Computer Science Newsletter

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Newsletter of the Department of Computer Science, Louisiana State University (Baton Rouge)
Fall, 1997

Chairman's Note

Welcome to the Fall 97 issue of our Newsletter. The Department is pleased to report that the 25th anniversary symposium of our department made a strong impression about our departmental success, in terms of student quality, to many of our distinguished speakers.

Our strategic directions in terms of curriculum and planning are to remain at the forefront of education and research in computing.

I want to thank the staff, faculty and students for their support in making this department a place for excellent education.

I hope you find this publication informative and enjoyable.

Best wishes for the fall semester.

Inside This Issue

News

Welcome!

This semester two new faculty members, Mr. David M.. (Mike) Dacus and Ms. Barbara Guillott, have joined the department. Barbara earned her Master's in Computer Science at the University of Southwestern Louisiana. Before joining LSU, she taught at the University of Southwestern Louisiana, Southeastern Louisiana University, McNeese State University, LSU at Eunice, and managed a computer Lab at LSU at Alexandria. She has also worked in industry. Mike joins us this year from New Mexico State University at Carlsbad. Prior to starting his teaching career, Mike worked for the US Army for 32 years as an officer and as a civilian. Most of his career with the Army was as an operations research analyst. For a number of years, Mike worked at the Training and Doctrine Command Analysis Command office at White Sands Missile Range, New Mexico. There, he used mainframe and mini-computers to develop and use high resolution force on force ground combat simulations (wargames) to perform cost and operational effectiveness analyses and training effectiveness analyses to support procurement decisions for major weapon systems such as the M1 Abrams main battle tank, and the M2 Bradley Fighting Vehicle.

These two instructor positions were vacated by the resignations of Ms. Laura Courter and Ms. Sheena Judson.

Congratulations! Professor Aiichiro Nakano has received a National Science Foundation (NSF) Faculty Early Career Development (CAREER) award. The CAREER award is a prestigious award for outstanding new faculty who intend to develop academic careers involving both research and education.

Contest! The department will again be sending a team to the ACM South Central Region Programming Contest. The contest will be sponsored by IBM this year, and will be held at Rice University in Houston on Saturday, October 18th. The programming team consists of three members, and the contest involves attempting to solve about six complex problems in a fixed time period of usually about five hours. The ACM faculty advisor and team coach, David Smith, is currently holding team practices with several students. The best three students will comprise the team. There is the possibility of taking a second team this year since the contest is only about four hours away in Houston. We will announce the names of the students chosen to represent our team in the next issue of the newsletter. (by D. Smith)

Computer Update

Microsoft, as part of their Instructional Lab Grant program, has renewed the grant to the department for $\$68,800$ worth of software licenses for a second year. The grant includes maintenance, which allows the department to purchase one copy of a software upgrade, and then install it on all of the lab PCs. In accordance with the grant, we have purchased one copy of the following products:

Visual Basic V5.0 Professional Edition
Visual C++ V5.0 Professional Edition
Visual J++ V1.1 Professional Edition

These packages are now available on the 20 Gateway 120MHz pentium PCs in our microcomputer lab. All other packages, except for WWW browsers, will remain the same. All PCs are currently running Windows NT 4.0 as the operating system. Thanks to Microsoft and David Smith for providing us this grant.

Research Publications

March 1, 1997 - September 15, 1997

Jianhua Chen, "Embedding prioritized circumscription in logic programs", accepted for publication in *Proceedings of the 10th International Symposium on Methodologies for Intelligent Systems.*

J. Chen, A. Mikulcic, and D.H. Kraft, "An Integrated Approach to Information Retrieval with Fuzzy Clustering and Fuzzy Inferencing," in Pons, O., Amparo Vila, M., and Kacprzyk, J. (eds.), *Knowledge Management in Fuzzy Databases*, Heidelberg, Germany: Physica-Verlag, 1997

Erick Mertooetomo and Jianhua Chen, "Character Recognition with Fuzzy Features and Fuzzy Regions", accepted for publication in *Proceedings of the 1997 Conference of North American Fuzzy Information Processing Society.*

Youwen Ouyang and Doris L. Carver, "Creation of Reusable Components Based on Formal Methods", *Proceedings of 8th Annual Workshop on Software Reuse*, 1997.

Ghassan Alkadi and Doris L. Carver, "The Application of Metrics to Object-Oriented Designs", accepted for publication in *Proceedings of IASTED International Conference on Software Engineering*, 1997.

R.R.Brooks, S.S.Iyengar, and S.Rai, "A comparison of GA's and Simulated Annealing for Cost Minimizing in a Multi-Sensor System.", to appear in *Optical Engineering.*

E.C.Cho, S.S.Iyengar, G.Seetharaman, R.Holyer, and M.Lybanon, "Velocity Vectors for Features of Sequential Oceanographic Images", to appear in *IEEE Transactions on Geoscience and Remote sensing.*

S.Kiran, S.S.Iyengar, R.Holyer, M.Lybanon, and J.zachary, "Wavelet Based Feature Detection of Oceanographic Images", to appear in *IEEE Transactions on Geoscience and Remote Sensing.*

D. H. Kraft, F. E. Petry, B. P. Buckles, and T. Sadasivan, "Genetic Algorithms for Query Optimization in Information Retrieval: Relevance Feedback," in E. Sanchez, T. Shibata, and L. A. Zadeh, (eds.), *Genetic Algorithms and Fuzzy Logic Systems: Soft Computing Perspectives*, Singapore: World Scientific, 1996.

D. H. Kraft, and D. Monk, "Applications of Fuzzy Computation - Information Retrieval: A Case Study with the CASHE:PVS System," in E. Ruspini, P. Bonissone, and W. Pedrycz, (eds.), *Handbook of Fuzzy Computation*, Part G: Fuzzy Computation in Practice, G6: Information Science, New York, NY: Oxford University Press and Institute of Physics Publishing, 1996.

F. E. Petry, and D. H. Kraft, "Managing Uncertainty in Databases and Information Retrieval Systems," *Fuzzy Sets and Systems,* in press, 1997.

G. Fanduiz, M. Krishnan, Y. Prada, B. Buckles, D. Kraft, and F. Petry, "Niching Genetic Algorithm Approach to Query Improvement for Information Retrieval," presented at the International Fuzzy Systems Association (IFSA) Conference, Prague, Czech Republic, June, 1997.

G. Fanduiz, M. Krishnan, Y. Prada, B. Buckles, D. Kraft, and F. Petry, "Query Improvement for Information Retrieval Using Niching Genetic Algorithm," poster paper presented at the 20th International ACM/SIGIR Conference on Research and Development in Information Retrieval (SIGIR 97), Philadelphia, PA, 1997.

S. Kundu, "Membership functions for a fuzzy group from similarity relations," *Fuzzy Sets and Systems*, in press.

S.Kundu, "A solution to histogram equalization and other related problems by shortest path method," *Pattern Recognition*, in press.

R. K. Kalia, A. Nakano, A. Omeltchenko, K. Tsuruta, and P. Vashishta, "Role of ultrafine microstructures in dynamic fracture in nanophase silicon nitride", *Physical Review Letters* 78, 2144 (1997).

A. Nakano and T. Campbell, "An adaptive curvilinear-coordinate approach to dynamic load balancing of parallel multi-resolution molecular dynamics", *Parallel Computing*, in press.

A. Nakano, "Fuzzy clustering approach to hierarchical molecular dynamics simulation of multiscale materials phenomena", *Computer Physics Communications*, in press.

A. Nakano, "Parallel Multilevel Preconditioned Conjugate-Gradient Approach to Variable-Charge Molecular Dynamics", *Computer Physics Communications*, in press.

A. Nakano, R. K. Kalia, and P. Vashishta "Multilevel algorithms for large-scope molecular dynamics simulations of nanostructures on parallel computers", *VLSI Design*, accepted for publication.

A. Nakano "Multilevel algorithms for large-scope molecular dynamics simulations of nanostructured materials on parallel computers", *Proceedings of the ASCI (Advanced School for Computing and Imaging) 97 Conference*, edited by H. E. Bal, H. Corporaal, P. P. Jonker, J. F. M. Tonino (Heijen, Netherlands, 1997), p. 121.

P. Vashishta, R. K. Kalia, W. Li, A. Nakano, A. Omeltchenko, K. Tsuruta, J. Wang, and I. Ebbsjo, "Million atom molecular dynamics simulations of materials on parallel computers", *Current Opinion in Solid State & Materials Science*, in press.

X.H. Sun, and S. Moitra, "Performance Comparison of a Set of Periodic and Non-Periodic

Tridiagonal Solvers on SP2 and Paragon Parallel Computers," *Concurrency: Practice and Experience*, pp.1-21, Vol.8(10), 1997.

Q. Hou, and X.H. Sun, "A Three-Level Parallelization of a Spatial Direct Numerical Simulation," accepted to appear in *International Journal on Advances in Engineering Software*.

X.H. Sun, and Y. Zhuang, "A Highly Accurate Fast Solver for Helmholtz Equations." *Proc. of the ACM International Conference on Supercomputing*, July, 1997.

X. Liao, and X.H. Sun, "A Simulation Study of Packed Exponential Connection Network," accepted to appear in *Proc. of the Int'l Conf. on Parallel and Distributed Computing Systems*, Oct. 1997.

Y. Pan, K. Li, and S.,Q. Zheng, "Fast Nearest Neighbor Algorithms on a Linear Array with a Reconfigurable Pipelined Bus System", to appear in *Proceedings of 1997 International Symposium on Parallel Architectures, Algorithms, and Networks.*

H. Shen, K. Li, Y. Pan, G.H. Young, S.Q. Zheng, "Performance Analysis for Dynamic Tree Embedding in k-partite Networks by Random Walk", to appear in *Proceedings of 1997 International Symposium on Parallel Architectures, Algorithms, and Networks.*

Yueming Li, J. Wu and S.Q. Zheng, "An Interconnection Network Based on the Dual of a Hypercube", to appear in *Proceedings of the 10th ICSA International Conference on Parallel and Distributed Systems.*

S.Q. Zheng, S. Olariu and M. C. Pinotti, "Systolic Architecture for Sorting an Arbitrary Number of Elements", to appear in *Proceedings of the Third IEEE International Conference on Algorithms and Architectures for Parallel Processing.*

S.Q. Zheng, K. Li, Y. Pan, H, Shen and G.H. Young, "A Partitionability of Interconnection Networks", *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications*, pp. 1349-1355, Las Vegas, NV, June 1997.

H. Shen and S.Q. Zheng, "Efficient Parallel Algorithms for Image Coloring", *Proceedings of International Conference on Imaging Science, Systems, and Technology*, pp. 48-53, Las Vegas, NV, June 1997.

K. Li, Y. Pan, H. Shen, and S.Q. Zheng, "A Study of Average-Case Speedup and Scalability of Parallel Computations on Static Networks", *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications*, pp. 1362-1371, Las Vegas, NV, June 1997.

K. Li, Y. Pan, and S.Q. Zheng, "Simulation of Parallel Random Access Machines on Linear Arrays with Reconfigurable Pipelined Bus Systems", *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications*, pp. 590-599, Las Vegas, NV, June 1997.

S.Q. Zheng, B. Calidas, and Y. Zhang, "A General Scheme for Parallel In-Place Sorting" to appear in *Journal of Supercomputing.*

Yueming Li, Y. Pan and S.Q. Zheng, "Pipelined TDM Optical Bus with Conditional Delays", to appear in *Optical Engineering.*

S.Q. Zheng and Yueming Li, "A Pipelined Asynchronous TDM Optical Bus", to appear in *Optical Engineering.*

Professional Activities

March 1, 1996 - May 18, 1996

Dr. Doris L. Carver is serving on the program committee for *International Conference on Computings and Information.*

Dr. Doris L. Carver is serving on the program committee for the 1997 *International Conference on Software Engineering and Knowledge Engineering.*

Dr.Peter Chen is serving on the Program Steering Committee of the *16-th International Conference on Conceptual Modeling* to be held in Los Angeles, California ,Nov.3-6, 97. He also will chair the Preconference Symposium *Conceptual Modeling: Historical Perspectives and Future Directions.*

Dr. Jianhua Chen attended the *ACM Joint Conference on Principles of Databases and Management of Data*, Tucson, Arizona, May 1997.

Dr. A. Nakano delivered a keynote speech at the ASCI (Advanced School for Computing and Imaging) 97 Conference (June 3, 1997, Heijen, Netherlands) entitled "Multilevel algorithms for large-scope molecular dynamics simulations of nanostructured materials on parallel computers".

Dr. A. Nakano (joint with Professors R. K. Kalia and P. Vashishta) gave a talk on "Multilevel algorithms for large-scope molecular dynamics simulations of nanostructures on parallel computers" at the *Fifth International Workshop on Computational Electronics*, which was held on May 29, 1997 in Notre Dame, Indiana.

Dr. A. Nakano presented his work entitled "Computer-Aided Design of High-Temperature Materials" at the *Multilevel Algorithms for Computational High-Temperature Materials Research Conference*, on August 1, 1997 in Santa Fe, New Mexico.

Dr. Xian-He Sun has been elected to be a member of New York Academy of Science.

Dr. Xian-He Sun is featured in the 1997 edition of *International Who's Who in Professionals.*

As a guest speaker of the *NAS New Technology Seminar Series*, Dr. X.-H. Sun delivered a talk on "Performance Evaluation for Parallel Program Optimization" in NASA Ames Research Center in July 1997.

In May 1997, Dr. X.-H. Sun was an invited guest at the Los Alamos National Laboratory. He delivered an invited seminar on "Performance Modeling of Scalable Computations."

Dr. X.-H. Sun gave an invited seminar "Performance Evaluation for Parallel Program Optimization," University of North Carolina at Charlotte, May 1997.

Dr. S.Q. Zheng presented a paper at *The Fourth International Conference on Massively Parallel Processing Using Optical Interconnections*, which was held in Montreal, Canada, June 22-24, 1997.

Dr. S.Q. Zheng chaired two sessions at *International Conference on Parallel and Distributed Processing Techniques and Applications*, which was held in Las Vegas, NV, June 30 -July, 1997.

Dr. Zheng is serving as a member of the Steering Committee of *1998 International Conference on Parallel and Distributed Computing and Systems.*

Dr. S.Q. Zheng is serving as a member of the Program Committee of *The Third IEEE International Symposium on Parallel Architectures, Algorithms, and Networks*, which will be held in Taipei, Taiwan, Dec. 1997.

Dr. S.Q. Zheng is serving as a member of the Program Committee of the *The Second International Workshop on CSCW in Design*, which will be held in Bangkok, Thailand, Nov. 1997.

Grants:
March 1, 1997 - September 15, 1997

Doris L. Carver, "Software Engineering Laboratory Enhancement", *Louisiana Education Quality Support Fund*, $25,000.

S. S. Iyengar, "Faculty Incentives and Rewards Enhancement, Undergraduate Project, Computer and Information Sciences," *Louisiana Education Quality Support Fund*-Board of Regents, $94,000 (1997-99).

S. S. Iyengar and Doris L. Carver, "Recruitment of Superior Students to the Doctoral Program in Computer Science", *Louisiana Education Quality Support Fund*-Board of Regents, $136,000 (1997).

S.S. Iyengar, S.Q. Zheng, and X.-H. Sun "Distributed Multimedia Laboratory for Advanced Research and Education," *Louisiana Education Quality Support Fund*-Board of Regents, $80,000 (1997-98).

A. Nakano "Large-Scope Atomistic Simulations of Multiscale Material Phenomena: A Multidisciplinary Computational Approach" *National Science Foundation CAREER Award*, Division of Advanced Scientific Computing, $239,306 (1997-2001).

P. Vashishta, R. K. Kalia, A. Nakano, K. Tsuruta "US-Japan collaboration: Molecular Dynamics Simulations of Synthetic Functional Materials on Parallel Computers", *National Science Foundation*, International Opportunity for Scientists and Engineers Program, $30,000 (1997-2000).

Xian-He Sun, "The SCALA System for Performance Modeling and Prediction," *National Science Foundation*, $75,000.

Rajiv Kalia, P. Vashishta, "Atomistic Simulations of Metal/Ceramic Interfaces, Nanophase Composites, and MEMS on Parallel Computers," Air Force (DEPSCoR), $540,000, (1997-2000).

Graduate Students:

PhD degrees:

Yueming Li completed his Ph.D. Degree. The title of his Ph.D. dissertation is "Design and Analysis of Optical Interconnection Networks for Parallel Computation", Aug, 1997. Advisor: S.Q. Zheng

MS System science:

The following students have successfully defended their projects toward their MS degrees during the Spring and Summer Semester of 97.

Libo Zhang, "BasinGuis: a graphical user interface to a basin modeling system", Advisor: Dr. J. Chen.

Rui Shen, "A web-based trouble ticket management system", Advisor: Dr. J. Chen.

Andreja Mikulcic, "An environment for fuzzy clustering and fuzzy control", Advisor: Dr. J. Chen.

Hwajin Lee, "Distributed debugger based on I/O automata," Advisor: Dr. Kundu.

Y.-H. Hwang, "Image compression by optimal selection of gray-values for quantization," Advisor: Dr. Kundu.

Lei Zhang, "Implementation of a Distant Tutorial System Through World Wide Web," Advisor: Dr. Xian-He Sun.

Senthil Kenchiah, "A Discrete Time Event Simulator for an ATM Network," Advisor: S.Q. Zhen

Min He, "Efficient Parallel Algorithms on a Linear Array with a Reconfigurable Pipelined Bus System," Advisor: Dr. S.Q. Zheng.

Seminars
March 1, 1997 - September 15, 1997

Dr. Michael Pieper and Mr. Dirk Hermsdorf from GMD, Germany, gave a seminar on Apr. 14, 1997. The topic was "Teleworking for Disabled People - GMDUs TEDIS Project".

Dr. Paul Messina from Caltech gave a Distinguished Lecture on May 1, 1997.

Dr. N. Van Gyseghem from Centenary College of Louisiana gave a seminar on May 9, 1996. The topic was "Exploring the UFO Database Model".

Dr. Dr. Gowda from J.C.College of Engineering, India, gave a seminar on Jun. 16, 1997. The topic was "Symbolic Objects and Its Applications".

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Xian-He Sun, editor.