

**NDSU DEPARTMENT OF COMPUTER SCIENCE
AND OPERATIONS RESEARCH**

**ANNUAL REPORT
2004-2005**

Primary Contact:
Dr. Kendall E. Nygard, Chair
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Faculty, Lecturer's and Special Appointments Profiles



**Dr. Sandra Andersen, Assistant Professor
PhD, North Dakota State University, 1996**

Dr. Andersen primarily teaches undergraduate courses in programming languages and computer science foundations. She is interested in alternative approaches for teaching languages, and in software engineering.



**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.



**Dr. Xiaojang (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.



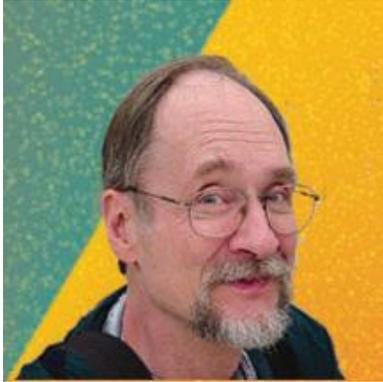
**Dr. D. Bruce Erickson, Associate Professor and Undergraduate Program Coordinator
PhD, Yale, 1973**

Dr. Erickson teaches courses in programming, data structures and data abstraction, discrete mathematics for computer science, files for database systems, and mathematical foundations of programming. As undergraduate program coordinator, Dr. Erickson serves on the undergraduate curriculum committee, advises on transfer course equivalencies, ensures that national accreditation principles are followed, and makes recommendations on scholarship recipients.



**Dr. Huirong Fu, Assistant Professor
PhD, Nanyang Technology University, Singapore,
2000**

Dr. Fu teaches courses and conducts research in networks, network security, and information assurance. She is also carrying out curriculum development work in networks and related areas.



**Dr. Paul Juell, Associate Professor
PhD, Ohio State University, 1981**

Dr. Juell is interested in Artificial Intelligence, Multimedia and distance education. He teaches courses in artificial intelligence, computer graphics, operating systems, and comparative languages. He is working with the use of video conferencing to facilitate partnerships with universities around the world, including synchronous delivery of courses over the internet.



**Dr. Ahmed Kamel, Assistant Professor
PhD, Michigan State University, 1994**

Dr. Kamel teaches courses in artificial intelligence, programming languages, computer science foundations, operating systems, software agents and assembly language programming. He also coaches the undergraduate programming contest teams. He has applied a variety of artificial intelligence techniques to agricultural management and unmanned air vehicle applications.



**Dr. Honglin Li, Assistant Professor
PhD, Ohio State University, 2003**

Dr. Li is interested in multi-media systems, including annotation of video information data sources. He is also interested in the use of signal processing analyses in bioinformatics. He teaches courses in computer science foundations and computer engineering, including signal processing.



**Dr. Kenneth Magel, Professor
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.



**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. 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 and graduate coordinator for the department.



**Dr. Kendall E. Nygard, Professor and
Departmental Chair
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.



**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.



**Dr. Akram Salah, Associate Professor
PhD, University of Alabama at Birmingham 1985**

Dr. Salah is interested in software engineering and database management, and is teaching and developing courses in those areas. He has developed a partnership program with Cairo University under sponsorship of the bi-national Fulbright Commission.



**Dr. Brian M. Slator, Professor
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. He is a recipient of the Meier sponsored professorship. 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.

LECTURERS



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

Ms. Johnson teaches and coordinates the offering of introductory courses in application software (Microsoft Office), programming languages (Visual Basic, COBOL), and online courses in electronic commerce.



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

Mr. Kotala teaches courses in systems analysis and design and foundations of programming for MIS majors. He also teaches the summer governor's school for high school students, and has research interests in database management.



Dean Knudson, Adjunct Professor

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. Dr. Knudson has extensive experience working for Microsoft and several other companies.

STAFF



Lynn Thorp, Systems Support

Ms. Thorp administers department systems, maintains the departmental web site, and handles configurations for the departmental instructional laboratories.



Carole Huber, Administrative Assistant

Ms. Huber coordinates the administrative functions of the department, including managing research and appropriated funds, and facilitating the work of the faculty and students.



Mimi Monson, Part-time Administrative Secretary

Ms. Monson carries out office support functions, including maintaining departmental data and student records and survey information, and assisting students and faculty.



Betty Opheim, Part-time Administrative Secretary

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

I. Goals/accomplishments for the current year

A. INSTRUCTION AND STUDENT ACIEVEMENT

1. Capstone Projects:

The 2004-05 academic year marked the third year in which capstone projects for seniors in CS and MIS 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. The sponsors for spring semester 2005 are as follows:

1. ATK
2. Forum Publishing
3. IBM Rochester
4. Infinity Windows, Data Collection
5. Infinity Windows, User Interface
6. Infinity Windows, Local Area Network
7. Information Technology Services, NDSU
8. Laney's Plumbing and Heating
9. Phoenix International
10. Summer's Harvest Grain Milling
11. Sundog
12. TW, Project Management
13. TW, XML
14. Cargill, User Update
15. Microsoft Business Solutions, Application Development

16. Mind Tremors, Portal Development
17. Mind T, Server Project
18. Noridian
19. Sugar Sand
20. Microsoft Business Solutions, Software Testing
21. WorkforceROI
22. Cargill, Time Tracking
23. Eide Bailly

The survey response rate from the project sponsors was 100%. There were two projects for which two responsible individuals from the sponsoring company were involved and completed surveys independently, resulting in a total of 25 responses for 23 projects. Seven of the more important surveyed items are reported in the table below.

Summary tabulation of the Project Sponsor Survey, Compiled May 16, 2005

	Very Good	Good	Marginal	Poor	N/A
Knowledge in Scientific and Technical Areas	9	11	5	0	0
Teamwork/Dedication to task	13	6	2	3	1
Communication/Formal	9	12	3	1	0
Communication/Informal	11	10	2	2	0
Process	7	6	4	1	7
Program Management	8	12	2	3	0
Overall Opinion of Capstone Program	13	6	1	1	0

The spring semester 2005 capstone program was clearly the most successful in the history of the department. The survey results do provide insight into areas that can be somewhat improved. However, the results are very positive overall. In addition to the positive results tabulated above, there are several other significant items to report, as given below:

1. Several sponsors reported that they gained valuable perspective on project issues of importance to them as a result of the work of the student project teams.
2. Numerous students were offered full time employment or internships as a direct result of the student projects. Several students accepted their offer. There was one example of a sponsor who offered jobs to all three members of the student team.
3. Many of the sponsors committed to sponsoring projects again next year.

2. Distance Education and use of Technology in Courses:

CSci 773 (Foundations of the Digital Enterprise) and CSci 774 (Topics in the Digital Enterprise) have now been successfully offered entirely by distance education for several years. Two sections each of general education courses CSci 114 (Microcomputer Applications) and CSci 116 (Business Use of Computers) are being successfully taught in a web-based format. CSci 159 (Computer Science Problem Solving) was taught this past

year via distance education for the first time, including offering the course to teachers who wish to use the course for continuing professional education.

Under Sponsorship of the binational Fulbright commission, a partnership with Cairo University is underway. Exchange visits are regularly taking place, and a video conferencing seminar series has been initiated, with alternating delivery of research seminars by faculty and graduate students from the two sites. This series has stimulated a major expansion of video conferencing activity at Cairo University, and is leading to higher-level partnership activities. One Cairo University Master of Science student is being coadvised by an NDSU professor. The department is also participating in a twinning arrangement with the Ansal Institute in India, and will be receiving undergraduate seniors under that program in the fall of 2006.

Dr. Brian Slator continues to lead the World-Wide Web Instructional Committee at NDSU, a group focused on the use of technology for learning. Under this project, technology-based delivery of many courses has taken place, including geography and sociology.

The Personal Response System (PRS) was utilized by several professors in several courses to facilitate active learning. Two professors participated in the problem-based learning series.

3. Advising Efforts:

UNDERGRADUATE ADVISEES 2004-2005

D. Bruce Erickson

Casey	Chambers	Fr	Computer Science
Nicholas	Hauschild	Fr	Computer Science
Adam	Helsene	Fr	Computer Science
Brett	Kingsley	Fr	Computer Science
James	Peterson Jr	So	Computer Science
Jeremy	Mertz	Jr	Computer Science
Patrick	Tufton	Jr	Computer Science
Peter	Garcia	Sr	Computer Science
Justin	Gronfur	Sr	Computer Science
Clement	Harambe	Sr	Computer Science
Steve	McGinnity	Sr	Computer Science
Matthew	Zeltwanger	Sr	Computer Science

Huirong Fu

Taylor	Foley	Fr	Computer Science
Matthew	Mason	So	Computer Science
Chau	Pham	So	Computer Science
Austin	Schuch	So	Computer Science
David	Cariveau	Jr.	Computer Science

Linzey	Crockett	Jr.	Computer Science
Alexander	Pratt	Jr.	Computer Science

Paul Juell

Travis	Byberg	Fr	Computer Science
Travis	Leight	Fr	Computer Science
Carlos	Quiros	Fr	Computer Science
Robin	McDonough	So	Computer Science
Preston	Nermoe	So	Computer Science
Tim	New	So	Computer Science
Brad	Rehm	Jr.	Computer Science

Kenneth Magel

Russell	Conklin	Fr	Computer Science
Andrew	Haugen	Fr	Computer Science
Mary	Ovbiebo	Fr	Computer Science
Zachary	Roecker	Fr	Computer Science
Jason	Stone	Fr	Computer Science
Daniel	O'Donnell	So	Computer Science
Joseph	Lindahl	Jr	Computer Science
Ron	Beyer	Sr	Computer Science
Joseph	Duncan	Sr	Computer Science
Celeste	Schweyen	Sr	Computer Science
Lorren	Zemke	Sr	Computer Science

John Martin

Nicholas	Adducci	Fr	Computer Science
Anthony	Baumgartner	Fr	Computer Science
Matthew	Behrend	Fr	Computer Science
Evan	Braaten	Fr	Computer Science
Vamorris	Dosso	Fr	Computer Science
Sven	Dunkel	Fr	Computer Science
Kent	Grueneich	Fr	Computer Science
Steven	Hartmann	Fr	Computer Science
Rohit	Parvathaneni	Fr	Computer Science
Conrad	Rustad	Fr	Computer Science
Alex	Samanta	Fr	Computer Science
Celton	Seelig	Fr	Computer Science
Paul	Stevenson	Fr	Computer Science
John	Tomaszewski	Fr	Computer Science
Eric	Zeis	Fr	Computer Science
Timothy	Barsness	So	Computer Science
Megan	Bouret	So	Computer Science
Joel	Hartleib	So	Computer Science

Avery	Hays	So	Computer Science
Peter	Jothen	So	Computer Science
Anthony	Lynch	So	Computer Science
Andrew	Ming	So	Computer Science
Steven	Novotny	So	Computer Science
Alex	Radermacher	So	Computer Science
Alic	Selvedin	So	Computer Science
Darin	Swenson	So	Computer Science
Eric	Vosika	So	Computer Science
Heather	Arndt	Jr	Computer Science
Brady	Augeson	Jr	Computer Science
Patrick	Baskerville	Jr	Computer Science
Matthew	Berseth	Jr	Computer Science
David	Blattner	Jr	Computer Science
Jacob	Boomgaarden	Jr	Computer Science
Zachariah	Christiansen	Jr	Computer Science
Jordan	Debilzan	Jr	Computer Science
Laremy	Depyper	Jr	Computer Science
Troy	Driscoll	Jr	Computer Science
Scott	Fisher	Jr	Computer Science
Paul	Flatt	Jr	Computer Science
Christopher	Forseth	Jr	Computer Science
Brian	Gussiaas	Jr	Computer Science
Randy	Haaland	Jr	Computer Science
Craig	Johnson	Jr	Computer Science
Ikania	Kaale	Jr	Computer Science
Shaun	Kohanowski	Jr	Computer Science
Matthew	Makosky	Jr	Computer Science
Benjamin	Mueller	Jr	Computer Science
Michael	Nordick	Jr	Computer Science
Nathan	Olson	Jr	Computer Science
James	Peterson	Jr	Computer Science
David	Rodriquez	Jr	Computer Science
Aaron	Rosecrans	Jr	Computer Science
Cordell	Schaff	Jr	Computer Science
Bradley	Seifert	Jr	Computer Science
Zachary	Thurn	Jr	Computer Science
Jonathan	Albers	Sr	Computer Science
Jared	Allar	Sr	Computer Science
David	Boll	Sr	Computer Science
Benjamin	Dischinger	Sr	Computer Science
Daniel	Hamre	Sr	Computer Science
Eric	Hughes	Sr	Computer Science
Kiyochika	Nakamura	Sr	Computer Science
Douglas	Plante	Sr	Computer Science
Jeffrey	Schmidt	Sr	Computer Science
Riley	Verret	Sr	Computer Science
Scott	Vorachek	Sr	Computer Science
Wallace	Wiest	Sr	Computer Science
Christopher	Wurtz	Sr	Computer Science

David Serhienko Sr. Computer Science

William Perrizo

Patrick Huber Sr Computer Science

Akram Salah

Matthew Lengenfelder Fr Computer Science
David Ramsdell So Computer Science
Craig Massee Jr Computer Science
Jeffrey Bladow Sr Computer Science
Christopher Carroll Sr Computer Science
Matthew Feist Sr Computer Science
Ryan Harmon Sr Computer Science
Christopher Hudson Sr Computer Science
David Lorenz Sr Computer Science
Michell Statz Sr Computer Science
Jacob Welch Sr Computer Science
Chad Woinarowicz Sr Computer Science

Brian Slator

Michael Christianson Fr Computer Science
Gabriel Groesbeck Fr Computer Science
Todd Lemke So Computer Science
Mohamed Elmaraghy Jr Computer Science
Charles Fangsrud Jr Computer Science
Joseph Schaepfi Jr Computer Science
Richard Frovarp Sr Computer Science
Nicholas Hetland Sr Computer Science
Harry Hight Sr Computer Science
Douglas Kuvaas Sr Computer Science
Bret Lindeman Sr MIS
Charles Peterson Sr Computer Science
Justin Pribula Sr Computer Science

Vasant Ubhaya

Tyler Ferderer Fr Computer Science
Eric Odegaard Fr Computer Science
Jason Baker So Computer Science
Jason Buchfink So Computer Science
George Norton So Computer Science
Christopher Heyne Jr Computer Science
Kevin Ketcher Jr Computer Science
Gregory Larson Jr Computer Science

Anthony	Pecarina	Jr	Computer Science
Sharif	Rahman	Jr	Computer Science
Michael	Veit	Jr	Computer Science
Robert	Sell	Sr	Computer Science
Mohammad	Vafadar	Sr	Computer Science

4. Curriculum and course development and changes:

There was considerable activity in developing bioinformatics education in the department in 2004-05. CSci 732, Introduction to Bioinformatics, was taught for the second time. An advanced graduate course in bioinformatics modeling was developed, proposed, and approved and will be taught in the spring of 2006. Academic credit was arranged for participation in the virtual seminar on genomics and bioinformatics. Two more graduate courses in the area have also been proposed. Graduate program options in bioinformatics for both the MS and Ph.D. degrees have been drafted and will be submitted for approval in the fall of 2005. A similar initiative is underway in information assurance and security, including the offering of a new advanced course in network security and graduate program options being developed. The department is also taking steps to become certified as a national center of excellence in The graduate certificate, Master of Science, and Doctor of Philosophy programs in Software Engineering continue to grow. Special arrangements were made to attract personnel from Microsoft corporation into the software engineering programs, including switching the course offerings to the early evening on an experimental basis. CSci 159, computer science problem solving, was submitted for general education and approval in the quantitative methods area. The department also drafted a candidate undergraduate degree program in an applied computing, an initiative that will be further developed in 2005-06.

5. Accreditation and reviews:

National Accreditation in Computer Science was first offered by the Computer Science Accreditation Board in 1985. The B.S. in Computer Science earned national accreditation in the first year, and has held this status continuously ever since. A visit by an evaluation team was hosted in the fall of 2003. The program was accredited through the fall of 2006. An interim accreditation visit report has been prepared, and a visit is scheduled for the fall of 2005. Modification of the external-oriented program outcomes was completed in 2004-05 and fully reported in the June, 2005 assessment report. Computer Science accreditation is managed under ABET, the Accreditation Board for Engineering and Technology.

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

Graduate teaching assistants are mentored by Ms. Dana Johnson, senior lecturer in the department. A special student evaluation is carried out at midsemester in addition to the standard one at the end of the semester, in an effort to identify any teaching problems early enough to make adjustments and to help retain students. Graduate students are required to meet higher standards in English proficiency than the university wide requirements. Where possible, new GTAs are paired with experienced ones their first semester, and support the course through working as rovers in the laboratory sessions and in grading. The service courses are also supported with online materials, special tutors, and CD-based materials, providing a variety of resources for students in those courses. New faculty are assigned a

mentor to help with their teaching efforts. Enrollment of CS majors continues to decline, which is in accordance with both regional and national trends. This has stimulated discussion of a new applied major at the undergraduate level. At the graduate level, standards for admitting Master of Science students have been increased in an effort to increase the ratio of Ph.D. to Master of Science students. This is proving to be very effective, particularly in increasing the number of Ph.D. students. although the number of Master of Science applications continues to be large. A preference in graduate assistantships for Ph.D. students is being followed. The number of Ph.D. students has grown doubled in the past two years and is now over 50. To assist retention at the graduate level, increasing numbers of students have been supported with stipends, fellowships, and tuition waivers. In the capstone course, a TWIKI site to structure online collaboration has been introduced and is an additional successful resource for students in that course.

7. Employment of graduates:

Fall 2004

Graduate Teaching Assistants - 20

Graduate Assistants (Graders) - 19

Spring 2005

Graduate Teaching Assistants - 23

Graduate Assistants (Graders) – 19

8. 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 principles.. Entry level courses are regularly taught by senior professors.

9. 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 also offered. The department offers several courses each summer under the self-support program. The self-support program is very beneficial for the department.

10. Career Center student employment

CS Bachelor students employment rate is 81% at a salary range of Low-Average-High being 26-45-60K.

B. RESEARCH AND SCHOLARLY ACTIVITY

1. Research overview:

Departmental faculty members continue to publish regularly and to attract external funding for research. During 2004-05 no major awards were received. However, there were a number of significant continuing multi-year awards. Some of the sources of funding include the National Science Foundation, Air Force Office of Scientific Research, Office of Naval Research, U. S. Department of Education, and Microsoft Business Solutions. Each research faculty member is expected to regularly apply for external funding. Faculty members regularly publish in refereed journals and conference proceedings. Newer faculty hired in the past 1-4 years are regularly applying for funding and publishing.

Departmental major areas of research activity include bioinformatics, distributed database management systems, educational technology and synthetic environments, image processing, pattern recognition, sub-symbolic artificial intelligence, software engineering, quality assurance in networks, and military applications of operations research. There are approximately eighty M.S. students, and fifty Ph.D. students. Each research-oriented faculty member has laboratory space in addition to an office. During the summer of 2003, a remodeling and reconfiguring of departmental space was carried out to handle expanded needs for faculty offices and laboratory space. This space became fully in 2004-05 and the department has a need for additional space.

During 2004-05 the faculty members published 108 articles in the open refereed literature. This is significantly up from, 2003-04, when the faculty published 77 articles. This is a significant increase and is very strong rate of publishing. Some senior faculty continue to publish at high, rates, but the younger faculty are well represented, suggesting that the department is building a stronger base of accomplishment in newer research areas. Primary growth technical areas include bioinformatics and information assurance and security, data mining, and military applications,

2. Grants/Contracts/Research:

COMPUTER SCIENCE DEPARTMENT GRANTS AND CONTRACTS, PART 1 PROJECTS INITIATED PRIOR TO JULY 1, 2004, AND CONTINUING INTO THE 2004- 2005 ACADEMIC YEAR

YEAR	GRANT #	PRINCIPAL INVESTIGATOR	TITLE	FUNDING SOURCE	AMOUNT
2/04 to 1/05	1175	Denton	Research Foundation	NDSU	10,000
8-04 to 4/05	4840	Denton	EPSCoR New Faculty Startup	EPSCoR	14,100
6/03 to 5/05	4102	Fu	Cyber Security Capacity Building at NDSU	National Science Foundation	199,921
1/04 to 4/05	4858	Li	EPSCoR New Faculty Startup	EPSCoR	4,410
11-20-01 to 11-19-06	4205	Nygaard	Virtual Archival Storage Terminal	US Dept. of Housing and Urban Dev.	249,450
4-15-01 to 10-15-04	4795	Nygaard	Cooperative Control of Multiple Unmanned Autonomous Vehicles	US Air Force AFOSR	345,148
5-1-02 to 4-30-05	4871	Nygaard	Near Real-time Mission Planning for Autonomous Vehicles	Office of Naval	354,829

YEAR	GRANT #	PRINCIPAL INVESTIGATOR	TITLE	FUNDING SOURCE	AMOUNT
				Research	
12/03	5280	Nygaard	Microsoft Business	Microsoft Business Solutions	19,500
3/04 to 5/05	5287	Nygaard	Data Development Analysis for ND School Transportation	ND Dept of Public Instruction	40,000
3/02 -----	1338	Perrizo	Engberg Presidential Award	NDSU	8,100
3-22-02 to 9-30-04	4251	Perrizo	Virtual Archival Storage Terminal 2002	US General Serv. Adm.	250,000
9/03 to 8/04	4759	Perrizo	Development of Diploid Wheat	National Science Foundation	31,260
5/03 to 5/05	4951	Perrizo	Center for High Performance Computing CHPC	General Services Admin.	225,000
1/04 to 6/05	5177	Perrizo	Doctorial Dissertation Award	EPSCoR	19,680
7/93 ----	5512	Perrizo	Residual Value Surrogates	Dakota Race Mgmt.	16,469
00-05		Slator	Systems for Learning Science and Assessing Student Learning;	NSF-ITR	1,940,000
7-03 to 4/05	5276	Xu	EPSCoR New Faculty Startup	EPSCoR	20,000
TOTAL					\$3,747,867

**COMPUTER SCIENCE DEPARTMENT GRANTS AND CONTRACTS
PROJECTS INITIATED DURING THE JULY 1, 2004 TO JUNE 30, 2005 TIME PERIOD**

YEAR	GRANT #	PRINCIPAL INVESTIGATOR	TITLE	FUNDING SOURCE	AMOUNT
4/05 to 4/07	10466	Denton	Tools and Applications of Gene-by Gene Sequencing in Common Bean	USDA/CSEES	61,955
1/05 to 6/05	10215	Du	EPSCoR New Faculty Startup	EPSCoR	16,733
1/05 to 5/05	10437	Nygaard	Software Agent Control of Autonomous Rovers	NASA/UND	2,700
8/04 to 7/05	8513	Perrizo	Virtual Genomics & Bioinformatics Conference Participant Support	National Science Foundation	27,968
Totals					\$109,356

3. Articles/Books/Publications and Presentations:

Anne Denton

Publications

1. Anne Denton, "Clustering of Time Series Data," in Encyclopedia of Data Warehousing and Mining, ed. John Wang, Idea Group Publishing, Hershey, PA, 2005 (in print).
2. Anne Denton and Christopher Besemann, "Association Rule Mining of Relational Data," in Encyclopedia of Data Warehousing and Mining, ed. John Wang, Idea Group Publishing, Hershey, PA, 2005 (in print).
3. Sisir Ray, Anne Denton, Christopher Besemann, and Kendall E. Nygard, "Learning Theory and Styles in Online Computer Science Courses," 2004 WSEAS Int. Conf. on Engineering Education, EE'04, Venice, Italy, Nov. 2004. Also: Advances in Engineering Education, 2005 (both in print).
4. William Perrizo and Anne Denton, "Framework unifying association rule mining, clustering and classification," Special Issue of the Journal of Computational Methods in Science and Engineering (JCMSE), 2004 (in print). (Journal version of 11. see below)
5. Anne Denton, "Density-based clustering of time series subsequences," In Proceedings The Third Workshop on Mining Temporal and Sequential Data (TDM 04) in conjunction with The Tenth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, Seattle, WA, Aug. 22, 2004.
6. Christopher Besemann and Anne Denton, "Differential association rule mining for the study of protein-protein interaction networks," In Proceedings of The Fourth Workshop on Data Mining in Bioinformatics (BIOKDD 04) in conjunction with The Tenth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, Seattle, WA, Aug. 22, 2004.

Presentations

Presented the above papers

- 5 (talk)
- 6 (talk)
- 7 (poster)
- 9 (talk)

Presented the poster "Which Definition of a Domain Works Best?" (authors: Anne M. Denton, Christopher A. Besemann) at the Plant & Animal Genomes XIII Conference, January 15-19, 2005, Town & Country Convention Center, San Diego, CA

Co-Author of the poster "Identifying Plant Paralogs And Orthologs Using Complete Linkage Hierarchical Clustering" (authors: Nathan J Olson, Christopher Besemann, Anne Denton, Phillip McClean,

Shahryar Kianian) at the Plant & Animal Genomes XIII Conference, January 15-19, 2005, Town & Country Convention Center, San Diego, CA.

Xiaojiang Du

Publications

Book Chapter

X. Du, "Backbone Quality-of-Service Routing Protocol for Heterogeneous Mobile Ad Hoc Networks", *Advances in Wireless Networks and Mobile Computing*, D.-Z. Du and G. Xue (Eds.), Springer, Jan. 2005.

Journal Papers

X. Du, "QoS Routing for Mobile Ad Hoc Networks", *Elsevier Journal of Ad Hoc Networks*, Vol. 2/3 pp. 241-254, July 2004.

Conference Papers

1. X. Du, "Efficient Energy Management Protocol for Target Tracking Sensor Network", The Ninth IFIP/IEEE International Symposium on Integrated Network Management (IM 2005), Nice, France, May 2005 (in print).
2. X. Du, "Improving Routing in Sensor Networks with Heterogeneous Sensor Nodes", IEEE VTC Spring 2005, Stockholm, Sweden, May 2005, (in print).
3. X. Du, and F. Lin, "Improving Sensor Network Performance by Deploying Mobile Sensors", The 24th IEEE International Performance, Computing, and Communications Conference (IPCCC), April 2005, Phoenix, AZ, (in print).
4. X. Du, "Designing Efficient Routing Protocol for Heterogeneous Sensor Networks", The 24th IEEE International Performance, Computing, and Communications Conference (IPCCC), April 2005, Phoenix, AZ, (in print).
5. X. Du, "Secure Cell Relay Routing Protocol for Sensor Networks", First IEEE Workshop on Information Assurance in Wireless Sensor Networks (WSNIA 2005), in conjunction with IPCCC 2005, April 2005, Phoenix, AZ, (in print).
6. X. Du, "Using K-Nearest Neighbor Method to Identify Poison Message Failure", In Proceedings of IEEE Globecom 2004, Dallas TX, Nov. 2004.

Presentations

X. Du, "Using K-Nearest Neighbor Method to Identify Poison Message Failure", IEEE Globecom 2004, Dallas TX, Nov. 2004

Huirong Fu

Publications

Conference Papers

1. Kumar Mangipudi, Nagaraja Malneedi, Rajendra Katti, and Huirong Fu, "Attacks and Solutions on Aydos-Savas-Koç's Wireless Authentication Protocol," *IEEE GLOBECOM'04*, Dallas, Texas, Nov. 2004.

2. Benzir M. Ahmed, Tanjina Helaly, and Huirong Fu, "Secure Routing in Wireless Mobile Ad Hoc Networks without the Support of Key Management Infrastructure," *International Conference on Wireless Networks (ICWN'04)*, Las Vegas, Nevada, Jun. 2004.
3. Satoshi Kawamura, Huirong Fu, Meegeum Choi, and Shanhong Wu, "End-to-End Mobility Management: A Two-Phase Deployment Scheme for Personal Use," *International Conference on Wireless Networks (ICWN'04)*, Las Vegas, Nevada, Jun. 2004.

Papers in Submission or Preparation

1. Huirong Fu and Ming Zhang, "On-line Adaptive Firewall Allocation in Internet Data Center," submitted to *Computer Communications, Elsevier Science*, with favorable reviews.
2. Kumar V. Mangipudi, Rajendra S. Katti, and Huirong Fu, "Aydos-Savas-Koç's Wireless Authentication Protocol: Attacks and Solutions," submitted to the *IEEE Transactions on Wireless Communications*.
3. Huirong Fu, "On Parameter Estimation of a Simple Real-Time Flow Aggregation Model," submitted to *International Journal of Communication Systems*.
4. Guangyuan Sun and Huirong Fu, "Intrusion Detection Analysis Techniques: Basic Principles, Recent Advances and Open Issues," submitted to *IEEE Communications Surveys and Tutorials*.
5. Sanjay Ramaswamy, Huirong Fu, and Kendall E. Nygard, "Effect of Cooperative Black Hole Attack on Mobile Ad Hoc Networks," submitted to *ICWN'05*.
6. Huirong Fu, Vivek Goel, Elangovan Murugaiyan, and Sudhan Shanmugasundaram, "Unified Solution to Registration, Authentication and Billing for Wireless Hotspots: Architecture and Protocols," submitted to *ICWN'05*.
7. Huirong Fu, Satoshi Kawamura, and Ming Zhang, "Replication Attack on Random Key Pre-distribution Schemes for Wireless Sensor Networks," *in preparation*.

Paul Juell

Publications

1. Rahman, Syed, Akram Salah and Paul Juell, A Practical Experience on Web Applications Developing Environments, ISCA 20th International Conference on Computers and Their Applications, New Orleans, March 16-18, 2005.
2. Shanmugasundaram, V., Juell, P., Vanderschoot, H., and Tschakert, C. Online Voting System for Student Body Election, 17th International Conference on Computer Applications in Industry and Engineering(Sponsored by the International Society for Computers and Their Applications (ISCA)), Orlando, Florida, USA: Nov. 17-19, 2004.
3. Shanmugasundaram, V., Juell, P., Landa, K., Hornstein, K. Multi Use of Course Management Online Tool in a College. E-Learn 2004 -- World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education, organized by the Association for the Advancement of Computing in Education (AACE) and co-sponsored by the International Journal on E-Learning, Washington, DC. Nov 1-5, 2004.

4. Juell, Paul, Robust Hierarchical Web Space for a University, ED-MEDIA 2004 - World Conference on Educational Multimedia, Hypermedia & Telecommunications, in Lugano, Switzerland, June 21-26, 2004.
5. Shanmugasundaram, Vijayakumar and Paul Juell, Development of ViewJ - a Visualization Builder for Object Oriented Programming Development Environment, ED-MEDIA 2004 - World Conference on Educational Multimedia, Hypermedia & Telecommunications, in Lugano, Switzerland, June 21-26, 2004.

Ahmed Kamel

Publications

1. Seth, Deepak, and Ahmed Kamel (2004). An Agent-Based System for E-mail Monitoring. Third International Conference on Computer Science, Software Engineering, Information Technology, E-Business, and Applications, Cairo, Egypt, International Society for Computers and their Applications. December 2004, Submitted.
2. Seth, Dheeraj, and Ahmed Kamel (2004). An Intelligent-Agent Based Automated Weather Alert System. Third International Conference on Computer Science, Software Engineering, Information Technology, E-Business, and Applications, Cairo, Egypt, International Society for Computers and their Applications. December 2004, Submitted.
3. Kamel, Ahmed, Mohd M. Anwar, and Kendall Nygard (2004). Neuro-Dynamic Programming for Task Allocation to Unmanned Aerial Vehicles. ISCA 13th International Conference on Intelligent and Adaptive Systems and Software Engineering, Nice, France, International Society for Computers and their Applications. July 2004.

Presentations

Intelligent Agents Research at North Dakota State University, invited presentation at The American University in Cairo, Cairo, Egypt. March 10, 2004.

Tutorial on Intelligent Agents, INFOS 2004 - The Second International Conference on Informatics and Systems, Cairo, Egypt. March 6, 2004.

Honglin Li

Publications

1. "Hierarchical Organization for Video Annotation", Honglin Li, and Stan Ahalt, IEEE Electro/Information Technology Conference 2005, Lincoln, Nebraska, May 2005 (accepted)
2. "Multimedia Access Platform for Virtual Learning Environment", Aijuan Dong, and Honglin Li, IEEE Electro/Information Technology Conference 2005, Lincoln, Nebraska, May 2005 (accepted)

3. “Ontology-driven Multimedia Access in Virtual Learning Environment”, Aijuan Dong, and Honglin Li, 9th World Multi-Conference on Systemics, Cybernetics and Informatics, Florida, USA, from July 10-13, 2005 (accepted)
4. “Digital Image Processing in Turf Grass Research”, Aijuan Dong, Honglin Li, and Deying Li, International Conference on Computing, Communications and Control Technologies: CCCT'04, August 2004, Austin, Texas
5. “High-level Video Annotations using Syntactic Approach”, Honglin Li, Yi Zhao, and Stan Ahalt, International Conference on Computing, Communications and Control Technologies: CCCT'04, August 2004, Austin, Texas
6. “Hierarchical Video Semantic Annotation -- The Vision and Techniques”, Honglin Li, Yi Zhao, and Stan Ahalt, International Conference on Computing, Communications and Control Technologies: CCCT'04, August 2004, Austin, Texas
7. “Optimized Packet Interleaving for Streaming Applications on Burst-lossy Channels”, Yi Zhao, Honglin Li, and Stan Ahalt, SPIE DSS 2004, Visual Information Processing XIII, April 2004, Orlando, Florida
8. Journal submission: “Hierarchical Video Semantic Annotation”, Honglin Li, Yi Zhao, and Stan Ahalt, submitted to *IEEE Transactions on Multimedia*, 2004
9. Journal submission: “Syntactic Approach to High-level Video Pattern Analysis”, Honglin Li, Yi Zhao, and Stan Ahalt, submitted to *IEEE Transactions on Circuits and Systems for Video Technology*, 2004
10. In the process of submitting another journal paper on the topic of ontology-driven video annotation by June 2005.

Presentations

“Hierarchical Video Semantic Annotation -- The Vision and Techniques”, CS@NDSU, Jan. 2004

“Hierarchical Video Semantic Annotation -- The Vision and Techniques”, International Conference on Computing, Communications and Control Technologies: CCCT'04, August 2004, Austin, Texas

“High-level Video Annotations using Syntactic Approach”, International Conference on Computing, Communications and Control Technologies: CCCT'04, August 2004, Austin, Texas

“Multimedia Information Processing – Past, Present, and Future”, ACM NDSU Chapter, schedule on Mar 16, 2005

Kendall Nygard

Publications

Refereed Journal Articles

1. Sisir Ray, Anne Denton, Christopher Besemann, and Kendall E. Nygard, "Learning Theory and Styles in Online Computer Science Courses", in Transactions on Advances in Engineering Education 1(1), ISSN: 1790-1979, 2005, pp. 83-87. also in proceedings of the 2004 WSEAS Int. Conf. on Engineering Education, Venice, Italy, Nov. 2004.

Book Chapters

1. Nygard, Kendall E., Altenburg, K., Tang, K. and D. Schesvold, A Decentralized Swarm Approach to Asset Patrolling with Unmanned Air Vehicles, in Theory and Algorithms for Cooperative Systems, Kluwer publishing, Series on Computers And Operations Research, Volume 4, Don Grundel, Robert Murphy, and Panos M. Pardalos, Eds, 2004.
2. Nygard, Kendall E., Altenburg, K. , Tang, J., Schesvold, D. and K. Nygard, Alternative Control Methodologies for Patrolling Assets with Unmanned Air Vehicles, under review, Algorithms for Cooperative Control, World Scientific publishing, Oleg Prokopyev, Don Grundel, Robert Murphy, and Panos M. Pardalos, Eds, 2005.
3. Also presented at the 5th International Conference on Cooperative Control and Optimization, Florida, January, 2005.

Fully Refereed Proceedings

1. Dianxiang Xu, Weifeng Xu, and Kendall E. Nygard. A State-Based Approach to Testing Aspect-Oriented Programs. Under review, SEKE'05 conference, July, 2005.
2. Lundell, Martin, Tang, Jingpeng, and Kendall E. Nygrad, Fuzzy Petri Net for UAV Decision Making, forthcoming in The 2005 International Symposium on Collaborative Technologies and Systems, May 15-20, 2005, Saint Louis, Missouri, USA
3. Dianxiang Xu, Priti Borse, Ken Grigsby, and Kendall E. Nygard. A Petri Net Based Software Architecture for UAV Simulation. Proc. of International Conference on Software Engineering Research and Practice (SERP'04). June 2004.
4. Kamel, Ahmed, Mohd M. Anwar, and Kendall E. Nygard, Neuro-Dynamic Programming for Task Allocation to Unmanned Aerial Vehicles. ISCA 13th International Conference on Intelligent and Adaptive Systems and Software Engineering, Nice, France, International Society for Computers and their Applications. July 2004.

Papers with Refereed Abstracts

1. Hennebry, Michael, and Kendall E. Nygard, "An Integer Program for Assigning Task Sequences to Unmanned Air Vehicles," NZIMA Conference in Combinatorics and its Applications, Taupo, New Zealand, December, 2004

William Perrizo

Publications

JOURNAL PAPERS

1. "A Survey on Intelligent Text Data Analysis", under first review by The Journal of Data Management (JDM), submitted in June 2004. (with I.Rahal)
2. "Efficiency Considerations for k-Nearest Neighbor Text Categorization", under first review by the Knowledge and Information Systems Journal (KAIS), submitted in June 2004. (with I. Rahal, H. Najadat)
3. "Accurate and Efficient Local Support Vector Classification for Spatial Data", under second review by the International Journal on Computers and Their Applications (IJCTA), to be submitted in 2004. (with F. Pan and B. Wang)
4. "Efficient Quantitative Frequent Pattern Mining Using Predicate Trees", under second review by the International Journal on Computers and Their Applications (IJCTA), submitted in June 2004. (with B. Wang, F. Pan and Y. Cui)
5. "Efficient Mining of Digital Sky Surveys Using P-HTM", under first review by the Digital Library Journal, submitted in July 2004. (with B. Wang and Q. Ding)
6. "Scalable Vertical Mining of Association Rules" Journal of Information and Knowledge Management, (JIKM), Vol.3, No. 4, pp. 317-329, December 2004. iKMS & World Scientific Publishing Co. (with I. Rahal and D. Ren)
7. "Exploiting Edge Semantics in Citation Graph Data Using an Efficient Vertical Association Rule Mining Model", under second review by the Knowledge And Information Systems Journal (KAIS), submitted in August 2004. (with I. Rahal, D. Ren, W. Wu, C. Basemann and A. Denton)
8. "A Predicate-tree based Framework for Accelerating Multilevel Secure Database Queries", International Journal of Computer Applications (IJCTA), Vol.11, No. 4, pp. 262-269, December 2004. (with I. Rahal)
9. "Comprehensive Vertical Sample-based K-Nearest Neighbor and Local Support Vector Machine Classification for Gene Expression Analysis", Journal of Biomedical Informatics, Biomedical Machine Learning, Vol. 37, No. 4, pp. 240-248, August 2004. (with F. Pan, B Wang and X. Hu)
10. "A Framework for Unifying Association Rule Mining, Clustering, and Classification", Journal of Computational Methods in Science and Engineering (JCMSE), 2004 (with A. Denton)
11. "Performance Evaluation of Wireless Tactical Networks", IEEE Transactions on Vehicular Technology, 2004 (under review). (with Victor Shi)
12. "Read-Commit Order for Concurrency Control in Centralized High Performance Database Systems", Information: An International Journal, Vol. 7, No. 1, pp. 95-106, 2004. (with Victor Shi)

14. "Cluster Analysis of Spatial Data Using Peano Count Trees", Information: An International Journal, Vol. 7, No. 1, pp.15-26, 2004. (with Qiang Ding)

BOOKS and BOOK CHAPTERS

1. "Vertical Data Mining", to be published (April 2005), Encyclopedia of Data Warehousing and Mining, edited by John Wang, Idea Group, Hershey, Pennsylvania,. (with Q. Ding, Q. Ding, and T. Abidin)
2. "Vertical Database Design for Scalable Data Mining", to be published (April 2005), Encyclopedia of Database Technologies and Applications, editor L.C. Rivero et al, Idea Group, Hershey, Pennsylvania,. (with Q.Ding, M.Serazi, T.Abidin, B.Wang)

REFEREED CONFERENCE and SYMPOSIUM PAPERS

1. "Vertical Set Square Distance: A Fast and Scalable Technique to Compute Total Variation in Large Datasets" International Society of Computer Applications International Conference on Computers and Their Applications, ISCA CATA 2005, New Orleans, Louisiana, March 2005. (with T. Abidin, A. Perera and M. Serazi)
2. "Multi-Layered Framework for Distributed Data Mining". 13th International Conference on Intelligent and Adaptive Systems and Software Eng., ISCA IASSE 2004, Nice, France, July 2004. (with M.Serazi, A.Perera, Q.Ding, V.Malakhov)
3. "Sub-Cellular Expression of a Species Cytoplasm Specific (SCS) Gene in Different Stages of Wheat Development", Plant and Animal Genome Conference Poster, PAG 2004, Jan., 2004, San Diego, CA (with K. Hussain, Debbie Laudencia-Chingcuanco, Venugopal Kalavacharia, Oscar Riera-Lizarazu, S. Kianian).
4. "Invisible Digital Watermarking of Remotely Sensed Satellite Images – A New Approach", ISCA 17th International Conference on Computer Applications in Industry and Engineering, Orlando, FL, Nov., 2004 (with S. Krebsbach)
5. "Incremental Interactive Mining of Constrained Association Rules from Biological Annotation Data" 20th ACM Symp. on Applied Computing (SAC 2005), Santa Fe, New Mexico, March 2005 (with I.Rahal, D.Ren, A.Pererra, H.Najadat, R. Rahhal).
6. "Tree-based Clustering for Gene Expression Data" 20th ACM Symposium on Applied Computing (SAC 2005), Santa Fe, New Mexico, March 2005 (with B. Wang).
7. "Primer Design for Wheat Reverse Genetics from Triticum Monococcum ESTs", Plant and Animal Genome Conference Poster, PAG 2004, Jan., 2004, San Diego, CA (with R. Syamala, A. Rishi, K. Hussain, R. Yadigari, S. Kianian).
8. "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)
9. "A P-tree based Outlier Detection Algorithm", International Society of Computer Applications Conference on Applications in Industry and Engineering, ISCA CAINE 2004, Nov., 2004 (with D. Ren and B. Wang.)

10. "A Cluster-based Outlier Detection Method with Efficient Pruning", International Society of Computer Applications Conference on Applications in Industry and Engineering, ISCA CAINE 2004, Nov., 2004 (with D. Ren and B. Wang)
11. "A Density-based Outlier Detection Algorithm using Pruning Techniques", International Society of Computer Applications Conference on Applications in Industry and Engineering, ISCA CAINE 2004, Nov., 2004 (with D. Ren, K. Scott, and B. Wang)
12. "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 (with B. Wang)
13. "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 and I. Rahal)
14. "Bioinformatics Involving Vertical Data", Fourth Virtual Conference on Genomics and Bioinformatics, VCGB 2004, September, 2004.
15. "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)
16. "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 and I. Rahal).
17. "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, D. Ren and W. Wu)
18. "Properties of Universal and Existential Predicates on Predicate-Bushes", Rushmore Regional Conference on Biocomplexity, August, 2004, Sioux Falls, SD, (with D. Akimov)
19. "DataMIME™", Proceedings of Association of Computing Machinery, Management of Data, ACM SIGMOD 2004, Paris, June 2004. (with M. Serazi, A. Perera, Q. Ding, V. Malakhov, I. Rahal, F. Pan, D. Ren, and W. Wu)
20. "Efficient Ranking of Keyword Queries Using P-Trees", International Society of Computer Applications International Conference on Computers and Their Applications, ISCA CATA 2004, Seattle, WA, March 2004. (with F. Pan, I. Rahal, Y. Cui)
21. "A Kernel-Based Semi-Naïve Bayesian Classifier Using P-Trees", SIAM Data Mining Conference, SIAM DM 2004, Lake Buena Vista, FL, April 2004. (with A. Denton).
22. "Decision Tree Induction for Dynamic, High-Dimensional Data Using P-Trees", International Society of Computer Apps Int'l Conference on Computers and Their Applications, ISCA CATA 2004, Seattle, WA, March 2004. (with A. Denton)
23. "Rapid and Accurate KNN/PSVM for Microarray Gene Expression Analysis", SIAM Bioinformatics Workshop, Lake Buena Vista, FL, April 2004. (with F. Pan, B. Wang, and X. Hu)

24. "Efficient Density Clustering Analysis for Gene Expression Data", SIAM Workshop, Lake Buena Vista, FL, April 2004. (with F.Pan, B.Wang, and X.Hu)
25. "An optimized Approach for KNN Text Categorization using P-trees", ACM Symposium on Applied Computing, ACM SAC 2004, Nicosia, Cyprus, March 2004. (with I. Rahal)
26. "Density Clustering for Large Spatial Data using Hobbit Rings", European Conf. On Machine Learning / Principles and Practice in Knowledge Discovery in Databases Conference, Cavtat-Dubrovnik, Croatia. September 2003. ECML PKDD 2003. (with F. Pan, B. Wang, Y. Zhang, D. Ren and X. Hu)
27. "Semi-parametric Regression Analysis of Yeast Gene Regulation Prediction", American Chemical Society Biotechnology Division, New Orleans, March, 2003. (with F. Pan and X. Hu)
28. "Efficient Modeling the Sloan Digital Sky Survey Data Using P-orchards" 13th International Conference on Intelligent & Adaptive Systems, and Software Eng., ISCA IASSE 2004, Nice, France, July 2004. pp 6–10. (with B.Wang, Q.Ding, F.Pan)
29. "Rapid and Accurate Density Clustering Analysis For High Dimensional Data" 13th International Conference on Intelligent & Adaptive Systems, and Software Eng., ISCA IASSE 2004, Nice, France, July 2004. pp 6–10. (with F.Pan, X.Hu, B. Wang)
30. "Digital Sky Surveys in P-HTM" 13th International Conference on Intelligent & Adaptive Systems, and Software Engineering, ISCA IASSE 2004, Nice, France, July 2004. pp 6 – 10. (with B. Wang, Q. Ding and F. Pan)

Akram Salah

Publications

Papers

1. Akram Salah, "Engineering a Technique for Online Course Development," Proceedings of MICS03 (The 36th Midwest Instruction and Computing Symposium) Duluth, MN.
2. Akram Salah, "An Architecture for a Decision-Based Processor, Accepted to be presented in the International Conference on Software Engineering.
3. Akram Salah, "An Architecture for Decision-Based Processor," Proceedings of the International Conference on Software Engineering Research and Practice, Las Vegas, Nevada, June 2004.
4. Akram Salah, "A Project Directed teaching for Software engineering," MICS 04, Morris, MN, April 2004.
5. Within the Conference course, Students developed 5 papers all of them have been accepted in conferences. I coauthored two of them.
6. I coauthored 12 papers with graduate students as part of the SWEL Group.

Brian Slator

Publications

Journal Articles

1. Slator, Brian M., Harold Chaput, Robert Cosmano, Ben Dischinger, Christopher Imdieke, Bradley Vender (In Press). A Multi-user Desktop Virtual Environment for Teaching Shop-keeping to Children. *Virtual Reality Journal*. Springer-Verlag London Ltd.
2. McClean, Phillip, Christina Johnson, Roxanne Rogers, Lisa Daniels, John Reber, Brian M. Slator, Jeff Terpstra, Alan R. White (In Press, Accepted Dec 14, 2004). Molecular and Cellular Biology Animations: Development and Impact on Student Learning. *Cell Biology Education*, Vol. 4, Summer 2005, 11 pgs.
3. Slator, Brian M. Curt Hill, Dayna Del Val (2004). Teaching Computer Science with Virtual Worlds. *IEEE Transactions on Education*. New York: IEEE Press. May. Pp. 269-275.

Conference Proceedings

1. Hill, Curt, Brian M. Slator, Lisa M. Daniels (Accepted, To Appear, 2005). The Grader in ProgrammingLand. *Proceedings of the National ACM Computer Science Education Conference*. St. Louis, MO: Sheridan Publishing. February.
2. 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.
3. Hill, Curtis D, 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.

Vasant Ubhaya

Presentations

I 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.

Publications

An Algorithm for Discrete Approximation by Quasi-convex Functions on \mathbb{R}^m , Computers and Mathematics with Applications, an International Journal, Volume 47, Issues 10-11, May-June 2004, Pages 1707-1712

Dianxiang Xu

Publications

1. Josh Pauli and Dianxiang Xu. Threat-Driven Architectural Design of Secure Information Systems. In Proc. of ICEIS'05, Miami, May 2005. To appear.
2. Dianxiang Xu and Vivek Goel. An Aspect-Oriented Approach to Mobile Agent Access Control. In Proc. of ITCC'05, Las Vegas, April 2005. To appear.
3. Josh Pauli and Dianxiang Xu. Misuse Case-Based Design and Analysis of Secure Software Architecture. In Proc. of ITCC'05, Las Vegas, April 2005. To appear.
4. Wu-Jun Li, Chong-Jun Wang, Dian-Xiang Xu, Bin Luo, and Zhao-Qian Chen. A Study on Illumination Invariant Face Recognition Methods Based on Multiple Eigenspaces. Proc. of ISNN'05, China, May 2005. To appear.
5. Weifeng Xu and Dianxiang Xu. A Model-Based Approach to Test Generation for Aspect-Oriented Programs. Proc. of AOSD'05 Workshop on Testing Aspect-Oriented Programs, Chicago, March 2005. To appear.
6. Wujun Li, Chongjun Wang, Dianxiang Xu, and Shifu Chen. Illumination Invariant Face Recognition Based on Neural Network Ensemble. Proc. of 16th International Conference on Tools with Artificial Intelligence (ICTAI04), pp.486-490, Nov. 2004.
7. Dianxiang Xu, Priti Borse, Ken Grigsby, and Kendall E. Nygard. A Petri Net Based Software Architecture for UAV Simulation. Proc. of International Conference on Software Engineering Research and Practice (SERP'04). June 2004.

Submitted Publications

1. Junhua Ding, Dianxiang Xu, Xudong He, Shu Gao, Yi Deng, Model Checking Logical Agent Mobility. Submitted to Journal of Systems and Software.
2. Dianxiang Xu, Richard A. Volz, Michael S. Miller, and Jesse Plymale. A Knowledge-Based Approach to Human-Agent Mixed Teams for Distributed Training. Submitted to Journal of Applied Artificial Intelligence.
3. Dianxiang Xu, Weifeng Xu, and Kendall Nygard. A State-Based Approach to Testing Aspect-Oriented Programs. Submitted to SEKE'05.

4. Junhua Ding, Dianxiang Xu, Yi Deng, Peter J. Clarke, Xudong He. Design an Interoperable Mobile Agent System Based on Predicate Transition Net Models. Submitted to SEKE'05.

During academic years 2003-04 and 2004-05, the department graduated 36 Master of Science students and 8 Ph.D. students. During this period, there were 179 total distinct graduate students registered in departmental programs. A total of 56 distinct students, nearly all of them graduate students, became published authors during this period, and produced a total of 163 papers in the open, refereed, literature. In many cases, the student published one or more articles. This provides an over-arching external measure that relates to all of the specific outcomes described in the tables. The publishing rate table is given below.

Publishing rates for graduate students, compiled May, 2005

Name of Student	Degree Program	Number of Publications with Student as Author
Christopher Beseman	MS in progress	4
Sisir Ray	MS in progress	2
V. Shanmugasundaram	MS	6
Qin Ding	Ph.D.	3
Kirk Scott	Ph.D.	3
Qiang Ding	Ph.D.	10
Maleq Khan	MS	2
Amal Perera	Ph.D. in progress	8
Pratap Kotala	Ph.D. in progress	2
William Jockheck	Ph.D. in progress	3
Liren Zhang	MS	2
Syed Rahman	MS, Ph.D. in progress	1
Md. Ahsan Habib	MS	1
Deepak Seth	MS in progress	1
Dheeraj Seth	MS in progress	1
Md. M. Anwar	MS	1
Deepak Rautela	MS	1
Nathan Huff	MS in progress	2
Aijuan Dong	Ph.D. in progress	3
T. Abdin	Ph.D. in progress	3
M. Serazi	Ph.D. in progress	4
V. Malakhov	MS in progress	2
Steve Krebsbach	Ph.D.	2
I. Rahal	Ph.D. in progress	8
Dongmei Ren	Ph.D. in progress	13
H. Najadat	Ph.D.	1
Baoying Wang	Ph.D.	15
W. Wu	MS	3
D. Akimov	MS	1

F. Pan	Ph.D.	12
Y. Cui	MS in progress	3
Y. Zhang	MS	2
A. Roy	Ph.D.	1
R. Frovarp	BS	1
R. Kranitz	BS	1
George Hamer	Ph.D. in progress	1
Jingping Tang	Ph.D. in progress	5
Weifeng Xu	Ph.D. in progress	2
Martin Lundell	Ph.D. in progress	1
Priti Borse	MS in progress	2
Ken Grigsby	MS in progress	2
Mohd M. Anwar	MS	1
Joseph Schlecht	BS	1
Benzir M. Ahmed	MS	2
Sanjay Ramaswamy	Ph.D. in progress	1
John Dixon	MS in progress	1
Chin A. Lua	Ph.D. in progress	1
Josh Pauli	Ph.D. in progress	2
Vivek Goel	MS in progress	1
Robert Cosmono	BS	1
Ben Dischinger	BS	1
Christopher Imdieke	BS	1
Bradley Vender	MS	1
Curt Hill	Ph.D.	1
Dayna Del Val	MS	1

C. OUTREACH

1. Professional Service:

Many of the faculty are quite active in service on program committees for conferences. Dr. Nygard was program chair for the annual CAINE conference in November, 2003. Dr. Perrizo serves on the administrative board for the ISCA organization. The partnership projects with Cairo university and the Ansal Institute of Technology are high visibility outreach activities that are expected to generate several spinoff activities. The first Ph.D. student from Cairo University is expected to enroll at NDSU in the fall semester of 2005.

2. Alumni Events and other community related activities:

The special alumni web site continued to expanded and upgraded. Alumni are actively registering on the site, including new graduates each semester. This provides a way for

alumni to stay in contact with their home department, and to network with each other. The senior capstone projects, sponsored by external corporations are expanded and provide service to their operations. There are many examples of software developed under these projects being immediately brought into service. The department annually sends a representative to the local high schools for their career day activities, where they provide a presentation of computer science as a career.

3. Fund-raising accomplishments and other outreach activities:

The alumni web site development described above reaches out to alumni, and their donations are now at a level where they are genuinely helpful to the department.

4. Cooperative Education:

Placement Summary Summer 2005:

Student	Employer	Job Type
Shireesha Baddam	Open Access Technology Int'l Inc. Minneapolis, MN	Full-time Coop
Samdip Basu	Mayo Clinic, Rochester, MN	Full-time Coop
Jagadish Beeram	RSystems El Dorado Hills, CA	Full-time Coop
Derek Buchfink	Thomson West Eagan, MN	Full-time Coop
Sharath Bukkapatnam	Tata Infotech Limited Atlanta, GA	Full-time Coop
David Cariveau	Meritcare Health Systems Fargo, ND	Full-time Coop
Vamsikrishna Dhalli	Bose Software Systems Chicago, Il	Full-time Coop
Vivek Goel	Measurement Technology Laboratores Brookings, SD	Part-time Coop
Vijaya Gorla	Open Access Technology Int'l Inc. Minneapolis, MN	Full-time Coop
Vikram Mehto	IDesign LLC Monterey, CA	Full-time Coop
Elangovan Murugaiyan	Makro Technologies NewarK NJ	Full-time Coop
Srikanth Vasepalli	Marlabs, Inc Edison, NJ	Full-time Coop
Sampath Velupula	Stratum Global Littleton, CO	Full-time Coop

U Saw Win	Thomson West Eagan, MN	Full-time Coop
Ying Yang	Kelly IT Resources Eagan, MN	Full-time Coop

D. SPECIAL INITIATIVES

1. Cultural diversity:

The partnerships with universities in Cairo and in India are organized projects that promote cultural diversity. Organizing for student projects carried out jointly with Egyptian students has revealed great cultural differences and social issues in computing. The faculty is very diverse, with representation from the United States (6), Egypt (2), China (4), Germany (1) and India (1). Dr. Nygard serves as faculty advisor to both the Bangladeshi and Pakistani student organizations. The graduate student population is very diverse, with countries represented including China, Korea, Taiwan, India, Bangladesh, Lebanon, Egypt, Morocco, Jordan, Sri Lanka, Indonesia, Russia, Germany, Brazil, Afghanistan, Canada, and Japan.

2. Affirmative Action/Equal Opportunity:

For many years the department had no female tenure-track faculty (although there were female lecturers). The department now has two tenure-track professors and a senior lecturer who are female. Both of these professors participate in the special program focused on retaining the interest in junior high school girls in the sciences. The department is committed to equal opportunity. These teachers were not hired through a direct affirmative action program, but rather through following equal opportunity principles and offering an open position to the best qualified applicant.

3. Cooperation programming/interdisciplinary efforts/interinstitutional activities:

The projects with Egypt and India were mentioned above. A relationship with Nanjing University in China may also be possible. An cross-listed bioinformatics course is offered and is required for the interdisciplinary Ph. D. program in genomics. Drs. Perrizo and Denton serve on the steering committee for that program. Remote students can earn variable numbers of credits for participation in the Virtual Bioinformatics conference. The MIS program is jointly administered with the College of Business. The department offers three courses that support the minor in web design offered by the Communications Department. A minor was configured to primarily serve students who are majoring in Industrial Engineering. Two meetings and two workshops have been held with representatives of institutions in the Red River valley regarding forming a consortium focused on facilitating projects of emerging importance in information technology, such as information assurance and network security. Articulation agreements are in place and actively used with Bismarck State University and the State College of Science in Wahpeton. The graduate certificate program in the Digital

Enterprise has options that require one or more courses from the College of Business. One departmental research associate also holds a half-time teaching contract with the University of Minnesota at Crookston.

4. *International activities:*

Described above are the projects with Egypt and India as well as the emerging project with China. Department chair Kendall E. Nygard has traveled to both Egypt and India to facilitate these programs. .

5. *Economic Development Efforts:*

The outreach effort for student capstone projects is under federal sponsorship and was justified based on economic development stimulai. Many students have now been offered permanent jobs in North Dakota through linkages with this program, and there is at least one startup company linkage as well. One faculty member is consulting with Microsoft Business Solutions. The department also participates in the Microsoft Academic Alliance program. The project involving school transportation is an efficiency-driven study that can potentially save school districts in North Dakota on the order of \$2M annually.

6. *Assessment:*

The department greatly revised outcomes and assessment procedures for the BS degree in 2003-04, to clearly link outcomes for graduates to outcomes from courses. The first cycle of survey work for the new outcomes was completed in 2004-05. The outcomes for capstone projects were significantly revised, and the project sponsors provided a 100% response rate for the projects. 2004-05 was a major year for establishing the new assessment procedures.

7. *Addressing institutional purposes:*

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 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 competitive anywhere in the country.

The department fully participates and supports the quest of the university to become a Carnegie research extensive university. During 2004 the department awarded four Ph.D. Degrees, and thus far in 2005 has awarded another four.

8. *College/Unit planning functions/activities/accomplishments:*

The department hosts an annual holiday gathering, and a spring gathering to recognize our graduates (at which time each graduate receives a departmental gift). Planning for academic affairs and curricula is typically done through faculty meetings and committees that are formed for special projects. The department is very faculty-driven for planning purposes. The current curriculum development work in bioinformatics, information assurance and security, and undergraduate applied computing are the prominent recent examples of departmental planning activities.

A. DEPARTMENTS FUTURE PLANS PROGRAM STRENGTHS

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, including proposing new degree options. Continue to maintain excellence in core areas of computer science.
- At the undergraduate level, develop 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 include elements of software engineering and information systems.
- Continue to increase the number of Ph.D. students in the department, possibly assisted by reducing the number of Master of Science students.
- Diversity funding sources
- Continue to foster international programs, such as the ones underway with Egypt and India.
- Expand departmental research funding.
- Take steps to become a designated Center of Excellence in Information Assurance and security.

B. USE OF ASSESSMENT DATA IN DECISION MAKING TO SUPPORT INSTITUTIONAL MISSION AND PURPOSE

Significant revisions to assessment outcomes and procedures were made in 2003-04 and again in 2004-05. The department operates in a continuous improvement mode, with assessment procedures constantly influencing curricula and course development. The Computer Science department takes a continuous improvement, proactive approach to changing the programs delivered. What follows are several examples of specific actions that have been taken recently and some that will be underway in the near future.

1. A new senior level software engineering course, CSci 413, was developed for CS majors and is now being offered in regular rotation.
2. The CSci 159 course, computer science problem solving, was revised to make it more in line with a computer fluency course and to serve as a precursor to the foundation sequence, CSci 160–161. A freshman placement test was instituted.
3. The entire suite of courses for the software engineering graduate programs and the associated student outcomes were phased into the departmental offerings.
4. Increasing importance of computer and network security issues prompted the introducing of a new advanced graduate course in network security.
5. Increasing importance of bioinformatics prompted the introducing of two new courses in bioinformatics at the graduate level. Groundwork for two additional courses has been done, and a draft proposal for new graduate degree options has been written.
6. A new “conference” course at the graduate level has been developed, to help stimulate research productivity among graduate students. The first offering resulted in four additional graduate student publications.
7. In general education courses, the content of CSci 116 was significantly upgraded and the number of credits was changed from 3 to 4. Both CSci 114 and 116 were modified to make them much more laboratory oriented.

The following actions and changes are planned for the capstone experience for spring, 2006.

1. Separate the Capstone projects from the Social Implications of Computers course, making it a separate 3 credit course.
2. Take steps to ensure that each mentor is communicating regularly with their team, answering questions, and providing feedback
3. Require sponsors to do a monthly report on the status of their project with feedback on how their project is proceedings
4. Incorporate good examples of Initiation/Planning/Post Mortem/Closure Documents from the current year as well as providing templates.
5. Ensure that students understand that they may have to learn new skills not seen in their coursework

6. Provide more tutorials in specialized languages (e.g., C#, ASP .NET, and Visual Studio)
7. Resolve all legal issues prior to project starts
8. Make requirements and design documentation mandatory
9. Require more frequent updates to project schedules
10. Require one early deliverable to the sponsor (e.g., a requirements document)
11. Extend the use of a Twiki site for collaboration, and require sponsors use it to send their monthly report
12. Requiring that students make a trip to their sponsor site, even if located remotely.

III. INSTRUCTIONAL PROGRAM, ENROLLMENT AND FTE DATA

Student Credit Hours and FTEs Generated

	2000 2001		2001- 2002		2002- 2003		2003- 2004		2004- 2005	
	Credit hours	FTE								
100-200	8915	11.14	9097	11.37	8159	10.20	7999	10.0	7098	8.87
300-400	3243	5.96	3504	6.44	3279	6.03	2467	4.53	2307	4.24
600-700	1570	5.45	1506	5.23	1502	5.22	1795	6.23	2095	7.27
TOTAL	13728	22.56	14307	23.04	12940	21.44	12261	20.76	11500	20.39

SUMMER II SCHEDULE 2004

COURSE HOURS	CLASS TITLE	INSTRUCTOR	STUDENT CREDIT ENROLL	
116	Business Use of Computers	D. Johnson	21	4
161	Computer Science II	B. Erickson	4	4
235	Theoretical Computer Sc. 1	J. Martin	16	3
413	Software Engineering	A. Salah	Cancelled	3
489/689	Social Implications of Computers	A. Kamel	18	3
708	Foundation of Programming	B. Erickson	11	3
797	Master Paper	Staff	5	R-3
798	Master Thesis	Staff	5	R-10
799	Doctoral Dissertation	Staff	19	R-15

**FALL SEMESTER SCHEDULE
2004**

COURSE HOURS	CLASS TITLE	INSTRUCTOR	STUDENT ENROLL	CREDIT
114	Microcomputer Packages	H. Mukhami	55	3
114	Microcomputer Packages	M. Gomaa	54	3
114	Microcomputer Packages	D. Patharana	53	3
114	Microcomputer Packages	U Saw Win	54	3
114	Microcomputer Packages	Kambhampaty	58	3
114	Microcomputer Packages	Kambhampaty	58	3
116	Business Use of Computers	W. Saeed	57	4
116	Business Use of Computers	M. Manan	52	4
116	Business Use of Computers	U. Srichinta	53	4
116	Business Use of Computers	Bryce Johnson	58	4
116	Business Use of Computers	N. Bandaru	57	4
116	Business Use of Computers	N. Bandaru	56	4
122	Program in BASIC	S. Rahman	43	3
155	Immigration (JAVA)	S. Andersen	2	3
159	CS Problem Solving	K. Nygard	23	2
159	CS Problem Solving	A. Denton	9	3
160	Computer Science I	J. Martin	33	4
160	Computer Science I	J. Martin	29	4
160	Computer Science I	S. Andersen	13	4
161	Computer Science II	S. Andersen	8	4
161	Computer Science II	S. Andersen	21	4
172	Intermediate Basic/Visual	S. Basu	15	3
214	Self-Paced C	A. Nath	14	1
222	Discrete Mathematics	B. Erickson	34	3
222	Discrete Mathematics	V. Ubhaya	43	3
227	Computing Fund. I	P. Kotala	27	3
227	Computing Fund. I	P. Kotala	10	3
235	Theoretical CS I	J. Martin	46	3
277	Introduction to UNIX	J. Latimer	7	3
277	Introduction to UNIX	J. Latimer	9	3
315	System Anal & Design	P. Kotala	16	3
315	System Anal & Design	D. Dorr	35	3
366	Files/Database System	A. Denton	46	3
372	Comparative Languages	X. Du	46	3
373	Assembly Programming	S. Asgar	37	3
413	Principles/Software Engineering	X. Du	29	3
426	Intro/Artificial Intelligence	A. Kamel	25	3
453	Linear Program Network	V. Ubhaya	4	3
458	Microcomputer Graphics	P. Juell	29	3
474	Operating Systems Conc.	A. Kamel	44	3

488	Human-Computer Interaction	K. Magel	21	3
494	IS/VR Development	B. Slator	0	3
494	IS/Network Security	H. Fu	7	3
494	IS/Soc/Ethical Issues	K. Nygard	2	3
496	FE/Interdependent Sftwre Env	H. Fu	1	3
499	ST/Foundations of Digital Enter.	D. Johnson	7	3
613	Principles/Software Engineering	X. Du	2	3
626	Intro/Artificial Intelligence	A. Kamel	0	3
653	Linear Program Network	V. Ubhaya	4	3
688	Human-Computer Interaction	K. Magel	1	3
693	Ind. Study/Network Security	H. Fu	7	3
708	Foundations of Programming	B. Erickson	28	3
713	Software Engineering I	K. Magel	33	3
715	Software Req/Definition/Analys	A. Salah	24	3
717	Software Construction	D. Xu	19	3
765	Intro to Database Systems	W. Perrizo	42	3
773	Foundations of Digital Enterprise	K. Nygard	22	3
783	Topics/Sftwre Image Process	H. Li	10	3
783	Topics/Sftwre Sys/Adv Bio Sy	W. Perrizo	3	3
790	Sem/Artificial Intelligence	P. Juell	2	1
790	Sem/Database Systems	W. Perrizo	6	1
790	Sem/Wireless Mobile Netwks	H. Fu	3	1
790	Sem/Formal Met/Software Engr	A. Salah	3	1
790	Sem/Intelligent Agents	A. Kamel	0	1
790	Sem/XML.	K. Magel	7	1
790	Sem/Data Mining	A. Denton	5	1
790	Sem/Image/Video Processing	H. Li	1	1
790	Sem/Aspect-Orient Sftwre Dev	D. Xu	11	1
790	SEM/Conference	A. Salah	5	1
790	Sem/Distance Education	K. Nygard	1	1
793	IS/Software Testing Evidence	A. Salah	1	3
793	IS/Software Projects	K. Magel	24	R-3
798	Master Thesis	Staff	17	R-10
799	Doctoral Dissertation	Staff	32	R-15

***SPRING SEMESTER SCHEDULE
2005***

COURSE HOURS	CLASS TITLE	INSTRUCTOR	STUDENT ENROLL	CREDIT
114	Microcomputer Packages	D. Pathirana	44	3
114	Microcomputer Packages	I. Alsmadi	44	3
114	Microcomputer Packages	K. Alla	43	3
114	Microcomputer Packages	A. Dong	48	3
114	Microcomputer Packages	Bandaru/Johnson	48	3

114	Microcomputer Packages	Bandaru/Johnson	47	3
116	Business Use of Computers	D. Nagahawatte	48	4
116	Business Use of Computers	W. Saeed	53	4
116	Business Use of Computers	A. Nath	51	4
116	Business Use of Computers	S. Pingaprani	47	4
116	Business Use of Computers	M. Manan	48	4
116	Business Use of Computers	M. Manan	53	4
122	Beginning BASIC/Visual BASIC	S. Rahman	40	3
125	Beginning COBOL	S. Kolluru	30	3
159	Computer Sc. Problem Solving	A. Denton	7	3
159	Computer Sc. Problem Solving	J. Pikalek	10	3
160	Computer Science I	D. Xu	38	4
160	Computer Science I	H. Li	30	4
161	Computer Science II	H. Li	36	4
161	Computer Science II	B. Erickson	19	4
172	Intermed Basic/Visual Basic	S. Basu	25	3
212	Self-Paced C++	S. Abufardeh	20	1
228	Computing Fundamentals II	P. Kotala	24	3
228	Computing Fundamentals II	P. Kotala	11	3
236	Theoretical CS II	J. Martin	39	3
299	St/Sys/Server Admin	J. Latimer	6	3
299	St/Sys/Server Admin	J. Latimer	7	3
316	System Testing & Maintenance	D. Dorr	13	3
316	System Testing & Maintenance	P. Kotala	32	3
345	Topics on Personal Computers	B. Slator	55	3
372	Comparative Prog Languages	B. Erickson	32	3
374	Computer Org/Arch I	B. Erickson	17	3
374	Computer Org/Arch I	T. Asgar	18	3
459	Found/Computer Networks	H. Fu	34	3
467	Algorithm Analysis	J. Martin	37	3
468	Database Systems Design	A. Salah	29	3
475	Operating Systems Design	A. Kamel	21	3
489	Social Implications of Comp	K. Magel	30	3
489	Social Implications of Comp	K. Nygard	45	3
494	IS/Studies/Operating Systems	A. Kamel	1	3
496	FE/Software Projects	K. Magel	12	2
496	FE/Software Projects	K. Nygard	28	2
659	Found/Computer Networks	H. Fu	9	3
668	Database Systems Design	A. Salah	2	3
714	Softwre Project Plan/Estimation	X. Du	10	3
716	Software Design	K. Magel	27	3
718	Software Testing/Debugging	D. Xu	19	3
724	Survey/Artificial Intelligence	P. Juell	27	3
728	Computer Graphics	P. Juell	3	3
732	Intro to Bioinformatics	A. Denton/V. Ubhaya	23	3
741	Algorithm Analysis	V. Ubhaya	9	3

745	Formal Meth/Softwre Devel	A. Salah	8	3
774	Topics/Digital Enterprise	K. Nygard	26	3
779	Advanced Data Mining	W. Perrizo	6	3
783	Topics/Adv Top/Network Sec	H. Fu	4	3
783	Topics in Software Systems	W. Perrizo	2	3
790	SEM/Intelligent Agents	A. Kamel	2	1
790	SEM/CompMeth/BioInfo	A. Denton/V. Ubhaya	3	1
790	SEM/Building Secure Softwre	D. Xu	4	1
790	Sem/Artificial Intelligence	P. Juell	5	1
790	Sem/Softwre Engineering Conf	A. Salah	1	1
790	Sem/Database Systems	W. Perrizo	10	1
790	Sem/Educational Media	B. Sator	6	1
790	Sem/Formal Methods in Software Engr.	A. Salah	3	1
790	Sem/XML	K. Magel	11	1
790	Sem/Image & Video Processing	H. Li	1	1
793	IS/Software Projects	K. Magel	1	3
793	IS/Software Project	A. Salah	2	3
797	Master Paper	Staff	18	R-3
797	Master Paper	Staff	14	R-3
798	Master Thesis	Staff	10	R-10
798R	Master Thesis	Staff	10	1-3
799	Doctoral Dissertation	Staff	30	R-15

**SUMMER I SCHEDULE
2005**

COURSE HOURS	CLASS TITLE	INSTRUCTOR	STUDENT ENROLL	CREDIT
114	Microcomputer Packages	D. Johnson	42	3
116	Business Use of Computers	P. Kotala	34	4
160	Computer Science I	B. Erickson	12	4
372	Comparative Lanuages	B. Erickson	Cancelled	3
499/696	Intro to .NET	K. Magel	Cancelled	3
499/696	Foundations of Digital Enter.	D. Johnson	5	3
708	Foundations of Programming	B. Erickson	8	3
713	Software Development Process	A. Salah	7	3
773	Foundations of Digital Enter	K. Nygard	13	3
790	Sem/Agent Negotiations Tech	K. Nygard	1	1
793	IS/Quality Assurance	D. Xu	1	1
793	IS/Software Projects	K. Magel	1	1
793	IS/C#	K. Magel	6	3
797	Master Paper	Staff	5	R-3
798	Master Thesis	Staff	2	R-10
799	Doctoral Dissertation	Staff	19	R-15

STUDENT RATING OF INSTRUCTION RESULTS 2004-2005

FALL, 2004 and SPRING 2005

Questions	VG	G	IB	P	VP	OMI T	DEPARTMENT LEVEL		
							Mean	S.D.	#R
100 TO 200 LEVEL									
1. Your satisfaction with the instruction in this course.	28.0	44.1	19.8	9.7	2.2	0.2	3.637	1.099	1553
2. The instructor as a teacher.	30.2	42.7	18.9	5.5	2.6	0.1	3.699	1.109	1554
3. The ability of the instructor to communicate effectively	24.6	37.3	23.9	11.8	2.2	0.1	3.561	1.146	1553
4. The quality of this course	20.7	44.4	25.5	6.9	2.2	0.3	3.592	1.019	1554
5. The fairness of procedures for grading this course.	42.3	43.5	9.8	3.8	0.6	0.0	3.994	0.918	1551
6. Your understanding of the course content.	25.7	48.4	19.3	5.0	1.4	0.2	3.731	0.912	1548
300 TO 400 LEVEL									
1. Your satisfaction with the instruction in this course.	24.3	41.0	17.7	9.4	7.4	0.2	3.637	1.099	1553
2. The instructor as a teacher.	29.9	37.8	15.7	9.0	7.6	0.0	3.699	1.109	1554
3. The ability of the instructor to communicate effectively	25.3	41.4	17.9	9.0	6.4	0.0	3.561	1.146	1553
4. The quality of this course	18.7	41.8	25.3	8.6	5.2	0.4	3.592	1.019	1554
5. The fairness of procedures for grading this course.	26.9	45.0	17.1	7.2	3.8	0.0	3.994	0.918	1551
6. Your understanding of the course content.	19.1	52.2	22.3	4.4	2.0	0.0	3.731	0.912	1548
600 TO 700 LEVEL									
1. Your satisfaction with the instruction in this course.	37.9	44.3	12.0	4.2	1.3	0.3	3.637	1.099	1553
2. The instructor as a teacher.	47.2	37.9	9.7	2.6	2.3	0.3	3.699	1.109	1554
3. The ability of the instructor to communicate effectively	41.4	40.8	13.9	2.3	1.0	0.6	3.561	1.146	1553
4. The quality of this course	31.1	46.3	17.8	3.9	0.6	0.3	3.592	1.019	1554
5. The fairness of procedures for grading this course.	41.1	46.6	10.4	0.3	0.6	1.0	3.994	0.918	1551
6. Your understanding of the course content.	35.3	46.9	13.9	2.6	0.6	0.6	3.731	0.912	1548

Masters Students:

Abufardeh, Sameer	Jinka, Vasuprakash
Akimov, Dmitriy	Johnson, Bryce
Alla, Kishore	Kakumanu, Shalini
Anugonda, Sreelatha	Kambhampaty, Krishnan
Aybar, Hector	Kancherla, Sridhar
Ayyarsamy, Arunprakash	Katib, Faraz
Baddam, Shiresha	Kattakindi, Kiran
Balakrishnan, Prashanth	Kawamura, Satoshi
Bandaru, Narendra	Khalique, Abu Saleh
Basu, Samdip	Khan, Ezaz
Beeram, Jagadish	Kolluru, Sunil
Besemann, Christopher	Kuck, David
Borse, Priti	Lee, Michael
Bukkapatnam, Sharath	Li, Mei
Cherukuri, Chandrasekhar	Malakhov, Vasilii
Choi, Meegeum	Manan, Megha
Cosmano, Robert	Mangipudi, Venkata
Cui, Yue	Mannepalli, Aditya
Dhalli, Vamsikrishna	Manohar, Radha
Dimri, Dhananjay	Mehto, Vikram
Dixon, John	Mistry, Dilip
Dong, Aijuan	Moses, Joseph
Duanmu, Shan	Muchow, Dale
Dutta, Tridib	Mukhami, Harish
Erhardt, Eric	Nanam-Kumar, Sunil
Farheen, Swara	Namboori, Praveen
Fazal, Nazeer	Nandula, Aparna
Farooq, Mohammad	Nanna, Tania
Foster, James	Nath, Anupam
Gorla, Vijaya	Njos, Robby
Grigsby, Kenneth	Oberoi, Inderjeet
Guo, Wenge	Opgrande, John
Habib, MD	Oruganti, Ravi
Haider, Chowdhury Omar	Patel, Dharmesh
Helaly, Tanjina	Patil, Archana
Hokanson, Guy Eric	Patterson, Jared
Huck, Jason	Peterson, Jason
Huff, Nathan	Phan, Thiep
Huq, Shamima	Pinagaprani, Satish
Iqbal, Tong	Pikalek, Jonathan
Jiang, Yuehong	Ren, Suqin

Rautela, Deepak
Saeed, Walid
Saha, Debashis
Sarker, MD Nuruzzaman
Schlecht, Nem
Seth, Deepak
Seth, Deeraj
Shanmugasundaram, Sudhan
Sreekantaradhya, Manohar
Srichinta, Uday
Sun, Guangyuan
Sun, Wei
Sun, Yongliang
Syamala, Ranapratap
Tatta, Vasanth
Vasepalli, Skrikanth

Velpula, Sampath
Vender, Bradley
Vijayan, Dhinurru
Vijaykumar, Chitra
Virupakshi, Vamsi
Viswanathan, Manohar
Win, U Saw
Wu, Shanhong
Wu, Weihua
Yang, Peining
Yelupula, Sampath
Zaman, Mahbub
Zaman, Tareq Uz
Zhang, Gendong
Zhang, Yi

SOFTWARE ENGINEERING MASTERS

Berseth, Matt
Boyko, Gregory
Chauhan, Anuj
Debilt, Daniel
Elzain, Eltayeb
Hetzler, Christopher
Kaliki, Srikanth
Lua, Chin

Miteva, Martina
Murugaiyan, Elangovan
Nagahawatte, Don
Nelson, Daniel
Saeed, Walid
Srichinta, Pallavi
Srivastava, Arun

PHD STUDENTS:

Abidin, Taufik
Abraham, Rina
Ahmed, Md
Alsmadi, Izzat
Arora, Baresh
Attia, Alaa
Borchert, Otto
Canton, Maria
Ding, Qiang
Dong, Aijuan
Dorr, Deitmar
Goel, Vivek
Gomaa, Mohammad
Guo, Wenge
Hamer, George
Hill, Curtis
Jockheck, William

Kambhampaty, Krishnan
Kotala, Pratap
Krebsbach, Stephen
Lin, Fengjin
Najadat, Hassan
Nath, Anupam
Naznin, Mahmuda
Pan, Fei
Pathirana, Dilsara
Perera, Amal
Rahal, Imad
Ramaswamy, Sanjay
Ren, Dongmei
Sanchez, Julio
Serazi, MD Masum
Sreekantaradhya, Monahar
Tang, Jingpeng

Wang, Baoying
Yang, Ying

Zhang, Ming
Zhao, Wei

SOFTWARE ENGINEERING PHD

Abufardeh, Sameer
Asgar, Talukdar
Chan, Fung
Lundell, Martin
Pasupuleti, Satyanarayana
Pauli, Jeremy

Pauli, Joshua
Rahman, MD Syed
Robillard, Greg
Satter, Medhi
Smadi, Mohammad
Xu, Weifeng

Computer Science Department Enrollment Data

AY	Enrollment (Fall 2004 to Spring 2005)				Total UG	Total Grad	Degree		
	1st FR	2nd SO	3rd JR	4th SR			BS	MS/ Software	PhD/ Software
2004-2005	49	37	47	84	217		45	22/5	4/0
2003-2004	82	64	48	86	280	178	108	24	0
2002-2003	96	69	51	91	397	90	110	20	3
2001-2002	127	92	63	106	388	104	113	19	3
2000-2001	142	95	73	96	406	116	70	30	2
1999-2000	133	91	92	63	379	86	61	13	0

Graduate Degrees Awarded, 2004-05

Summer Semester, 2004	Degree
Ding, Qiang	Doctor of

	Philosophy
Kuck, David	MS, CS
Saha, Debashis	MS, CS
Sarker, MD Nuruzzaman	MS, CS
Wu, Weihua	MS, CS
Zaman, Muhibub	MS, CS
Zaman, Tareq Uz	MS, CS
Fall Semester, 2004	Degree
Anugonda, Sreelatha	MS, CS
Attia, Alaa	Doctor of Philosophy
Jiang, Yuehong	MS, CS
Nelson, Daniel D.	MS, SE
Pan, Fei	MS, CS
Petterson, Jared	MS, CS
Rahman, Syed	MS, SE
Sreekantaradhya, Manohar	MS, CS
Wu, Shanhong	MS, CS
Wu, Weihua	MS, CS
Spring Semester, 2005	Degree
Ahmed, Benzir	MS, CS
Breseth, Matt	MS, SE
Besemann, Christopher	MS, CS
Duanmu, Shan	MS, CS
Elzain, Eltayeb	MS, SE
Hetzler, Christopher	MS, SE
Hill, Curtis	Doctor of Philosophy
Khan, Ezaz	MS, CS
Najadat, Hassan	Doctor of Philosophy
Nanna, Tania	MS, CS
Shanmugasundaram, Sudhan	MS, CS
Vijaykumar, Chitra	MS, CS
Yang, Peinang	MS, CS
Zhang, Yi	MS, CS