

# Computer Science

## Newsletter

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*Newsletter of the Department of Computer Science, Louisiana State University (Baton Rouge)  
Fall, 1996*

### Chairman's Note

Welcome to this issue of our Newsletter. The department of computer science at LSU will celebrate its 25th anniversary on April 17-19, 1996. This celebration will be in the form of a symposium featuring distinguished speakers who will discuss advances in several important areas of computer science. The Department is pleased to invite alumni, students, present and former faculty members, colleagues and friends to join this celebration.

The success of our programs (BS, MS and Ph.D) can best be measured by placement after graduation. Our graduates consistently receive job offers from universities and high-tech industrial organizations.

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.

### News

*Party!* This years homecoming football game was the occasion of the College's first Homecoming Tailgate Party. The Dean invited all BASC alumni, students, faculty and staff to attend. While a disc jockey playing dance tunes, the crowd enjoyed the kegs of beer, tubs of soft drinks and lots of jambalaya with white beans provided. Dr. Nakano brought his PC and demonstrated virtual reality programs off the World Wide Web. This drew many admirers to our table. We ate, visited and had the pleasure of watching Dean Rabideau dancing on the steps of Choppin Hall with his children and a couple of college staff members.

A great time was had by all.

*Celebration!* Dr. Peter Chen, responsible for inviting Distinguished Speakers for the 25th Anniversary Symposium, pleased to announce the following famous computer scientists to be our speakers (in alphabetical order):

- Juris Hartmanis, New Associate Director of NSF, ACM Turing Award winner, Walter R. Reed Professor at Cornell.
- David Gries, William L. Lewis Professor at Cornell.
- C. V. Ramamoorthy, past Editor-in-Chief for IEEE-TSE and IEEE-TKDE, Professor at University of California, Berkeley.

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- Raj Reddy, Dean of School of Computer Science, CMU, ACM Turing Award Winner.

*Congratulations!* Professor Doris Carver has been elected as President-Elect of the IEEE Computer Society. The IEEE Computer Society, an international organization for computing professionals, has approximately 90,000 members.

*Great Paper!* Professor Peter Chen's original paper on the Entity/Relationship model was selected in a recent book, *Great Papers in Computer Science*, by P. Laplante (West Publishing, 1996). Most authors in the paper collection (book) have won ACM Turing Awards, but less than one third of the Turing Award winners were listed there. The book also lists several great scientists far beyond computer science and Turing Awards such as John von Neumann, Claude E. Shannon, and A.M. Turing.

*Contest!* Its time to start planning for the Fourth Annual LSU Computer Science High School Programming Contest. The date of the competition will be March 8, 1997. We have invited nearly one thousand schools. We will accept the first 40 teams that return their invitations.

Last year Laura Courter was the chair of the committee that created an excellent set of contest problems. This year Dr. Nakano is the chair and I am sure he would appreciate help in creating this year's problem set. For the contest we need 12 problems with source code, 4 input data files and the output for those files.

Faculty volunteers of the Department are needed to give seminars on "Where Computing is Going in the Future", "Current Topics in Computer Science" and "Positions Available for Computer Professionals" to entertain the faculty sponsors and students from the participating high schools. We also need faculty, staff and students for hospitality and as escorts for high school advisors and students on tours. Please contact Ms. Traxler to volunteer and help organize the programming contest.

The high school programming contest is probably one of our most powerful recruiting efforts. The Computer Science Department is up 100 students from last Fall and many of the new students never considered LSU before attending the programming contest. This year's contest has the potential to be the best ever but will require teamwork from our department to pull it off.

## Computer Update

The new Pentium machines have been installed in the Microcomputer Laboratory in support of teaching and research. The Laboratory currently consists of 20 Pentium 120MHz PCs from Gateway 2000, with 16MB of RAM, all running Windows 95. Later this semester, the Laboratory will be running Windows NT 4.0 workstation to be served by a P150, 48MB RAM computer, also GW2000, running Windows NT 4.0 server. If use of the Laboratory is a measure of its popularity and success, then our new MicroLab is a sure winner! Many classes are now taught using the machines there, and many students can now do their assignments on the PCs, as well as navigate the World-Wide Web with blazing speed!

Microsoft, as part of their Instructional Lab Grant, granted our department \$68,800 worth of software licenses consisting of 25 licenses of Windows NT workstation, 25 of Visual C++, 25 of Visual Basic, and 25 of Visual FoxPro. Most of the packages are now installed and usable by classes and individuals. Thanks to Microsoft and to David Smith for working hard to provide us this grant.

## Research Publications

May 19, 1996 - Oct. 15, 1996

Bonnie Achee, Doris L. Carver, "Creating Object-Oriented Design from Legacy Code", to appear in *Journal of Systems and Software*.

Doris L. Carver, "Reverse Engineering Procedural Code", *Proceedings of 8th International Conference on Software Engineering and Knowledge Engineering*, held in Lake Tahoe, June, 1996.

Youwen Ouyang and Doris L. Carver, "A Model to Facilitate the Reuse of Specifications", to appear in *Proceedings of Second World Conference on Integrated Design and Process Technology* to be held in Austin, TX, Dec. 1996.

Ravi C. Erraguntla, Doris L. Carver, "RETK: A Reverse Engineering Toolkit for Extracting Parallelism from Sequential Code", to appear in *Proceedings of Second World Conference on Integrated Design and Process Technology* to be held in Austin, TX, Dec. 1996.

R. Brooks, S.S. Iyengar, J. Chen, "Automatic Correlation and Calibration of Noisy Sensor Readings using Elite Genetic Algorithms", *Artificial Intelligence*, Vol. 84, No. 1-2, July 1996, pp. 339-354.

R.R. Brooks and S.S. Iyengar, "Real Time Distributed Sensor Fusion for Time Critical Sensor Readings", accepted to appear in *Optical Engineering Journal* special issue on Sensor Fusion.

Bush Jones and Patti Isles, "Parallelization of a Greedy Algorithm for a Generalization of the Reconstruction Problem," *Advances in Systems Science and Applications*, pp. 215-220, 1996.

S. Kundu and J. Chen, "A New Class of Theories for which Circumscription Can Be Obtained Via Predicate Completion", *J. Expt. and Theor. Artificial Intelligence*, 8(1996).

S. Kundu and J. Chen, "Fuzzy Logic or Lukasiewicz Logic: a Clarification", accepted for publication in *Fuzzy Sets and Systems*.

S. Kundu, "The Min-Max Composition Rule and its Superiority Over the Usual Max-Min

Composition Rule", accepted for publication in *Fuzzy Sets and Systems*.

S. Kundu, "Preference Relation on Fuzzy Utilities Based on Fuzzy Leftness Relation on Intervals", accepted for publication in *Fuzzy Sets and Systems*.

P. Vashishta, A. Nakano, R. K. Kalia, and I. Ebbsjo, "Crack Propagation and Fracture in Ceramic Films – Million Atom Molecular Dynamics Simulations on Parallel Computers", *Materials Science & Engineering B* 37, 56 (1996).

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*, 1 (1996) in press.

P. Vashishta, R. K. Kalia, A. Nakano, W. Li, and I. Ebbsjo, "Molecular dynamics methods and large-scale simulations of amorphous materials", in *Amorphous Insulators and Semiconductors*, edited by M. F. Thorpe and M. I. Mitkova (Kluwer, Dordrecht, 1996) in press.

X.-H. Sun and J. Zhu, "Performance Prediction: A case study using a shared-virtual-memory machine," accepted to appear in *IEEE Parallel & Distributed Technology*.

S.T. Leutenegger, and X.-H. Sun, "Limitations of Cycle Stealing of Parallel Processing on a Network of Homogeneous Workstations," accepted to appear in *Journal of Parallel and Distributed Computing*.

X.-H. Sun, and S. Moitra, "Performance Measurement and Comparison of a Set of Parallel Periodic and Non-Periodic Tridiagonal Solvers," *Proc. of the International Symposium on Parallel Architectures, Algorithms, and Networks*, June, 1996.

K. Chanchio, and X.-H. Sun, "MpPVM: A Software System for Non-Dedicated Heterogeneous Computing," *Proc. of the International Conference on Parallel Processing*, August, 1996.

S.Q. Zheng, B. Calidas and Y. Zhang, "Efficient In-Place Sorting Algorithms Using Feasible Parallel Machine Models", *Proceedings of the International Symposium on Parallel Architectures, Algorithms, and Networks*, pp. 15-21, 1996.

S.Q. Zheng, "Algorithms for Sorting Arbitrary Input Using a Fixed-Size Parallel Sorting Device", *Proceedings of the International Conference on Parallel Processing*, pp.II.95-99, 1996.

Y. Li and S.Q. Zheng, "Parallel Selection on a Pipelined TDM Optical Bus", *Proceedings of the 9th International Conference on Parallel and Distributed Computing Systems*, pp. 69-73.

S. Latifi and S.Q. Zheng, "Fault-Tolerant Simulation of a Ring on Torus Networks", *Proceedings of the 9th International Conference on Parallel and Distributed Computing Systems*, pp. 468-472.

S. Olariu and S.Q. Zheng, "Sorting N Items Using a p-Sorter in Optimal Time", *Proceedings of the 8th IEEE Symposium on Parallel and Distributed Processing*, pp. 264-272, 1996.

S.Q. Zheng and J. Wu, "Dual of a Complete Graph as an Interconnection Network", *Proceedings of the 8th IEEE Symposium on Parallel and Distributed Processing*, pp. 433-442, 1996.

S.Q. Zheng, Y. Li and X. Yang, "Versatile Processor Arrays Based on Segmented Optical Busses", to appear in *Proceedings of SPIE Photonics West '96*.

Y. Li and S.Q. Zheng, "Processor Arrays with Asynchronous TDM Optical Busses", to appear in *Proceedings of SPIE Photonics West '96*.

S.Q. Zheng, "Maximum Independent Sets of Circular-Arc Graphs: Simplified Optimal Algorithm and Proofs", *Networks*, Vol. 28, pp. 15-19, 1996.

## Professional Activities

**March 1, 1996 - May 18, 1996**

Professor Doris Carver is a member of the program committee for the 5th International Workshop on Program Comprehension.

Professor Doris Carver is a member of the program committee for the 9th International Conference on Software Engineering and Knowledge Engineering.

Dr. Jianhua Chen chaired a session and presented a paper at the 9th International Symposium on Methodologies for Intelligent Systems (ISMIS'96), Zakopane, Poland, June 1996.

Dr. Jianhua Chen chaired a session at the FUZZ-IEEE'96 conference, New Orleans, September 1996. Dr. Chen also presented a paper at the FUZZ-IEEE conference.

Ms. Andreja Mikulcic presented a paper (joint with Dr. J. Chen) at the FUZZ-IEEE'96 conference, New Orleans, September 1996.

Dr. Peter Chen delivered an opening address at 15th International Conference on Conceptual Modeling, Cottbus, Germany, October 7-11, 1996.

Dr. Bush Jones will chair a session on K-systems Theory at the Second Workshop of the International Institute for General Systems Studies in January, 1997. There will be five speakers. Dr. Jones founded the area of K-systems.

Dr. Kraft continues to serve as editor of the *Journal for the American Society for Information Science (JASIS)*.

- Dr. Kraft continues to serve as member of IEEE computer society education activities board.
- Dr. Kraft served as the program chair for FUZZ-IEEE '96, *International Conference on Fuzzy Sets*, held in New Orleans in September.
- Dr. S. Kundu presented the paper "What's in a Membership Value: Issues and Solutions," at NATO Advanced Study Institute on *Soft Computing and Its Applications*, Aug. 21-31, Turkey.
- Dr. X.-H. Sun gave an invited seminar "Network Process Migration for Non-Dedicated Heterogeneous Computing" at University of Californian, Santa Barbara on June 5, 1996.
- Dr. X.-H. Sun presented a paper in parallel computing at the *International Symposium on Parallel Architectures, Algorithms, and Networks*, which was held in Beijing, China, June 12-14, 1996.
- Dr. X.-H. Sun gave an invited seminar "Software Environment for Enterprising Network Computing" at Tsinghua University, Beijing, China on June 19, 1996.
- Dr. X.-H. Sun gave an invited talk on "Recent Development in Parallel and Distributed Computing" at National Research Center for Intelligent Computing Systems, Chinese Academy of Sciences, Beijing, China on June 20, 1996.
- Dr. X.-H. Sun visited NASA Langley Research Center as a visiting professor from July, 1996 to August, 1996.
- Dr. X.-H. Sun participated in the *Programming Models for Future Parallel Architectures* Workshop, which was held at NASA Langley Research Center from July 29, 1996 to August 2, 1996.
- Dr. X.-H. Sun presented a paper in distributed network computing at the *International Conference on Parallel Processing*, which was held in Chicago, August 12-16, 1996.
- Dr. S.Q. Zheng gave an invited seminar "Dual of a Complete Graph as an Interconnection Network" at City University of Hong Kong on July 22, 1996.
- Dr. S.Q. Zheng gave an invited seminar "New Parallel Sorting Architectures and Algorithms" at University of Hong Kong on July 23, 1996.
- Dr. S.Q. Zheng gave an invited talk "New Development in High-Speed Networking" at Northeastern Microelectronics Research Institute, Shenyang, China, on June 26, 1996.
- Dr. S.Q. Zheng presented a paper and chaired a session at the *International Symposium on Parallel Architectures, Algorithms, and Networks*, which was held in Beijing, China, June 12-14, 1996.
- Dr. S.Q. Zheng presented a paper at the *International Conference on Parallel Processing*, which was held in Chicago, August 12-16, 1996.
- Dr. S.Q. Zheng presented two papers and Chaired two sessions at the *9th International Conference on Parallel and Distributed Computing Systems*, which was held in Dijon, France, Sept. 25-28, 1996.
- Dr. S.Q. Zheng was invited to serve as a member of the Steering Committee of the *IASTED International Conference on Parallel and Distributed Computing and Systems*, which will be held in Washington D.C. in October, 1997.
- Dr. S.Q. Zheng was invited to serve on the editorial board of *IASTED International Journal of Parallel and Distributed Systems and Networks*.
- Dr. S.Q. Zheng is invited to serve as a co-chairman of the Program Committee of the *10th International Conference on Parallel and Distributed Computing Systems*, which will be held in New Orleans, Sept. 1997.

### Grants:

May 19, 1996 - Oct. 15, 1996

NRL (Naval Research Laboratory) has awarded a \$20,000 award to Dr. S.S. Iyengar for his project titled "Estimation of Velocity Field for Features of

Oceanographic Image sensiences”, Sep. 1996 - Dec. 1996.

A. Nakano, R. K. Kalia, P. Vashishta, “Computer Simulation of Strain Engineering and Phononics in Semiconducting Nanostructures on Parallel Architectures”, Army Research Office, \$300,424 (1996-1999)

A. Nakano (PI), R. K. Kalia, P. Vashishta, LEQSF Supplement to: “Computer Simulation of Strain Engineering and Phononics in Semiconducting Nanostructures on Parallel Architectures”, Louisiana Education Quality Support Fund (LEQSF), \$90,127 (1996-99)

Dr. Xian-He Sun has been awarded \$6,000 summer grant from the Institute for Computer Applications in Science and Engineering (ICASE) for his “Excellent Work in Computer Science,” July 1996 - August 1996.

Dr. Xian-He Sun has been awarded \$30,000 from the National Aeronautics and Space Administration (NASA) for his project “Efficient Parallel Kernel Solvers for Computational Fluid Dynamics Applications” for the academic year of 1996-1997. This award is in addition to the \$30,000 he received in the year of 1995.

## Graduate Students:

### PhD degrees:

Ravi Erraguntla. Dissertation title: *A Reverse Engineering Methodology for Extracting Parallelism from Design Abstractions*. Advisor: Doris L. Carver.

Youwen Ouyang. Dissertation title: *A Reusability Model that Creates Design Frameworks using a Formal Specification Clustering Approach*. Advisor: Doris L. Carver.

Moonsung Yoo. Dissertation title: *From Object-Oriented Specification to Implementation: A Formal Transformation*. Approach. Advisor: Doris L. Carver.

Richard R. Brooks. Title of the Dissertation: *Reliable Sensor Fusion Algorithms: Calibration and Cost Minimization*. Advisor: S.S.Iyengar.

### MS System science:

The following students have successfully defended their projects toward their MS degrees during the Summer Semester of 96.

Erick Mertoetomo, “Pattern Recognition with Fuzzy Neural Nets and Features”, Advisor: Dr. Jianhua Chen.

Xin Liao, “A Simulation Study of Packed-Exponential-Connection Network,” Advisor: Xian-He Sun.

Weixing Shen, “A Distributed Version of Crack”, Advisor: Dr. S.Q. Zheng.

Lijue Lin, “An On-Line Banking Transaction System”, Advisor: Dr. S.Q. Zheng.

## Seminars

May 19, 1996 - Oct. 15, 1996

Dr. Zdzislaw Pawlak from Warsaw Univ. of Technology, Poland, gave a seminar on Sep. 12, 1996. The topic was “Rough Set Theory: A New Approach to Data Analysis”.

Dr. Gabriella Pasi from CNR, Italy, gave a seminar on Sep. 12, 1996. The topic was “Fuzzy Indexing of Structured Documents”.

Dr. Lech Polkowski from Warsaw Univ. of Technology, Poland, gave a seminar on Oct. 10, 1996. The topic was “Fuzzy Containment from Rough Inclusions: Rough Mereology and Its Applications to AI”.

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