



Computer Science Newsletter

DEPARTMENT OF
COMPUTER SCIENCE,
LOUISIANA STATE
UNIVERSITY,
BATON ROUGE, LA

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Editor:
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Assistant Professor

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From the Chairman

Welcome to the Department of Computer Science at Louisiana State University, Baton Rouge. The purpose of this



Dr. S.S. Iyengar,
Department chair

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 Fall Semester of 2008 academic year and the beginning of 2009. This has been an exciting time in terms of research and publications. The department has continued to make significant strides in research funding, with external funding amount exceeding one million dollars. 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 of interdisciplinary nature.

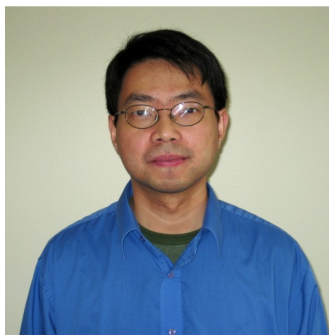
Increased faculty size will enhance the department's competitiveness and visibility in the critical research areas of high-performance computing, visualization, sensor net-



We are pleased to have an outstanding faculty member Dr. Jian Zhang who joined the department in Fall 2008. The sponsored research and in-

works and cyber-security.

Thanks for taking the time to read this Newsletter of Fall 2008/Winter 2009.



Dr. S.S. Iyengar
Chair, Department of Computer Science, LSU

Dr. Jian Zhang,
**new faculty in the
Computer Science
Department**

Computer Science Intensive

Orientation for Students (CIOS)

The LSU Department of Computer Science hosted in August 2008 a 3 day intensive orientation for incoming Computer Science undergraduate students which was organized by Dr. Thomas Sterling. The orientation helped to address some of the common questions that incoming freshmen have about the

curriculum content. Additionally the orientation will also cover basic introductions to key aspects of computer science as a discipline and a profession.



Dr. Thomas Sterling,
Computer Science
and CCT

IT Eminent Lecture by Dr. Linda Petzold

Dr. Linda Petzold gave a talk on January 23, 2009, with title: "Multiscale simulation of Biochemical Systems" as part of the IT Eminent Lecture series.

Dr. Linda Petzold is currently a Professor in the Department of Computer Science (Chair 2003-2007) and the Department of Mechanical Engineering, and Director of the Computational Science and Engineering Program at the University of California Santa Barbara. She received her Ph.D. in Computer Science in 1978 from the University of Illinois.

The presentation abstract is:

"Microscopic systems formed by living cells, the small numbers of some reactant molecules can result in dynamical behavior that is discrete and stochastic rather than continuous and deterministic. An analysis tool that respects these dynamical characteristics is the stochastic simulation algorithm (SSA). Despite recent improvements, as a procedure that simulates every reaction event, the SSA is necessarily inefficient for most realistic problems. There are two main reasons for this, both arising from the multiscale nature of the underlying prob-

lem: (1) the presence of multiple timescales (both fast and slow reactions); and (2) the need to include in the simulation both chemical species that are present in relatively small quantities and should be modeled by a discrete stochastic process, and species that are present in larger quantities and are more efficiently modeled by a deterministic differential equation. We will describe several recently developed techniques for multiscale simulation of biochemical systems, and outline some of the future challenges."



Dr. Linda Petzold,
University of California,
Santa Barbara

IT Eminent Lecture by Dr. Margaret H. Wright

Dr. Margaret H. Wright gave a talk on January 26, 2009, with title: "What can Be More Important than "Faster" and "Bigger"?", as a part of the IT Eminent Lecture series.

Margaret H. Wright is Silver Professor of Computer Science and Mathematics at the Courant Institute of Mathemat-

ical Sciences, New York University, and Chair of the Computer Science Department.

The presentation abstract is: For decades, the high-end computing community has come to expect continuing gains in the speed of computation and the size of data storage, and these expectations have consistently been fulfilled in remarkable ways. But "faster" and "bigger" are not the only things that count. We'll show how other factors, such as advances in mathematics and theoretical computer science, are just as important, leading to the obvious conclusion that an optimal strategy needs to be "faster, bigger, and smarter."

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Dr. Margaret H. Wright,
New York University

Faculty Accomplishments



Dr. Brygg Ullmer, Assistant Professor, Computer Science and CCT

Dr. Brygg Ullmer (Assistant Professor of Computer Science jointly with CCT) was honored to be included in the Baton Rouge Business Report's "Top Forty under 40" list.

Dr. Tevfik Kosar (Assistant Professor of Computer Science jointly with CCT) has been awarded with National Science Foundation's (NSF) most prestigious Career Award. The title of his award is "CAREER: Data-aware Distributed Computing for Enabling Large-scale Collaborative Science"; amount: \$400,001; duration: 5 years.



Dr. Tevfik Kosar, Assistant Professor, Computer Science and CCT

The LSU Computer Science Department Congratulates the Faculty Accomplishments and our New Graduates

Congratulations to our New Graduates

The LSU Computer Science department congratulates the graduates of the Fall 2008 semester.

M.S. Degree Awardees

Emir Mahmut Bahsi, Pamela Bhattacharya, Hongyi Chen, Lucio daniel Daza Ariza, Jian Guan, Srikanth Jandhyala, Ra-

thika Natarajan, Sirish Tum-mala, Emrah Ceyhan, Vikram Kumar Gopu, Richard D. Guidry, Jr.

B.Sc. Degrees Awardees

Carrie Lynn Butler (Honors), Philip Michael Cali, Razvan Corneliu Carbunescu (Honors), Kevin Anthony Cherry, John

Frederick Douthat, Kristyn Elizabeth Fontenot, Kyle Brian King, Louis Paul Ortego (Honors), Phillip Ponson, Jacob Andrew Saltich, Andrew Thomas Triplett, Andre Dale Valentine, David Paul West, Anshul Tandon (Summa Cum Laude), Matthew Kyle Bollich, Ryan Cahill Cain.

Alumni News



Jack Cheng

Jack Cheng, a Computer Science LSU Alumni, is one among the top Fortune 500 young individuals.

Dr. John Zachary is a Baton Rouge native and graduated from LSU with a BS and Ph.D. in Computer Science. After several successful years in academia and government research, John became the Baton Rouge Area chamber's New Research Director.



Dr. John Zachary

Funding: MRI - NSF Award



Dr. Seung Jong Park,
Assistant Professor,
Computer Science
and CCT

*“This has been
an exciting time
in terms of
research and
publications”*

Title: “MRI: CRON: Development of a Cyberinfrastructure Reconfigurable Optical Network for Large-Scale Scientific Discovery”. Duration: 2008 to 2011. PI: Seung-Jong Park (Principal Investigator). Co-PIs: Dr.Sitharama Iyengar, Dr.Thomas Steling, Dr.Rajgopal Kannan, Dr. Daniel Katz. Amount: \$495181. Funding agency: National Science Foundation.

Abstract:

In this project, we develop a

Cyber infrastructure for Reconfigurable Optical Networks (CRON) to bridge the gap between physical networks and large scale scientific research. The CRON provides integrated and automated access to diverse high speed optical networking environments. The CRON resolves the critical issues by achieving three key objectives: (i) Unlimited virtual networking resource CRON will enable researchers to explore new network technologies and rapidly assess their impact on

applications irrespective of physical limitation and allow educators to introduce the state-of-art networking environment to students who cannot access those physical networks. (ii) Reconfigurability CRON will allow researchers and educators to modify the virtual environments without interfering with others who share CRON. (iii) Complete environment CRON will provide all kinds of networking environments, including regional networks and global transoceanic optical networks.

Recent Research Funding

- “CAREER: Data-aware Distributed Computing for Enabling Large-scale Collaborative Science”; Dr.Tevfik Kosar, National Science Foundation; duration: 5 years.; amount: \$400,001.
- MRI: CRON: Development of a Cyber infrastructure Reconfigurable Optical Network for Large-Scale Scientific Discovery: Seung-Jong Park(PI), Iyengar.S.S, Kannan.R, Sterling T, McMahon(CCT), Katz D(CCT) (Co-PIs) funded by National Science Foundation from 8/15/08 to 7/31/2011 at the amount of \$495,181.
- A System Architecture Point Design Study for Exascale Computing: Sterling T (PI) funded by National Science Foundation from 9/1/2008 to 8/31/2010 at the amount of \$198,677.
- Collaborative Research: Simulating Neutron Star-Black Hole In spirals: From Binaries to Accretion and Jets: Sterling T (Co-PI) funded by National Science Foundation from 9/1/2008 to 8/31/2009 at the amount of \$300,000.
- Collaborative Research: A Study and Implementation of Semantic Constructs for Highly Scalable Leading-edge Scientific Computing: Sterling T(PI) funded by National Science Foundation from 8/1/2008 to 8/31/2009 at the amount of \$70,000.
- First-Principles Molecular Dynamics Simulations of Silicate Liquids: Structure: Karki B(PI) funded by National Science Foundation from 7/1/2008 to 6/30/2011 at the amount of \$283,726.
- SURA Coastal Ocean Observing and Prediction Program: Gabrielle Allen (PI) Seidel(co-PI), Tevfik.K (co-PI) funded by NOAA/SURA from 7/1/2008 to 12/31/2008 at the amount of \$130,000.
- Secure and Survivable Cyber-Centric Sensor Networks: Algorithms and Architecture Research: Iyengar.S.S(PI), Wu Hsiao(ECE Dept), SJ Park(co-PI) funded by Dept of Navy, Office of Naval Research (DEPSCOR program) from 4/8/2008 to 12/30/11 at the amount of \$761,368.
- DCP: A Framework for Constrained Optimization of Spectrum allocation for Cognitive Radios: Kannan.R (PI) funded by AFOSR (via AFRL) from 9/1/2008 to 8/31/09 at the amount of \$ 20,000.
- HostRx: An Expert System for Automated Malware Diagnosis: Zhang J (PI) funded by Army Research Office (subcontracting from SRI International) from 11/5/2008 to 7/14/2009 at the amount of \$39,958.

Recent Selected Publications

- Semantic Enabled Metadata Management in PetaShare X. Wang, D. Huang, I. Akturk, M. Balman, G. Allen and T. Kosar To appear in International Journal of Grid and Utility Computing (IJGUC), 2009
- D. Katz, G. Allen, R. Cortez, C. Cruz-Neira, L. Guice, S. Jha, R. Kolluru, T. Kosar, L. Leger, C. McMahan, J. Nabrzycki, E. Seidel, G. Speyrer, M. Stubblefield, B. Voss, S. Whittenburg. Louisiana: A Model for Advancing Regional e-Science through Cyberinfrastructure. Proceedings of UK e-Science All Hands Meeting, Edinburgh, UK, September 2008.
- Costas Busch, Rajgopal Kannan, Athanasios V. Vasilakos. Quality of Routing Congestion Games in Wireless Sensor Networks. Proceedings of the 4th International Wireless Internet Conference (WICON), to appear, Maui, Hawaii, November 2008. (Invited Paper.)
- H. Cao, B. Khoobehi , S. S. Iyengar , " Automated Optic Nerve Head Image Fusion of Nonhuman Primate Eyes Using Heuristic Optimization Algorithm", 5th IEEE Symposium on Computational Intelligence in Bio-informatics and Computational Biology (CIBCB 2008) , 15 - 17 September, 2008
- Shuangting Wei, Rajgopal Kannan, S.S. Iyengar and Nageswara S.Rao, "Energy Efficient Estimation of Gaussian Sources Over Inhomogenous Gaussian MAC Channels " , IEEE Globecom 2008 , 30 November- 4 December, 2008
- Hsiao-Chun Wu, Kun Yan, S.S. Iyengar, "Robustness Analysis of Source Localization Using Gaussianity Measure " , IEEE Globecom 2008, 30 November- 4 December, 2008
- N.Rao, M.Shankar, Jren-Chit Chin, David Yau , S.Srivathsan,S.S.Iyengar,Y.Yang,J.Hou, "Identification of Low -Level Point Radiation Sources Using a Sensor Network" , Proceedings of International Conference on Information Processing in Sensor Networks, April 22-24, 2008, St.Louis, Missouri.
- Manikandan Karuppasamy, Debnath Pall, Ramakumar Suryanarayanan, Nathan E Brener, Sitharama S Iyengar, Guna Seetharaman, "Functionally important segments in proteins dissected using Gene Ontology and geometric clustering of peptide fragments" , Genome Biology, 2008.
- U. Wiggins, R. Kannan, V. Chakravarthy and A. V. Vasilakos, "Data-Centric Prioritization in a Cognitive Radio Network: A Quality of Service based Design and Integration", IEEE DySPAN 08, Chicago, Oct. 2008.
- Mookherjee M, Stixrude L and Karki BB, Hydrous silicate melt at high pressure. Nature, 2008, 452: 983-986
- de Koker NP, Stixrude L and Karki BB, Thermodynamics, structure, dynamics, and freezing of Mg₂SiO₄ liquid at high pressure, Geochimica et Cosmochimica Acta, 2008, 72: 1427-1441
- Khanduja G and Karki BB, Exploiting data coherency in multiple dataset visualization, Proc. of the 10th Int'l. Conf. on Computer Graphics and Imaging (CGIM'08),
- T. Kosar and M. Balman, A New Paradigm: Data-Aware Scheduling in Grid Computing, To appear in International Journal of Grid Computing (FGCS), 2009
- J. Brees, Sukhamay Kundu, A distributed O(|E|) algorithm for optimal link-reversal, Intern. Conf. Distributed Computing and Networking ICDCN-09, Jan 3-6, 2009, pp. 243-250.
- Sukhamay Kundu, EasyMAC: a new and simple protocol for slot assignment for media access in sensor networks, ISCA 21 Intern. Conf. on Parallel and Distributed Computing and Communication Systems, New Orleans, 2008, pp. 141-146.
- J. Brees and Sukhamay Kundu, Finding shortest multipaths with O(N²) message complexity, ISCA 21 Intern. Conf. on Parallel and Distributed Computing and Communication Systems, New Orleans, 2008, pp.1-6.
- Sukhamay Kundu, Orthogonal Decomposition of Finite-State Behavior Models As a Basis for Determining Components in Software Architectures, Proc. Intern. Conf. on Software Engineering Theory and Practice (SETP-08), Orlando, Florida, July 7-10, 2008.
- Sukhamay Kundu, Teaching software modeling and design based on relevant science of software design and science of learning, Proc. Intern. Conf. on Frontiers in Education Computer Science and Computer Engineering (FECS-08), Las Vegas, July 14-17, 2008.
- Paolo Ferragina, Roberto Grossi, Ankur Gupta, Rahul Shah, Jeffrey Scott Vitter: On searching compressed string collections cache-obliviously. PODS 2008: 181-190
- Sarvjeet Singh, Chris Mayfield, Sagar Mittal, Sunil Prabhakar, Susanne E. Hambrusch, Rahul Shah: Orion 2.0: native support for uncertain data. SIGMOD Conference 2008: 1239-1242.
- Wing-Kai Hon, Rahul Shah, Peter J. Varman, Jeffrey Scott Vitter: Tight competitive ratios for parallel disk prefetching and caching. SPAA 2008: 352-361.
- Sarvjeet Singh, Chris Mayfield, Rahul Shah, Sunil Prabhakar, Susanne E. Hambrusch: Query Selectivity Estimation for Uncertain Data. SSDBM 2008: 61-78.
- Yinian Qi, Sarvjeet Singh, Rahul Shah, and Sunil Prabhakar, Indexing Probabilistic Nearest-Neighbor Threshold Queries. Joint International Workshop on Quality in Databases and Management of Uncertain Data in conjunction with VLDB 2008.
- Sunil Prabhakar, Rahul Shah, and Sarvjeet Singh: Indexing uncertain data. In Managing and Mining Uncertain Data, Charu Aggarwal eds (Springer), to appear.
- Y. Xia, S. Prabhakar, S. Lei, R. Cheng, R. Shah: Indexing Constantly Changing Data with Mean-Variance Tree, In International Journal of High Performance Computing and Networking (IJHPCN), to appear.

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