

Computer Science

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Newsletter

Newsletter of the Department of Computer Science, Louisiana State University, Baton Rouge, Fall 1999

Chairman's Note

Through this Newsletter we convey to our colleagues in academia and industry the highlights of our accomplishments during the last months.

The Science of Computing is changing rapidly, and it is an exciting time to be a part of the LSU Computer Science Department. The growth and change in the department have focused on emerging areas of Computer Science, such as Data Mining, e-Commerce and Image Computing.

In addition, I would like to wish all Happy Holidays and a Happy New Millenium!

S. S. Iyengar, Chairman

New Initiative

The new initiative is to develop a Southern University/Louisiana State University Joint Research and Educational Program in *High Performance Networking* through the NSF/LaSER Joint Faculty Appointment Program. This includes: sample projects like multi-level networking algorithms, data intensive network algorithms, performance evaluation of scalable computing, multi-media Internet networking, collaborative network computing, etc. This is being funded by NSF/LaSER Program.

The primary goal of this networking initiative is to provide LSU/SU with a new avenue of research on high performance networking. The long-term goal is to establish a self-sustained High Performance Networking Research Center. The investigators have confidence that the program will be a successful national model of how a historically black and white majority institution can jointly develop faculty and research.

These long-term goals are to develop foundations for understanding tele-and-data communications and problems connecting laptops to cellular networks. More specifically, two specific issues that may bring in qualitative improvement to wide area networks will be addressed.

The Next Generation Internet (NGI) initiative research is already in progress at LSU/SU.

Faculty News!

New Faculty!

Ms. **Savitha Pinnepalli** joined the Department of Computer Science as an Instructor in the fall 1999.

Visiting Faculty:

Dr. Dong Soo Byun is a visiting faculty in the department of Computer Science from Korea. He will be here from August 1999 through July 2000. Dr. Iyengar is the host for this position.

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Invited Talks!

1. Design of nanostructured materials by multiscale simulations. Workshop on "Parallel Algorithms, Computational Efficiency and Multiscale Materials Simulations" Aiichiro Nakano, on April 2, 1999, in New Orleans, LA.
2. Scalable molecular-dynamics, visualization, & data-management algorithms for simulating nanocomposite materials. Aiichiro Nakano, International Materials Research Congress, August 31, 1999, Cancun, Mexico.
3. *S. S. Iyengar* at University of Illinois-Chicago on November 22, 1999 on Fault Tolerant Computing in Distributed Sensor Fusion.
4. *S. S. Iyengar* at University of California at Berkeley on November 9, 1999 on Fault Tolerant computing in Distributed Sensor Fusion sponsored by US Army Research Office.
5. *Doris Carver* gave a keynote talk, "Women and the Information Technology Workforce," 1999 Annual Grantee Meeting of the Program for Gender Equity in Science, Mathematics, Engineering, and Technology (SMET) at the National Science Foundation, October, 1999

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Promotions and Awards:

Dr. Xian-He Sun has been appointed to be a visiting faculty in the Mathematics and Computer Science Division at the Argonne National Laboratory.

Dr. Xian-He Sun has received the Office of Naval Research (ONR) and The American Society for Engineering Education (ASEE), *Certificate of Recognition* award for research contributions made through the 1999 Navy-ASEE faculty research program.

Dr. Donald Kraft received the American Society for Information Science (ASIS) Research Award for 1999.

Presentations:

Dr. Jianhua Chen presented two papers at the 11th International Symposium on Methodologies for Intelligent Systems, Warsaw, Poland, June 1999.

X. Liao, and X.H. Sun, "Computer Simulation of PEC Network," *Journal of Simulation Practice and Theory*, No.7, 1999, pp 251-278.

D. Khettry, and X.H. Sun, "Virtual Collaboratory in Windows-NT Environment," accepted to appear in *International Journal on Advances in Engineering Software*.

X. Wu, Q. Chen, and X.H. Sun, "Design and Implementation of a Java-based Distributed Debugger Supporting PVM and MPI," to appear in the *Proc. of 11th Int'l Conf. on Parallel and Distributed Computing and Systems*, Nov. 1999.

Y. Zhuang, and X.H. Sun, "A High-Order Multilevel ADI Solver for Generalized Helmholtz Equations," in *Proc. of the 5th NASA National Symposium on Large-Scale Analysis, Design and Intelligent Synthesis Environments*, Oct. 1999.

Michael Portwood delivered presentations in Sydney Australia and in San Francisco, titled "Using Java Programming Language Interfaces to Improve Design."

Dr. Donald Kraft, "Optimizing Textual Retrieval: Weights, Boolean Queries and Machine Learning," INFORMS conference, Cincinnati, May, 1999.

Srinivasan, P. and Kraft, D.H., "Data Mining Via Rough Sets and Fuzzy Sets of a Controlled Vocabulary for Information Retrieval," invited paper, EUROFUSE-SIC'99, Budapest, May, 1999

Further Information

Dr. Xian-He Sun has been invited to be a member of the Program Committee of the 5th International Workshop on High-Level Parallel Programming Models and Supportive Environments

Dr. Iyengar has been invited to be a member in the Baton Rouge Technical Council coordinated by Drs. Lynn Jelinski and Joe Jelinski and Mr. McCollister Jr.

Dr. A. Nakano was a member of the WTEC (World Technology Evaluation Center) panel on "Molecular Model Application" kick-off meeting (June 13-14, 1999, Arlington, VA)

Dr. A. Nakano was a reviewer of "Molecular Simulations" and "National Science Foundation (9) "

6. *Doris Carver* gave a keynote talk, "Software Engineering: Its Relevance and Importance to Information Technology Industries Today," University of Auckland Industry Forum, Auckland, New Zealand, June, 1999.

7. *Dr. Iyengar* is giving a keynote talk on "Information Technology for Engineering Applications: A Road Map to the 21st Century, National Convention, Institution of Engineers, Hyderabad, Dec 17, 1999

Grants

Dr. Iyengar received an extension on his contract from DOE-ORNL operated Lockheed Martin System on Global Optimization Algorithms for Image Registration and Fusion problems \$35,000 (1999-2000).

"Templates, Databases, and Forums for Web-Based Instruction in Chemistry and Computer Science," L. Butler, M. Dick, W. Moore, S. S. Iyengar, W. Walker, R. Hall. NSF-LEQSF, \$25,000.

"Data Management for Computational Nanoelectronics on the Information Power Grid: Phase Engineering of Semiconductor Nanocrystals." A. Nakano, R. K. Kalia, and P. Vashishta. NASA, \$190,000 (1999-2001).

"Development of SU/LSU Joint Research and Educational Program in High Performance Networking." S. S. Iyengar, A. Nakano, X.-H. Sun, S.-S. Pang (LSU), E. Walker, I. Dabipi, H. Mohamadian (Southern University) NSF/EPSCoR Joint Faculty Appointment Program, \$460,000 (1999-2001).

Doris L. Carver, "Research Foundations for Improving the Representation of Women in the Information Technology Workforce," NSF, Award amount: \$132,475 Award Period: September 1999 - August, 2000 .

Jianhua Chen, "Fuzzy Clustering Techniques for Back-calculation of Pavement Parameters," Louisiana Transportation Research Center, \$19,850.

Xian-He Sun, W. Cai, "Adaptive Wavelet Element Method for Highly Parallel Computations," NSF (CCR-9972251), \$322,146, Aug. 15, 1999 to July 30, 2002.

Dr. A. Nakano participated in the Workshop on "Parallel Algorithms," Computational Efficiency and Multi-scale Materials Simulations" (April 1-2, 1999 in New Orleans).

Dr. Iyengar and *Dr. Kalia* have been appointed as a member of the LSU Information Technology Master Planning Task Force.

Dr. A. Nakano was Guest Editor of IEEE/APS Computing in Science and Engineering for the September/October 1999 issue.

Dr. A. Nakano was a member of the National Science Foundation Phase I Small Business Innovation Research and Small Business Technology Transfer Program Peer Review Panel (September 13, 1999, Arlington, VA)

Dr. Bush Jones has been invited to be a guest editor for *Journal of Applied Systems Studies*

Ph.D. Defenses

Carlos Montes de Oca, Ph.D. Dissertation, "Design Recovery and Data Mining: A Methodology that Identifies Data Cohesive Subsystems Based on Mining Association Rules," Spring, 1999, Major Professor Doris L. Carver.

Ramachenga Reddy Valasareddi, Ph.D. Dissertation, "A Transformational Reengineering System that Supports Software Maintenance Using a Graph Representation for Identification of Object-Oriented Software Architecture, Spring, 1999, Major Professor Doris L. Carver.

Ghassan Alkadi, Ph.D. Dissertation, "Restructuring Object-Oriented Designs Using a Metric-Driven Approach," August, 1999, Major Professor Doris L. Carver.

Ihssan Alkadi, Ph.D. Dissertation, "Enhancing the Processing of Testing Object-Oriented Systems," August, 1999, Major Professor Doris L. Carver.

Elias Khalaf, Ph.D. Dissertation, "Congestion Control Mechanisms for Internet Multicast Transport Protocols," December 1999, Major Professor, S. S. Iyengar.

M. S. students graduation:

Xiao Fu, "Jefferson Garden Management System," Major Professor: Dr. J. Chen.

Wei Han, "Use of ID3 Decision Tree Learning in Data Mining," Major Professor: Dr. J. Chen.

Yixiang Huang, "A Web-Based Database System for the Graduate Program Management of LSU Chemistry Department," Major Professor: Dr. J. Chen.

Xiaochun Wang, "Integrated Web-based Biotechnology Server System," Major Professor: Dr. J. Chen.

Liping Wu, "Web-based Dufrocq Math Center for Dufrocq Montessori School," Major Professor: Dr. J. Chen.

Yifeng Zhang, "Integrated Online Scheduling System," Major Professor: Dr. J. Chen.

Brian Pangburn, "Development of an Information Technology Web Site to Supplement Multi-Sensor Fusion," Major Professor S. S. Iyengar.

Seminars Held During The Fall Semester:

Dr. Michael Stroschio from Army Research Office, *Distinguished Lecture*: "Dimensionally- Confined Optical and Acoustic Phonons and Their Interactions with Carriers in Nanostructures," on September 9th.

Dr. A. Lakhota from University of Louisiana Lafayette, "Restructuring Functions with Low Cohesion," September 10th.

Dr. Steve Seiden from Louisiana State University, "Scheduling Two Machines with Release Times," September 17th.

Dr. B. Belkhouche from Tulane University, "Multiple View Analysis of Software Designs," on September 24th.

Dr. P. Varshney from Syracuse University, *Distinguished Lecture*: "Multisensor Data Fusion," on October 1st.

Dr. John Zavada from Army Research Office, *Distinguished Lecture*: "Novel Light Emission from Rare Earth Doped Semiconductors," on October 14th.

Dr. Sundar Vedantham, from Louisiana State University, "Introduction to ATM Network Model," on October 15th.

Dr. Richard Hirsh from National Science Foundation, *Distinguished Lecture*: "The National Science Foundation and Information Technology Research," on October 19th.

Dr. Benjamin Wah from University of Illinois, Urbana-Champaign, *Distinguished Lecture*: "Global Optimization of Nonlinear Constrained Problems and its Engineering Applications" on October 29th.

Dr. Sundar Vedantham from Louisiana State University, "MPLS – An Introduction," on November 11th.

Dr. L. M. Patnaik from Indian Institute of Science, "Mobile Computing," on November 12th.

Dr. Vijay Raghavan from University of Louisiana Lafayette, "The Item-set Tree: A Data Structure for Data Mining," on December 3rd.

1999 ACM Regional Programming Contest

The 1999 ACM Regional Programming Contest was held on November 7 in Claremore, OK at Rogers State University. The competition included 68 Division I and Division II nodes (Division I schools have graduate programs). LSU's two teams placed 6th and 14th in Division I (6th place was actually awarded a prize and recognized during the Award's Banquet). LSU also had the highest finish of all the Louisiana schools (LA Tech best team finished 8th). Our 6th place team completed 4 of the 6 problems while our 14th place team completed 3. The top three teams in the competition completed 5 problems.

PUBLICATIONS

The following publications by the faculty during the semester were reported:

1. Multiresolution load balancing in curved space: The wavelet representation. A. Nakano. *Concurrency: Practice and Experience* 11, 343-353 (1999).
2. A rigid-body based multiple time-scale molecular dynamics simulation of nanophase materials. A. Nakano. *The International Journal of High Performance Computing Applications* 13, 154-162 (1999).
3. Scalable molecular-dynamics, visualization, and data-management algorithms for materials simulations. A. Nakano, R. K. Kalia, and P. Vashishta. *Computing in Science & Engineering* 1 (5), 39-47 (1999).
4. Large-scale atomistic simulation of dynamic fracture P. Vashishta, R. K. Kalia, and A. Nakano. *Computing in Science & Engineering* 1 (5), 56-65 (1999).
5. Dynamic fracture analysis. P. Vashishta and A. Nakano. *Computing in Science & Engineering* 1 (5), 20-23 (1999).
6. Dynamics of oxidation of aluminum nanoclusters using variable charge molecular-dynamics simulations on parallel computers. T. Campbell, R. K. Kalia, A. Nakano, P. Vashishta, S. Ogata, and S. Rodgers. *Physical Review Letters* 82, 4866-4869 (1999).
7. Structural correlations and mechanical behavior in nanophase silica glasses. T. Campbell, R. K. Kalia, A. Nakano, F. Shimojo, K. Tsuruta, and P. Vashishta. *Physical Review Letters* 82, 4018-4021 (1999).
8. Physics computing (invited contribution). A. Nakano. in *Encyclopedia of Electrical and Electronics Engineering, Area: Computers*, Vol. 16, edited by J. G. Webster (John Wiley & Sons, NY, 1999) pp. 420-426.
9. Multilevel algorithms for computational high-temperature materials research. A. Nakano, T. Campbell, R. K. Kalia, and P. Vashishta in *Computer-Aided Design of High-Temperature Materials*, edited by A. Pechenik, R. K. Kalia, and P. Vashishta (Oxford Univ. Press, Oxford, 1999) pp. 422-428.
10. Pressure induced structural transformation in nanocluster assembled gallium arsenide. S. Kodiyalam, A. Chatterjee, I. Ebbsj, R. K. Kalia, H. Kikuchi, A. Nakano, J. P. Rino, and P. Vashishta. *Materials Research Society Symposium Proceedings* 536, 545-550 (1999).
11. Molecular dynamics simulations of nanoindentation of silicon nitride. P. Walsh, A. Omeltchenko, H. Kikuchi, R. K. Kalia, A. Nakano, and P. Vashishta. *Materials Research Society Symposium Proceedings* 539, 119-124 (1999).
12. Multiresolution algorithms for massively parallel molecular dynamics simulations of nanostructured materials. R. K. Kalia, T. J. Campbell, A. Chatterjee, A. Nakano, P. Vashishta, and S. Ogata. *Computer Physics Communications*, to be published.
13. Multimillion atom molecular dynamics simulations of high temperature ceramics on massively parallel computers. T. Campbell, A. Chatterjee, R. K. Kalia, A. Nakano, A. Omeltchenko, K. Tsuruta, P. Vashishta, and S. Ogata. *Journal of the European Ceramic Society*, accepted for publication.
14. Structural correlations at Si/Si₃N₄ interface and atomic stress in Si/Si₃N₄ nanopixels - 10 million-atom molecular dynamics simulation on parallel computers. M. E. Bachlechner, P. Vashishta, I. Ebbsj, R. K. Kalia, A. Nakano, and A. Omeltchenko. *Journal of the European Ceramic Society*, accepted for publication.
15. Miguel Serrano, Carlos Montes de Oca, Doris L. Carver, "A Methodology for Evolutionary Migration of Legacy Systems to an Object-Based Distributed Environment," *Proceedings of the 1999 International Conference on Software Maintenance*, Oxford, UK, September, 1999, pp. 86-98.
16. Miguel Serrano, Doris L. Carver, "Migration of Object-Oriented Systems to Distributed Environments, *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications*, Nevada, July, 1999, pp. 403 - 409.
17. Jigang Liu, Doris L. Carver, "Performance Evaluation of Parallel Computational Geometry Algorithms", *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications*, Nevada, July, 1999, pp. 1377-1383.
18. W. Liao, J. Chen, E. Triantaphyllou, "Data Mining Applications in Industrial Engineering: A Perspective," *Proceedings of the 25th International Conference on Computers and Industrial Engineering*, New Orleans, March 1999.
19. Zhi Chen, S. S. Iyengar, S. Dira, and J. Banden, "An Approach to Solve Global Optimization Problems for Continuous Functions, " *Proceedings of ICIT 99 Conference*, Bhunevarwan, December 1999.
20. Meadow, C.T., Boyce, B.R., and Kraft, D.H., **Information Retrieval Systems**, second edition, San Diego, CA: Academic Press, 2000.
21. Kraft, D.H., Bordogna, G., and Pasi, G., "Fuzzy Set Techniques in Information Retrieval," in Bezdek, J.C., Didier, D. and Prade, H. (eds.), **Fuzzy Sets in Approximate Reasoning and Information Systems**, vol. 3, *The Handbook of Fuzzy Sets Series*, Norwell, MA: Kluwer Academic Publishers, 1999