Summary

For the period July 1, 2002, through June 30, 2003, the resident faculty of the Computer Science Department included 19 full time faculty members (9 Professors, 5 Associate Professors, 5 Assistant Professors) and 2 part-time Instructors. Permanent professional persons associated with the department included 3 secretarial staff members, 3 technical support personnel, and one undergraduate advisor.

As of Fall 2002, there were 96 graduate students enrolled in degree programs (31 in the doctoral program, 64 in the MS, and 1 in the MAMS), and 341 declared undergraduate majors. Additionally, there were a total of 1,632 seats offered in service courses, taken primarily by non-majors. During the past fiscal year, 2 students were awarded Ph.D. degrees, 20 graduated with M.S, and 1 student received the MAMS degree. Also, despite the drop in the total number of undergraduates, a record 65 bachelor's degrees were awarded.

As a group, the faculty authored or co-authored 111 research articles and gave 25 presentations at professional meetings. Many of the faculty members have served on editorial boards of distinguished journals. Our faculty were PI, CO-PI, or contributors to 22 externally funded grants. The amount of the external funding totaled $3,820,022. Also, the faculty received 5 internal grants for the total amount of $72,139.

Dr. Liming Cai was welcomed to our faculty in August 2002. Also, our 2002-03 faculty search ended with the hiring of Dr. Kang Li. Dr. Li obtained his Ph.D. from Oregon Graduate Institute and will begin his position as Assistant Professor in August 2003. Dr. Li is one of our faculty members funded by Georgia’s Yamacraw Initiative. However, Drs. Bishop, Chandra, and Gries have left the University during the past year. Dr. Krys Kochut succeeded Dr. Rod Canfield as Head of the Department. Dr. Canfield stepped down after nine years of dedicated service as Head, marked by tremendous growth of the Department.

A. Major Accomplishments

External Research Funding

2002-2003 has been a good year for the faculty of the Computer Science Department. Several of the faculty members have held externally funded research grants as PIs or CO-PIs. For additional details, please see the Appendix B, beginning on page 15.

Dr. Suchi Bhandarkar received funding from the US Dept. of Agriculture to work on Novel Statistical Methods for Generation of Integrated Genomic Maps. The grant will last three years. He also received funding from University of Georgia and Medical College of Georgia Joint Research Program for the project entitled Computer-assisted External Reduction and Internal Fixation of Complex Craniofacial Fractures. Dr.
Bhandarkar has continued work on two ongoing externally sponsored projects (from US Department of Agriculture and from NSF as a CO-PI).

Dr. Eileen Kraemer received funding from NSF for her new project Program Visualization: Using Perceptual and Cognitive Concepts to Quantify Quality, Support Instruction, and Improve Interactions. This project will last three years. She has continued work on the ongoing project An Infrastructure in Support of Configurable, Consistent, Interactive Computational Steering funded by NSF (a CAREER Grant).

Dr. David Lowenthal obtained external funding for a new project HC-MPI: A System for Out-of-Core, Heterogeneous Data Distributions. The project has been funded by NSF and will last for three years. He has continued research on his NSF CAREER Award entitled An Integrated Compiler/Run-Time System for Global Data Distribution.

Drs. David Lowenthal and R.W. Robinson have continued work as CO-PIs on a joint project on ITRACS: Stochastic Summation of High-Order Feynman Graph Expansions with the Physics Department (Dr. Bernd Schüttler, PI) which was funded by NSF.

Dr. Don Potter has continued work on a project entitled SAGA-STP Aerial Spray Treatment Planner, Extension funded by the USDA Forest Service.

Dr. Khaled Rasheed has continued his research (as a CO-PI) on a project entitled Data Driven Design Optimization in Engineering Using Concurrent Integrated Experiment and Simulation. The project has been funded by the National Science Foundation (the PI is Dr. Doyle Knight of Rutgers University).

Drs. Amit Sheth, Budak Arpinar, and Krys Kochut have received funding from NSF for a project entitled Semantic Association Identification and Knowledge Discovery for National Security Applications. The project will last three years.

Drs. Amit Sheth, Krys Kochut, and John Miller received funding from NIH for a project entitled Bioinformatics of Glycan Expression. This is a part of a large five year project originating from the Complex Carbohydrates Research Center (Dr. Michael Pierce, PI).

**Scholarly Publishing**

The Computer Science faculty members have been very productive in publishing their research results. We have authored or co-authored 111 articles in 2002-2003, which is an increase from the previous year. They were published or submitted to high quality journals and conference proceedings. Our faculty gave 25 presentations at conferences, 2 of which were presented abroad. Also, we have given 3 invited talks and one keynote address. For the list of publications, please see the Appendix C, beginning on page 19.

**Conference Organization**

Dr. Hamid Arabnia organized the 2003 International MultiConference on Computer Science and Computer Engineering. The Conference was held in June 2003, Las Vegas. Dr. Arabnia served as the General Chair of the MultiConference.
Dr. Thiab Taha organized the *Third IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory*. The conference was held in Athens, Ga., April 7-10, 2003. Dr. Taha received funding for the organization of the conference from NSF.

B. Strategic Planning

**Computer Science Education**

We have made big strides in improving the undergraduate program in Computer Science. As projected in our five-year strategic plan (1999-2004), we have increased the number of offered courses. Also, in the Fall of 2002, the department has started offering a Certificate in Computing, available to students majoring in other disciplines, but with a strong concentration in computing. The Certificate has proved to be popular, and in the first year we have awarded 12 certificates. The department has continued awarding Yamacraw Certificates to students who specialize in the areas of Computer Science emphasized by the Georgia’s Yamacraw Initiative, a major strategic initiative to promote growth in the broadband telecommunications industry. In the past year, we have awarded 38 Yamacraw Certificates.

Our graduate programs in Computer Science (Ph.D., M.S., and M.A.M.S) have experienced rapid growth. As of Fall 2002, there were 96 graduate students enrolled in graduate degree programs: 31 in the doctoral program, 64 in the MS, and 1 in the MAMS.

**Faculty Recruitment**

Dr. Liming Cai joined our faculty in the Fall 2002. Dr. Cai’s research interests concentrate in Computational Biology, an area of emphasis identified by the University of Georgia. During the 2002-2003 recruiting period, the department hired Dr. Kang Li. Dr. Li brings in his expertise in computer networks and network security. Both areas have been considered as primary needs in the department. Dr. Li is one of the Yamacraw Faculty, funded by the above mentioned Georgia’s Yamacraw Initiative. The department has two more Yamacraw-funded positions to be filled in Fall 2004. This will bring the number of Ph.D. faculty to 21, fewer than the 24 projected in our 1999-2004 Strategic Plan. However, we should point out that the plan was created at the time of a rapid economic expansion in the US, but the recent downturn and associated budgetary difficulties have trimmed considerably the amount of funding dedicated to hiring new faculty, both within the University and the Yamacraw Initiative.

**Space**

The department has an insufficient amount of space, especially in view of the recently hired faculty with research interests in experimental Computer Science. Even though the department acquired additional offices in Barrow Hall, the space available as experimental research labs is limited and several members of the new faculty have been forced to share lab space. The anticipated hires of the two Yamacraw faculty members in Fall 2004 will require additional lab space. An unwelcome implication of our current
space allocation is that our faculty are now located in three different buildings (Boyd, Hardman, and Barrow), not a good situation for fostering cohesiveness among the faculty body.

C. Short-Term Goals for FY 2004

Program Review

In the 2003-2004 academic year, the Computer Science Department will undergo the first Program Review and Assessment. This is an important process, which will involve our entire faculty throughout the upcoming year.

Faculty Recruitment

The department has two Yamacraw-funded positions to be filled in FY04. Our plan is to hire two high quality faculty members, preferably in the research areas complementing those of our current faculty, more specifically in such areas as computer networks, mobile communications, communication protocols, and embedded systems.

Space

With the anticipated addition of the new faculty, we would like to increase our space available for experimental CS research labs. Typically, experimental research labs need space for the installation of several (sometimes 20 or even more) computers to perform experiments in such areas of research as distributed computing, wireless communication, and network security.

D. Effectiveness Assessment

In the 2003-2004 academic year, the Computer Science Department will undergo the first Program Review and Assessment, conducted by Office of the Vice President for Instruction. This will be a very good opportunity to review all of our programs and conduct a thorough assessment of their effectiveness.

The Computer Science Department is in the process of modifying its undergraduate assessment procedures. A committee composed of Drs. Dan Everett, Liming Cai, and Suchendra Bhandarkar has created a new Computer Science Undergraduate Assessment model. The model has been approved and the new procedures will be created in the upcoming year. Also, we intend to collect measurements and analyze the results.

E. Student Retention and Graduation Rates

As of Fall 2002, there were 350 declared undergraduate CS majors, 124 less than this time one year ago. (This drop is typical of many Computer Science departments across the country, which is mostly attributed to the worsened economic conditions and fewer jobs awaiting CS graduates.) Many of these declared undergraduate majors students have not yet taken a course with a CSCI prefix. However, despite the drop in the total number of undergraduates, a record 65 bachelor's degrees were awarded.
Our graduate programs have continued to grow. As of Fall 2002, there were 96 students enrolled in graduate degree programs: 31 in the doctoral program, 64 in the MS, and 1 in the MAMS. Availability of funding for graduate students is a very important factor in the overall health of the graduate program. In Fall 2002, 46 graduate students received financial support (it is a typical number), as follows: Graduate Laboratory Assistants, 54%; Graduate Teaching Assistants (in charge of a course), 7%; Research Assistants supported by external funding, 30%; University Wide Assistantships, 9%. During the past fiscal year, 2 students were awarded Ph.D. degrees, 20 graduated with M.S., and 1 student received the MAMS degree, specializing in Computer Science.

In addition to graduate students and majors, the department taught several courses of a service nature, including CSCI 1100 (Introduction to Personal Computing), CSCI 1210 (Introduction to Computational Science), CSCI 1301 (Introduction to Computing and Programming). A total of 1,632 seats were offered in these courses.

The Department has decided to modify the undergraduate entrance requirements, which were in effect since Fall 1998. The students were required to receive the grade of B or better in CSCI 1301 and two “gateway” courses (CSCI 1302 and CSCI 2610). The faculty have reviewed the requirements and concluded that the grade requirement for all of the courses needed for the entrance into the Computer Science major should be set at a C minimum. The reasoning behind this change was twofold. First, it was our observation that some students may take a bit longer to realize their talents and potential for the discipline of computing. Disqualifying them from the Computer Science major at such an early stage may be premature. Second, as the number of students interested in majoring in Computer Science has decreased, it was not essential to maintain the stringent entrance requirements as one of the elements of the overall enrollment management. The change has resulted in an increase of students admitted to the Computer Science major (as a percentage of the students finishing all of the entrance requirement courses). At the same time, we will keep monitoring the quality of our majors to ensure that the change does not have an adverse affect on the quality of our graduates.

F. Overall Status

The overall record of the faculty in instruction and research is excellent. Similarly, our graduates are very well trained and are able to find quality employment. We have continued to provide quality education to a large number of students, both majors and non-majors. Moreover, this was possible without significant changes to teaching loads or class sizes and as a result, our research record has continued to improve both in scholarly publishing and in external research funding. We have added an excellent faculty member this year. At the same time, the resignations of some of our faculty members and the difficulty of filling all of our available positions serves as a reminder that we are still in a period of intense competition for recruitment of high quality faculty within the profession. Nevertheless, we believe that the professional environment for computer science at UGA is very good and we will continue our efforts to recruit highest quality faculty. The department looks forward to future opportunities for growth to strengthen our stature in economically and academically important sub-areas of Computer Science.
APPENDICES

Attached are detailed listings of professional activities, grants, publications, and presentations of the faculty during the past year.

A. PROFESSIONAL HONORS AND RECOGNITIONS

H. R. Arabnia


Member of American Association for the Advancement of Science, 1999 – present.

Member of World Occam and Transputer User Group (WoTUG), 1986 – present.

Member of the Editorial Board of the International Journal of Parallel and Distributed Systems and Networks (IJPDSN), 1996 – present.


Member of Advisory Board of Virtual Medical Worlds - an on-line magazine by Euromed (European Commission in Telemedicine), http://www.hoise.com/project/VMW, 1997 – present.


Member, Scientific Committee, International Arab Conference on Information Technology; University of Qatar; Doha-Qatar, Dec. 2002.

Member, Program Committee, IEEE and ACM-SIGARCH International Workshop on Performance Modeling, Evaluation and Optimization of Parallel and Distributed Systems (PMEO_PDS'02 and '03).
Member, Program Committee, The International Symposium on Parallel and Distributed Processing and Applications (PDPA/ISPA2002/03), University of Aizu, Japan.


Member, Program Committee, 41st Annual ACM Southeast Conference (ACM-SE'03), Armstrong Atlantic State Univ., Georgia, 2003.

Member, Program Committee, IEEE - The International Conference on "Parallel and Distributed Computing, Applications, and Technologies (PDCAT 2003)", Chengdu, P. R. China, August 2003.

Member, Program Committee, International Conference on Computing and Information Sciences - ICCIS'2004, University of Qatar, Doha - Qatar.

Member of Site Visit Team (1 of 7 team members), National Science Foundation (NSF); Evaluating an NSF funded research center, 2002 and 2003.

I. Budak Arpinar

Member, IEEE Computer Society.

Member, ACM Sigmod.


Web Chair, IEEE International Conference On Electronic Commerce (CEC'03), Newport Beach, CA., June 2003.

S. M. Bhandarkar

Program Committee Member, IEEE Computer Society Bioinformatics Conference, Stanford University, CA, August 2003.


Program Committee Member, Intl. Wkshp. High Performance Computational Biology (HiCOMB2003), Nice, France, April 2003.

Associate Editor, International Journal of Applied Intelligence, November 99 - present.


Member, Technical Committee on Pattern Analysis and Machine Intelligence, IEEE Computer Society, 1992-present.

Member, Association for Computing Machinery (ACM), 1990-present.

Member, International Society of Photo-optical and Instrumentation Engineers (SPIE), 1987-present.

Member, American Association for Artificial Intelligence (AAAI), 1985-present.

Member, Institute for Electrical and Electronic Engineering (IEEE), 1982-present.

L. Cai

Member, ACM.

Member, SIGACT.

Member, EATCS.

E. R. Canfield

Member, the Association for Computing Machinery.

Editor, Electronic Journal of Combinatorics.

M. Hybinette

Member, Association for Computing Machinery.

Member, Institute of Electrical and Electronics Engineers.

D. R. Gries

Steering Group, AAAS Section on Information Computing, and Communication (T), 2000-present

K. J. Kochut

Member, Association for Computing Machinery.

Member, SIGMOD.

Member, SIGCOMM.

E. T. Kraemer

Participant, Grant Proposal Review Panel, National Science Foundation.

Participant, Grant Proposal Review Panel, National Institute of Health.

Software Area Chair, Technical Papers Committee, SC03 Conference.

Program Committee Member, ACM Symposium on Software Visualization, 2003.

Member, Program Committee for Supercomputing 2003.

Member, Program Committee for SoftViz, 2003.

Finance Chair, 2002 IEEE Symposia on Human Centric Computing, Languages and Environments.


D. K. Lowenthal

Program Committee Member, Workshop on Languages, Compilers, and Run-Time Systems for Scalable Computing.

Program Committee Member, Workshop on High-Level Programming and Supportive Environments.

Member, ACM, 1992-present.
Member SIGPLAN, 1992-present.

Member, SIGOPS, 1992-present.

Member, IEEE.

National Science Foundation Grant Review Panel Member, "Advanced Computational Research Program", October 2002.

J. A. Miller

Associate Editor, ACM Transactions on Modeling and Computer Simulation (TOMACS), 1999-present.

Associate Editor, IEEE Transactions on Systems, Man and Cybernetics (TSMC), 1999-present.

Track Coordinator, The 2002 Winter Simulation Conference (WSC'02), Modeling Methodologies Track, San Diego, California (December 2002).

Member, Association for Computing Machinery.

Member, IEEE Computer Society.

Member, Society for Computer Simulation (SCS).

W. D. Potter


Program Committee Member, International Conference on Industrial and Engineering Applications of Artificial Intelligence and Expert Systems, (IEA/AIE’2003), June, 2003; UK.

Program Committee Member and Robotics Competition Chairman, International Conference on Artificial Intelligence (IC-AI’2003), June, 2003, Las Vegas, Nevada.

Member of: American Association of Artificial Intelligence (AAAI), Association of Computing Machinery (ACM), Institute of Electrical and Electronics Engineers: Computer Society (IEEE: CS), Institute for the Certification of Computer Professionals (ICCP), Certified Data Processor: 1980, International Society of Applied Intelligence (ISAI), American Society of Agricultural Engineers (ASAE).

K. M. Rasheed

Member, Institute of Electrical and Electronics Engineers (IEEE)

Member, IEEE Computer Society

Member, IEEE Neural Network Society

Member, American Association for Artificial Intelligence (AAAI)

Member, International Society of Genetic & Evolutionary Computation (ISGEC)

Workshop Co-organizer, Genetic and Evolutionary Computation Conference (GECCO’2003). Workshop on Learning and Adaptation in Evolutionary Computation.

Program Committee Member, Genetic and Evolutionary Computation Conference (GECCO’2003).

Session Chair, Genetic and Evolutionary Computation Conference (GECCO’2002)

Journal Guest Editor, Soft Computing Journal, special issue on approximation and learning in evolutionary computation, 2002

R. W. Robinson


Foundation Fellow, Institute of Combinatorics and its Applications.

Member, American Mathematical Society.

Member, Association for Computing Machinery (ACM) and the ACM special interest group SIGACT.

Member, Combinatorial Society of Australasia.
A. P. Sheth

Editor, IEEE Multimedia, November 1998 - present.


Member of the Editorial Board, Journal on Distributed and Parallel Databases, 1992 - present.

Associate Editor, SIGMOD Record, 1988 - present.

Member, Association for Computing Machinery, SIGMOD and other SIGs.

Member, IEEE Computer Society, including Technical Committee on Database Engineering.

Member of the Board and Founding Member, International Foundation on Cooperative Information Systems, 1996-present.


Advisory Board, Coca-Cola Center for Marketing Studies, Terry College of Business, 2001-present.

Program Committee Member, 4th International Conference on Web Information Systems Engineering (WISE’03), Roma, December 10-12, 2003.

Program Committee Member, 2nd International Conference on Ontologies, DataBases, and Applications of Semantics for Large Scale Information Systems (ODBASE’03), Sicily. November 3-7 2003.

Program Committee Member, 12th International Conference on Information and Knowledge Management (CIKM 2003), New Orleans, LA, November 2-8 2003.

Program Committee Member, 2nd International Semantic Web Conference, Sanibel, Florida, October 20-24, 2003. (Senior PC Member)
Program Committee Member, The 2003 IEEE/WIC International Conference on Intelligent Agent Technology (IAT 2003), Beijing, China, October 13-17, 2003.

Program Committee Member, IEEE Conference on E-Commerce (CEC03), Newport Beach, CA, June 24-27 2003.

Program Committee Member, 7th International Workshop CIA-2003 on Cooperative Information Agents, Helsinki, Finland, August 27 - 29, 2003.

Program Committee Member, 4th Annual International Conference on Object-Oriented and Internet-based Technologies, Concepts, and Applications for a Networked World, Thuringia, Germany, September 22-25, 2002.

Program Committee Member, Workshop on Semantic Web and Databases, Berlin, Germany, September 13-14, 2004.

Program Committee Member, 7th International Workshop on Cooperative Information Agents (CIA 2003), Helsinki, Finland, August 27 – 29, 2003.

Program Committee Member, IEEE International Conference on Electronic Commerce (CEC03), Newport Beach, CA, June, 2003.


Program Committee Member, 3rd Annual International Conference on Object-Oriented and Internet-based Technologies, Concepts, and Applications for a Networked World, Thuringia, Germany, October 7-10, 2002.

J. W. Smith


T. R. Taha

Member, Association of Computing Machinery (ACM).

Member, Society for Industrial and Applied Mathematics (SIAM).

Member, SIAM SEAS.

Member, International Association for Mathematics and Computers in Simulation (IMACS).

Member, SIAM Activity Group on Supercomputing.
Member, Middle East Advisory Panel on the Fulbright Senior Scholar Program for CIES (Council for International Exchange of Scholars), 1999 – present.

Member, IMACS technical committee on Dynamical Systems and Nonlinear Science, 1992 - present.

Member, Institute of Electrical and Electronics Engineers (IEEE), Inc.

Session Chair, Introducing the first key speaker at the Third IMACS International Conference on "Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory", Athens, GA, April 7-10, 2003.


Member, Editorial Board of The International Arab Journal of Information Technology (IAJIT), 2002-present.

Member, Review Committee of Applied Mathematics, Operational Research and Optimization Symposium to be held under the CESA’2003 in Lille, France, July 9-11, 2003.

S. Watterson

Member, Association for Computing Machinery.

Member, ACM SIGMICRO.

Member, IEEE.
B. GRANTS AWARDED OR CURRENT

EXTERNALLY FUNDED GRANTS


Lowenthal, D. (PI), E. Kraemer and S.M. Bhandarkar (Co-PI’s), National Science Foundation Major Research Instrumentation Grant, “Instrumentation Grant for Research in Parallel and Distributed Computing”, Experimental and Integrative Activities, $114,000, March 2000-February 2004 (includes matching from the University of Georgia Research Foundation).

Canfield, E.R. (PI), J.W. Smith and H.R. Arabnia, University of Georgia Yamacraw Program (2002-2003), Georgia Governor’s office, $608,402, continued support for permanent/continued staff and faculty positions for the Department of Computer Science.


Knight, D. (PI), Khaled Rasheed (Co-PI) and 3 other Co-PIs, National Science Foundation (NSF), "Data Driven Design Optimization in Engineering Using Concurrent Integrated Experiment and Simulation", $1,200,000 (UGA's portion $137,295), October 1, 2001 - September 30, 2004.


Sheth, A., K. Kochut, J.A. Miller, "Bioinformatics of Glycan Expression," National Institutes of Health, $709,401, July 1, 2003 – July 31, 2008. This is a part of a project originating from the Complex Carbohydrates Research Center at UGA (Dr. Michael Pierce, PI).


Sheth, A., donations from various sources to support research activities in the LSDIS Lab at University of Georgia, current funding, $90,000.

INTERNALLY FUNDED GRANTS


C. FACULTY PUBLICATIONS AND PRESENTATIONS

PUBLISHED ARTICLES AND CHAPTERS IN BOOKS: (senior author listed first)


Haijin Yan, Scott A. Watterson, and David K. Lowenthal, Client-Centered Energy Savings for Concurrent Web Connections, submitted to *11th IEEE International Conference on Network Protocols (ICNP)*.


A. Sheth, S. Thacker and S. Patel, Complex Relationship and Knowledge Discovery Support in the InfoQuilt System, VLDB Journal, September 25, 2002 (on-line publication; ISSN: 0949-877X), 12 (1) 2003 (print publication; ISSN: 1060-8888).


Taha, Thiab R. and Xu, Xiangming, "Parallel Split-Step Fourier Methods for the Coupled Nonlinear Schrödinger Type Equations", Special Issue on Parallel and Distributed Processing of the *Journal of Supercomputing*, submitted.


Chris Bentley, Scott Watterson and David Lowenthal, "Implicit Java Array Bounds Checking on 64-bit Architectures", *12th International Conference on Parallel Architectures and Compilation Techniques PACT*, submitted.
PRESENTATIONS AT MEETINGS


Liming Cai, "A stochastic grammar to model RNA pseudoknotted structures," Department of Computer Science, the University of Kentucky, October 2002.

E.R. Canfield, "The Number of Bipartite Graphs," Colloquium, Department of Computer Science, University of Kentucky, January 2003.


PRESENTATIONS AT INTERNATIONAL MEETINGS
