

COMPUTER SCIENCE NEWSLETTER

Louisiana State University, Baton Rouge

Volume I

Fall Issue

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Welcome to the Department of Computer Science at Louisiana State University, Baton Rouge. The purpose of this newsletter is to convey to our colleagues in academia and industry the highlights of our progresses in research and education programs, faculty hiring, and student and faculty achievements during the 2003 – 2004 academic year. This has been an exciting time in terms of research and publication. The department has continued to make significant strides in research funding. The department has also gone through a vigorous search process for faculty jointly with the Center of Computation and Technology to enlarge our research impact areas that are important to the future success of high visibility across the country. Moreover, our new faculty will also be able to teach important courses in networking, cyber security, computer graphics and scientific visualization. The sponsored research and increased faculty size will enhance the department's competitiveness and visibility in the critical research areas of scientific computing, visualization, sensor networks and cyber-security. Thanks for taking the time to read this newsletter.



S. S. Iyengar, Department Chair

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NEW FACULTY MEMBERS

Five faculty members have recently been hired thereby making a total of 17 professorial faculty members at the department. There is search going on for two more positions in Grid/Distributed Computing. Some of these positions are jointly between the Department of Computer Science (CS) and the Center for Computation and Technology (CCT).

Dr. Seung-Jong Park received his PhD from Georgia Institute of Technology in 2004. His primary research interests are in the broad areas of wireless networks and mobile computing. During his Ph.D. study, he has concentrated on the design of energy-aware protocols for wireless sensor networks. Dr. Park had previously worked for Shinsegi Telecomm, which is the first CDMA cellular service provider in the world, as a research staff working on wireless 2G and 3G cellular networks.



Dr.S.Park



Dr.B. Ullmer

Dr. Brygg Ullmer who is coming to LSU in the Spring 2005 completed his Ph.D. from

Massachusetts Institute of Technology in 2002, where his research focused on tangible user interfaces. Most recently, he has held a postdoctoral position in the visualization department of the Zuse Institute Berlin. His research interests include tangible interfaces, visualization, programming languages for networked and embedded systems, RFID, grid computing, and rapid physical and electronic prototyping.



Dr. G. Baumgartner



Dr. I. Taylor

Also joining the department this Fall Semester are three visiting assistant professors. Dr. Gerald Baumgartner received a PhD from Purdue University in 1996 and worked as an Assistant Professor at Ohio State University. His research interests include making programmers' job easier by working with different programming languages and tools in parallel and Grid environments. Dr. Ian Taylor has a joint position between CS and CCT. He got his PhD from Cardiff in 1994. His research interests include Grid Computing and distributed systems. Also joining this Fall

is Dr. Patti Iles Aymond who has her PhD from Louisiana State University in 1995. She has previously worked as the senior modeling and simulation design architect for Innovative Emergency Management, Inc. Her research interests include semi-autonomous agent-based modeling & simulation, scientific computing, high-performance computing, grid computing, optimization, and geospatial modeling & simulation.



Dr. P. Aymond

DID YOU KNOW?

- ❖ Dr Peter Chen has been appointed as *a member of the Advisory Committee of NSF/CISE (Computer and Information Science Engineering)* starting July 1, 2004. Dr. Chen has also been chosen as the 2004 overseas winner of *Pan Wen-Yuan Outstanding Research Award*. This is Taiwan's top high-tech award in memorial of Mr. Yuan's contribution to Taiwan's high-tech industry and



Dr. P. Chen (left) with Dr. D.P. Seiwiorek (middle) on his visit for IT Eminent Lecture and Dr. S.S. Iyengar (right)

economic miracle.

- ❖ Dr. Doris Carver has received the prestigious 2004 *Richard E. Merwin Distinguished Service Award* for her dedicated and sustained leadership to the computing profession and to the IEEE Computer Society. She has also been reappointed as the *Editor-in-Chief* for IEEE Computer.
- ❖ Dr. S. S. Iyengar has been appointed as the *Editor-in-Chief* for the International Journal of Distributed Sensor Networks published by Taylor and Francis Company/CRC Press.
- ❖ Dr. Bijaya B. Karki has received the National Science Foundation's most prestigious *Career Award* for junior faculty members. This is a five award in the amount of nearly a half million dollars.
- ❖ Dr. Donald Kraft has received *LSU Distinguished Faculty Award*.
- ❖ Dr. John. M. Tyler has won the *LSU Basic Sciences Award of Excellence* in graduate instruction.
- ❖ Dr. Sukhamay Kundu has been awarded the *Fulbright Scholarship* to work in Indian Institute of Technology (IIT), Khanagpur, India in the Spring Semester of 2004.
- ❖ Vamsi Parachuri, Arjan Durresi, Rajgopal Kannan and S.S. Iyengar have won the *Best-Paper Award* in the 18th International Conference on Advanced Information Networking and Application, Tokyo, 2004.



FUNDING SUCCESS

- NSF Career grant on "Rheology of materials of Earth's mantle: High-end computational/visualization research and education," \$465,144; 2004-2009: B.B. Karki is the PI.

From top to bottom: Drs. D. Carver, B.B. Karki, D. Kraft, J. Tyler, S. Kundu, A. Durresi and R. Kannan

- NSF REU grant on “Secure data distribution and access in large sensor networks,” \$6,000; 2004-2005: R. Kannan and S.S. Iyengar are the PIs.
- NSF grant on “Traffic management in IP networks,” \$27,619; 2003-2005: A. Durrezi is the PI.
- NSF grant on “First-principles investigations of silicate liquids at mantle conditions,” \$150,684; 2004-2007: B.B. Karki is the PI.
- NSF NMI grant on “GridChem: CyberInfrastructure for computational chemistry,” \$600,000; 2004: G. Allen is the PI.
- LEQSF grant on “Recruitment of PhD students in Computer Science,” \$64,000; Fall 2005: S.S Iyengar and D. Kraft are the PIs.
- DoE/EPSCOR grant on “Ubiquitous computing and monitoring system (UCoMS) for discovery and management of energy resources,” \$600,000; 2004-2007: G. Allen and E. Seidel are the PIs.
- DOE-ORNL grant on “Control theory and internet implementation of transport protocols in overlay networks,” \$45,000; 2004-2005: S.S. Iyengar is the PI.
- LSU Faculty Research Grant Award, \$ 10,000; 2004-2005: A. Durrezi is the PI.

CONGRATULATIONS!

Ph.D. Degree Awardees

Kevin Paul Grant, “Dissertation title: Machine Learning Techniques for Efficient Query Processing in Knowledge Base Systems,” Major professor: Jinhua Chen, Fall 2003

Osman Kandara, “Dissertation title: Level of Essentialness of a Node in Flowcharts and Its Application to Program Testing,” Major professor: Sukhamay Kundu, Fall 2003

James Steven O'Neal, “Dissertation title: Analyzing the Impact of Changing Software Requirements: A Traceability-based Methodology,” Major professor: Doris L. Carver, Fall 2003

Sai Pinnepalli, “Dissertation title: Address Optimization for Embedded Processors,” Major professor: Doris L. Carver and Jagannathan Ramanujam, Spring 2004.

Rion Dooley, “Dissertation title: A Distributed Quadtree Dictionary Approach to Multi-Resolution Visualization of Scattered Neutron Data,” Major professor: Aiichiro Nakano and John M. Tyler, Spring 2004.

M.S. Degree Awardees

Fall 2003: Gurcan Aral, Madhusudhanan Balasubramanian, Shreekanth Balasubramanian, Sureshkumar Gunasekaran, Song Guo, Kalyan Jammigumpula, Edin Krivic, Yesheng Li, Yan Liu, Ravi Chandra Paruchuri, Grazia Carvalho Phillips, Cheng Piao, Vishnu Vardha Reddy, Cindy Lynn Rountree, Nimisha Seth, Dizhou Shen, Anil Surathu, Narayanadas Choudary Vakamudi, Satyavani Vemparala, Yichuan Xu, Shuli Zhang, Yarong Zhou



2004 Spring graduates

Spring 2004: Varma K. Datla, Vidya R. Jadhav, Krishnapriya Krishnamaneni, Anuradha Krishnan, Svetlana V. Oard, Shangli Ou, Sarat Chand Peddi, Anuradha Revur, Yang Wen, Qian Zeng

Summer 2004: Somo S. Banerjee, Shivakumar Basavaraju, Rina Hong, Sunil K. Kanuri, Neeraja M. Krishnan, Sandeep Madduri, Bushra M. Rahaman, Harry J. Smith, Hariharan Veeriah, Xin Xu and Xiaoyang Zhao.

B.Sc. Degrees Awardees

Fall 2003: Justin Michael CoX, Jeffrey Allen Farnum, Juliana Hsieh, Jordan Scott Irwin, Daniel Scott Johnson, Sammie Joseph, Sean Robert Matens, Douglas Drew McCardle, Shovon Nazmus, Quoc Xuan Uye Nguyen, Toan Huy Phan, Sherwin Shaidae, Eric Michael Whitehead.

Spring 2004: Brian M Armitage, Michael Davis Brassette, Ashley Ann Cantrelle, Mark Allen Carter, Jr., Jason Keith Charrier, Yi J. Cheng, Gregory Bernard Fowler, Jeremy

Andrew Greenwald, Ronald Vincent Hidalgo, Walter Douglas Lafield, Daniel Hays Lewis, Michael Jason Maldonado, Brandon Joseph Oncale, Matthew T. Reynolds, Benjamin Chesley Richardson, Kyong-Jin Shim, Dylan Thomas Stark, Christopher Michael Sutherland, Ankit Tandori, Kenny Can Tran, Matthew L. Troescher, Zachary Paul Westphal, Kateryna Yakushina.

Summer 2004: Kevin Dawson, Judith Day-Sinclair, Joong-Ho Kim, Kyle Prestenback, Brian Schaefer and Brian Spence.

Recognition at the Honors Convocation

Department chair Dr. Iyengar presented top departmental honors to Lance Anthony Lohman, Ankit Tandon, Ussameh Ahmed, and Ronald Vincent Hidalgo. In addition, several students received the departmental research awards: Dylan Thomas Stark, Ankit Tandon, Hitesh Chheda, and Jason Keith Charrier. The College of Basic Sciences recognized two outstanding students with the R. Greg Hussey *College Achievement Awards* for their leadership, service, and scholarly activities. The winner for 2003-2004 was Ankit Tandon (computer science)

Summer Internship

Neelay S Shah got a Software Test Intern with Citrix Inc at Fort Lauderdale, Florida. Miss. Ranjani Narayani got an IT intern at Deloitte Touche in Boston.

Former Student at News

Dr. S. V. Nageswara Rao is one of three lead investigators to design a high-speed computer network (called *UltraNet*) capable of carrying massive amounts of data. The funding from DOE amounts 4.5 million dollars. Dr. Rao is a distinguished scientist at Oak Ridge National Laboratory.

Dr. Donald M. Chiarulli, now Professor at University of Pittsburgh recently received a major NSF grant to do research on micro-optical electrical mechanical system. (MOEMS).

CURRICULUM NEWS

Undergraduate Level

Significant changes to our curriculum have been made in the catalog for the upcoming 2004-2005 academic year. Most notably is the new requirement of two object-oriented programming courses and a one-hour course entitled,

"Computers in Society". Currently under review by the college is the introduction of two new courses entitled Special Topics in Computer Science, CSc 2700 and CSc 4700.

Graduate Level

The department has recently approved the new policies for the Doctoral General Exams in the Computer Science recommended by the committee chaired by Doris Carver, effective from Fall 2004. Regular admission to the PhD program requires a comprehensive computer science background, grade point average of at least 3.0 and GRE score of at least 1250 (verbal plus quantitative) and proficiency in English (TOEFL score of at least 550 for paper-based or 213 computer-based).

A schedule offering of the required courses in the program has been enacted for the upcoming academic calendar. The following courses will be taught each Fall Semester: CSc 4890, CSc 7103, and CSc 7300. Each Spring Semester the following courses will be offered: CSc 7080 and Csc 7101.

VISION STATEMENTS

- Build LSU-CS to become a nationally recognized department and try to achieve a ranking among the top 30 departments by 2010.
- Develop center of excellence involving interdisciplinary federally funded research with LSU-CCT over 3-5 years in areas like: Cyber Security and Information Assurance, Sensor Networking and Communications, Graphics and Visualization, Scientific Software Development in the context of Grid computing where heterogeneous resources are aggregated to provide seamless computational capabilities to the user.

Why is it achievable?

- LSU is a flagship University in Louisiana.
- LSU-CS jointly with LSU-CCT has much talent, a very good reputation and very strong in key Computer Science technologies like Grid Computing, Wireless Sensor Networks, Software Engineering, Cyber Security and etc.
- By selecting these contemporary and still maturing technology areas that also complement the skills of existing department faculty based on the funding and also achieving critical mass through new hires in these

areas will have an immediate impact on the department's competitiveness for more federal funding and ability to achieve national prominence.

MISSION STATEMENTS

The department is dedicated to achieving the following objectives:

- ❖ Sustain excellence in teaching and research
- ❖ Provide broad educational and research experiences through interdisciplinary programs
- ❖ Prepare students to enter the world of computing beyond the year 2000

To meet the first objective, the Department requires senior faculty to teach undergraduate courses, to act as mentors for junior faculty, and to supervise undergraduate students who are interested in doing research. Several LSU computer science undergraduates have presented research papers in national conferences and journals.

To meet the second objective, the faculty is encouraged to publish research papers in scholarly journals, to present their work at conferences, to encourage students to engage in similar research efforts, and to design and teach courses that present the state-of-the-art in computer science. In particular, the faculty takes an active role in professional computer science societies including the Association for Computing Machinery (ACM) and the IEEE Computer Society.

To meet the third objective, our department must be well equipped to teach the students of the 21st century. With an outstanding faculty and several research arenas; namely, the Center for Computation and Technology (CCT), the High Performance Computing Group, the Robotics Research Laboratory, the Scalable Computing Software Group, the Networking Laboratory, Sensors and Security Laboratory and the Software Engineering Laboratory.

To meet all of the objectives the department has set up a B.S. degree in Computer Science, M. S. degree in Systems Science and Ph.D. in Computer Science and several industries affiliate programs.

EVENTS

Dr. Peter Chen hosted a number of IT Eminent and Chancellor Distinguished Lectures by world-class

computer scientists including Dr. Gordon Bell from Microsoft, Dr. Raj Reddy from Carnegie Melon University, Dr. Frederick P. Brooks from North Carolina State University, Dr. David Patterson from University of California at Berkeley, Dr. Vinton G. Cerf from MCI.



*Top: Dr. Gordon Bell (standing on right) gave the IT Eminent Lecture. Dr. Peter Chen was standing on left.
Bottom: Dr. Raj Reddy (front right) gave the Chancellor Distinguished Lecture at LSU.*

Dr. B. B. Karki co-organized Mardi Gras Conference "Materials and Modeling for Information Technology," at LSU, February 19-21, 2004.

Dr. S. S. Iyengar presented a keynote talk at an International Conference on Design and Technology-Kusadasi-Izmir-Turkey June 27-July 1,2004. The title of the talk is "Distributed Sensor Networks: An Emerging technology." He also presented several talks including those at Billkent University in Turkey, Indian Institute of science, Supercomputing Research center on Distributed

sensor networks, Honeywell Research Center and Center for development for advanced computing (CDAC).

Dr. E. Seidel and G. Allen organized the LONI Forum at Pennington Conference Center, September 2-3, 2004. LONI (Louisiana Optical Network Initiative) funded by the Board of Regents of Louisiana is a statewide fiber-optic network that will connect research institutes and universities throughout Louisiana.

Dr. Durresi gave an invited talk on "Wireless networking: Interoperability and security challenges", at the Panel on Wireless Networking - IPCC 2004, Phoenix, AZ, April 16, 2004. He also gave talks at Fukuoka Institute of Technology, Japan and at Georgia Southern University.

Dr. Durresi was Program Vice Chair of the 18th International Conference on Advanced Information Networking and Applications (AINA2004), Fukuoka, Japan, March 29-31, 2004

Dr. Durresi was Publicity Co-Chair the 24th International Conference on Distributed Computing Systems, Tokyo, Japan, March 23-27, 2004

Dr. Durresi was Organizer and Moderator for the panel "Wireless networking: Interoperability and security challenges at 23rd IEEE International Performance and Communication Conference, April 15-17, 2004 - Phoenix, Arizona

Four CS students (A. Tandon, J. K. Charrier, D. T. Stark and H. Chheda) have participated in the IEEE Computer Society Fifth Annual International Design Competition, Washington, DC, 2004 (Dr. S.S. Iyengar was the mentor).

Our students participated in Summer Undergraduate Research Forum organized at LSU (July 29, 2004). Farid Harhad and Samuel Malone presented a poster "Computer-assisted indexing: XML based indexes for electronic documents" supported by NSF-REU program and their mentor was Dr. S.S. Iyengar. Thomas Fitzgerald presented a poster "Java implementation of molecular dynamics algorithm" supported by LBRN and his mentor was Dr. B.B. Karki.

RESEARCH PUBLICATIONS

J. O'Neal and D. Carver, Classifying software changes: A fuzzy approach, Proceedings of the 2004 Conference on Computer Sciences, January 2004.

S. Judson, R. France and D. Carver, A metamodelling approach to model refactoring, Proceedings of UML 2003, October 2003.

S. Chakravarthula, S.S. Iyengar, K. Chakrabarty and V. Swaminathan, An efficient energy-optimal device-scheduling algorithm for hard real-time systems, Proceedings of 6th Brazilian Workshop on Real-Time Systems, May 2004

N.S.V. Rao, Y. Bang, S. Radhakrishnan, Q. Wu, S.S. Iyengar and H. Choo, NetLets: measurement-based routing daemons for low end-to-end delays over networks, Computer Communications, Vol. 26, No. 8, 2003

S.K. Rangarajan, V.V. Phoha, K. Balagani, R. Selmic and S.S. Iyengar, Adaptive neural network clustering of web users, IEEE Computer Magazine, April 2004.

P. McDowell, B. Bourgeois and S.S. Iyengar, Formation maneuvering using passive acoustic communications, Proceedings of IEEE 2004 International Conference on Robotics and Automation, April 2004.

S. Sastry, S. S. Iyengar and N. Balakrishnan, Sensor technologies for future automation system, Journal of Sensor Processing letters, Vol. 2, 1-9, 2004.

N.S.V. Rao, Q. Wu and S.S. Iyengar, On throughput stabilization of network transport, IEEE Communication Letters, Vol. 8, No. 1, January 2004.

B. Krishnamachari and S.S. Iyengar, Distributed Bayesian algorithms for fault-tolerant event region detection in wireless sensor networks, Journal of IEEE Transactions on Computers, Vol. 53, No. 3, March 2004

R. Kannan, L. Ray, R. Kalidindi and S.S. Iyengar, Threshold energy constrained protocol for wireless sensor networks, Sensor Processing Letters, Vol. 1, 79-85, December 2003.

R. Kannan, S. Ray, S. Sarangi and S.S. Iyengar, Minimal sensor integrity: measuring vulnerability in sensor grids, Information Processing Letters, Vol. 1, 49-55, 2003.

R. Kannan, S. Sarangi and S. S. Iyengar, Sensor-centric energy-constrained reliable query routing for wireless sensor networks, Journal of Parallel and Distributed Computing, 2004.

B.B. Karki and R.M. Wentzcovitch, Vibrational and quasiharmonic thermal properties of CaO under pressure, Physical Review B, Vol. 68: No. 224304, 2003

R.M. Wentzcovitch, B.B. Karki, M. Cococcioni and S. de Gironcoli, Elasticity and wave velocities of MgSiO₃ perovskite: Insight into lower mantle, Physical Review Letters, Vol. 92: No. 018501, 2004.

R. M. Wentzcovitch, L. Stixrude, B. B. Karki and B. Kiefer, Akimotoite to perovskite transition in MgSiO₃, Geophysical Research Letters, Vol. 31: L10611, 2004.

S. Vemparala, B.B. Karki, R.K. Kalia, A. Nakano and P. Vashishta, Large-scale molecular dynamics simulations of alkanethiol self-assembled monolayers, Journal of Chemical Physics, Vol. 121, 4323, 2004.

A. Durresi, S. Kota, IP over Satellite Networks, Chapter in High Performance TCP/IP Networking, Edited by Mahbub Hassan and Raj Jain, Published by Prentice Hall, ISBN: 0130646342 October 2003, Prentice Hall

A. Durresi, V. Paruchuri, R. Kannan, L. Barolli, and S.S. Ivengar, Efficient and secure autonomous system based traceback, Journal of Interconnection Networks (JOIN), Vol. 5, No. 2, June 2004.

B. L. Anderson, A. Durresi, D. Rabb and F. Abou-Galala, Real-Time All-Optical Quality of Service Monitoring Using Correlation and a Network Protocol to Exploit It, Journal of Applied Optics, Vol. 43, Issue 5, 1121-1130, February 2004.

V. Parachuri, A. Durresi, R. Kannan, and S.S. Iyengar, Authenticated Autonomous System Trace back, 18th International Conference on Advanced Information Networking and Application (AINA 2004), March 29-31, 2004, Best Paper Award.

A. Durresi, D. Dash, B. L. Anderson, R. Kannan, S. Kota, and R. Jain, Routing of VoIP traffic in Transformational Communication Architecture, 2004 IEEE Aerospace Conference, Big Sky, Montana, March 6-15, 2004

M. Sridharan, A. Durresi, C. Liu and R. Jain, Wireless TCP Enhancements using Multi-level ECN, Proceedings of

SPIE Vol. 5245 Internet Quality of Service, ITCOMM 2003, Orlando Florida, September 7-11, 2003, pp. 180-187.

D. Dash, A. Durresi and R. Jain, Routing of VoIP traffic in multi-layered Satellite Networks, Proceedings of SPIE Vol. 5244, Performance and Control of Next-Generation Communications Networks, ITCOMM 2003, Orlando Florida, September 7-11, 2003, pp. 65-75.

A. Durresi, V. P., J. Innamuri, B. L. Anderson, R. Jain, Quality based optical routing protocol, Proceedings of SPIE Vol. 5247, Optical Transmission Systems and Equipment for WDM Networking II, ITCOMM 2003, Orlando Florida, September 7-11, 2003, pp. 410-420.

B. L. Anderson, F. Abou-Galala, A. Durresi, High-resolution optical correlator for monitoring health of an optical link, Proceedings of SPIE Vol. 5246, Active and Passive Optical Components for WDM Communications III, ITCOMM 2003, Orlando Florida, September 7-11, 2003, pp. 45-53.

S.J. Park, R. Vedantham, R. Sivakumar, and I. Akyildiz, A Scalable approach for reliable downstream data delivery in wireless sensor networks, Proceedings of ACM International Symposium on Mobile Ad hoc Networking and Computing (MOBIHOC), Japan, May 2004.

Further Information

The Computer Science Newsletter serves as a guide to activities in the department and other functions on and off campus. The Newsletter is published by the Department of Computer Science, Louisiana State University (Baton Rouge). Items to be included in the Newsletter should be submitted to Bijaya B. Karki in 283 Coates (karki@bit.csc.lsu.edu). Previous issues of the Newsletter can be found on the departmental homepage at <http://www.csc.lsu.edu/newsletter/>