Rehman, Sana
Reindl, Phillip
Sahni, Ritika
Sachdev, Rajeev
Sambaraju, Sharath
Sathiaseelan, Anu Evelyn
Saxena, Kaustubh
Schlecht, Ryun
Sehgal, Ankita
Sharma, Rajana
Sikharam, Sandeep
Sivanandam, Dinesh
Sundaram, Anita
Suravarapu, Vijay
Tirupathi, Ambika
Tirupathi, Phani
Thakur, Tej
Tiwari, Shweta
Vanteru, Siva
Vellaswamy Chelaiah, Ashok Kumar
Vellaswamy Chelaiah, Ganesh Kumar
Voorhees, William
Vijayan, Dhinuruju
Wang, Yan
Woznica, Szymon
Wu, Jianfei
Yadav, Asha

Yamparala, Sri Harsha

SOFTWARE ENGINEERING MASTERS

Aceituna, Daniel
Arora, Barjesh
Bhogadi, Manu
Bhowmick, Dibakar
Bindra, Dhruv
Boyko, Gregory
Carlson, Ryan
Carlsledt, Daniel
Chauhan, Anuj
Christeson, Eric
Cimic, Senad
Debilt, Daniel
Eda, Ravi
Fonseka, Nilukshi
Gronneberg, Bethlehem
Gunderson, Karl
Herath, Shanaka
Jahan, Farzana
Kallam, Lakshmi
Kazeck, Jerilyn
Kwete, Yannick
Limke, Jed
Maresca, Louis
McGinnity, Steve
Minot, Scott
Murugaiyan, Elangovan
Nagahawatte, Don
Pillarikuppam, Naresh
Pradhan, Basudha
Rahman, Mohamed Saif Ur
Rizvi, Huma
Roseen, Jeremy
Sarker, Mridula
Shrestha, Bickrant
Srichinta, Pallavi
Srivastava, Arun
Takahashi, Maomi
Thalloji, Pramodh
Upadhyay, Rajat

PhD STUDENTS:

Al-Azzam, Omar
Al-Nimer. Loai
Bengfort, Benjamin
Besemann, Christopher
Borchert, Otto
Dorr, Deitmar
ElAriss, Omar
Gagneja, Kanwalinder
Jockheck, William
Kambhampaty, Krishnan
Kandah, Farah
Lin, Fengjing
Marback, Aaron
Pikalek, Jonathan
Shanmugasundaram, Vijaykumar
Wu, Jiafei
Zhang, Ming
Zhao, Jingjun

SOFTWARE ENGINEERING PhD

Abufardeh, Sameer
Ahmadi, Hamed
Falah, Bouchaib
Johnson, Bryce
Kaliki, Srikanth
Lua, Chin
Lundell, Martin
Myronovych, Oksana
Pauli, Jeremy
Ranganathan, Prakash
Rummelt, Richard

Computer Science Department Enrollment Data

AY	Enrollment Fall 2008					Total UG	Total Grad	Total Degrees Fall 08/Spring 2009		
	1st FR	2nd SO	3rd JR	4th SR				BS/BA	MS Comp Sc. Software	PhD Comp Sc. Software
2008-2009	66	54	44	84		248	187	40/3	17/4	1/1
2007-2008	65	43	50	84		242	174	43/1	33/3	4/2
2006-2007	47	46	36	68		197	148	32/2	19/0	3/2
2005-2006	50	30	46	64		190	128	37	11/1	5/0
2004-2005	49	37	47	84		217	178	45	22/5	4/0
2003-2004	82	64	48	86		280	178	108	24	0

Graduate Degrees Awarded, 2008-2009

Summer Semester, 2008	**Degree**
Satoshi Kawamura	MS, CS
Abu Khalique	MS, CS
Tavishi Loomba	MS, CS
Sumanth Tadasina	MS, CS
Dinuagu Vijayan	MS, CS
Fall Semester, 2008	**Degree**
Jeremy Brown	MS, CS
Matthew Fiest	MS, CS
Rajendar Ganganagari	MS, CS
Shanaka Herath	MS, CS
Sathish Pinagapini	MS, CS

Rajeev Sachdev	MS, CS
Ganesh Vellaswamy	MS, CS
Dietmar Dorr	PHD, CS
Sameer Abufardeh	PHD, SE
Spring Semester, 2009	**Degree**
Shamima Huq	MS, CS
Harsh Jian	MS, CS
Ranchandra Kadam	MS, CS
Jerilyn Kazeck	MS, CS
Joseph Moses	MS, CS
Dan Aceituna	MS, SE
Hamed Ahmadi	MS, SE
Ranjana Garimedi	MS, SE
Pandu Nagahawatte	MS, SE

H. DIVERSITY

The Department has always had a significant international representation, particularly people of color from the Far East and the Indian sub-continent, principally in the graduate program. Recently this has extended to the undergraduate program as NDSU has started to offer twinning programs (start in India and spend the last year or two years at NDSU) at the undergraduate and graduate levels to students in India. We hope to expand these programs to Egypt (with which we have a faculty-student exchange) and China within the next few years.

The Department has worked hard to improve the representation of women and other disadvantaged groups in our faculty and student body. The lack of women students is a national problem which has become a priority for the national organizations in Computer Science. Our approach has been to increase female representation on our faculty to serve as role models and mentors for female students. We have been very successful in this effort. Five of our last ten faculty hires have been women. Presently we have five female Assistant Professors. The first of this cadre earned tenure and promotion to Associate Professor during 2008-09.

Starting in 2008-09, the Department encouraged e these female professors to try to increase the representation of women within our student population. This effort will have two components:
- Asking each female faculty member to assist with developing relationships with area high school;
- Forming a committee of female faculty to review our practices and curricula for anything which might make the programs less attractive to women than they should be.

We realize this is a long term effort. While it is too early to measure success, we are encouraged by our modest initial progress. We hope to expand our outreach efforts during the coming years.

Other disadvantaged groups whose representation in our programs should increase include Hispanics, Native Americans, and African Americans (domestic people of color). As mentioned above, the representation of international students of color, particularly from Asia, and especially in our graduate programs and on our faculty, is well above the national percentage of these groups in the United States population.

The Department has tried to reach out to Native Americans in North Dakota through a variety of organizations. We have had little success. We will continue to try. With the help of the National Science Foundation, the Department has formulated a more comprehensive strategy for attracting disadvantaged students.

The NDSU CoCISE (Collaborative for Scholarships in Computer, Information Sciences and Engineering) is for students majoring in Computer Science, Computer Engineering, Management Information Systems or Pre-Management Information Systems. CoCISE is a scholarship program designed to provide scholarship support and academic mentoring to talented and financially disadvantaged computer engineering, computer science, and management information systems students at NDSU. The CoCISE program is funded by a four-year grant from the National Science Foundation. The state objectives of the program include: "Increasing the numbers of women and minority group students, particularly Native Americans, in the computer engineering, computer science, management information systems, and pre-management information systems programs.

A complete list of CoCise awards can be located above, under "Speical Initiatives". This four year, $500,000 program has just entered its third year.