Dali Wang

Ecosystem Simulation Science
Environmental Sciences Division
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Research Interests

Climate and Environmental Modeling, Environmental Data Systems, Multiscale System Simulations, High Performance Computing, Geography Information Systems

Education

Ph.D. in Scientific Computation: Environmental Engineering
MS in Computer Science
MSC in Computational Science and Engineering
Rensselaer Polytechnic Institute, Troy, NY

MS in Environmental Chemistry
BS in Environmental Planning and Management
Jilin University, Changchun, Jilin, P.R.China

Professional Experience

Research Staff, Environmental Sciences Division & Climate Change Sciences Institute, **Oak Ridge National Laboratory**, Oak Ridge, TN, 37831 2009 – present

IT Infrastructure Manager, **Southeastern Universities Research Association,** Washington DC, 20005 2007-2009

Research Assistant Professor, Computer Science/The Institute for Environmental Modeling **University of Tennessee,** Knoxville, TN 2003-2007

Computational Scientist, Computer Science/Environmental Engineering/Scientific Computing Research Center, **Rensselaer Polytechnic Institute**, Troy, NY 1998-2002

Software Engineer, **Pitney Bowes**, Shelton, CT 06484 2001-2002

Assistant Professor (Certified EIA Engineer)**,** Environmental Sciences, **Nankai University**, China 1996-1998

Computing Expertise (Over 10 year experience on a variety of HPC platforms)

- **Programming**: C/C++, JAVA, FORTRAN, SQL, MPI, Pthread, OpenMP, Perl, Python
- **OS**: LINUX, AIX, Solaris, IRIX, BSD, Windows Server 2003/2008, WinXP/2000/7, DOS, WINCE

- **High Performance Computers**: **SMP**: SGI Origin 2000 (12@RPI), SUN E25K (128@TACC), SGI Altix (256@ORNL). **CLUSTER**: IBM SP2 (32(4)@RPI), IA-64 Linux Cluster (32(2)@UI), SUN Fire Cluster (32(2)@UT), IBM Power4 (27(32)@ORNL), IBM BlueGene (3072(2)@SDSC), IBM p690(384(2)@SDSC), IBM p655(272(2)@SDSC), HP Alphaserver (750(4)@PSC), Cell Broadband Engine (20(9)@TerraSoft), DELL/nVIDIA (129/96@NCSA), CRAY XT5 (Kraken@NICS) , CRAY XT4/5(Jaguar@NCCS), SunBlade (Ranger@TACC)
- **Applications and Software:** MATLAB, SAS, Oracle, TotalView, TAU, PAPI, GLOBUS, ArcGIS, Fluent, MapInfo, J2EE (Spring, Hibernate, etc), ASP.NET, Data Explorer, Together

Research Projects

- ORNL DAAC Hardware Refresh Project (NASA, Hardware Lead)
- ORNL Climate Change Program: Climate Change Forcing (DOE, Data assimilation/HPC)
- Enhancing Climate Impact Integrated Assessment for Water Through Climate Informatics (ORNL, Task Lead: Data System Integration)
- Performance Analysis and Tuning for PTCLM Climate Modeling (Co-PI, NICS)
- TeraGrid XD: Enabling Transformational Science and Engineering Through Integrated Collaborative Visualization and Data Analysis for the National User Community, (Lead Institute: TACC, Subaward, co-PI, NSF)
- SURA Regional Cloud Computing Initiative (SURA Tech Lead, SURA-NCSU-IBM)
- Promoting Computational Sciences within SURA Region (PI, TACC)
- Lattice Boltzmann Methods for Multiphase and Multicomponent Flows (co-PI, TeraGrid)
- SURA-Microsoft HPC Infrastructure for Academic Researches (PI, Microsoft)
- A Pilot Distributed SURA-Microsoft HPC Computational Platform (PI, Microsoft)
- Genetic Programming on Cell BE Processors (PI, Cell-HPC Consortium)
- Interactive Cyberinfrastructure for Nature Resource Management (PI, TeraGrid)
- Ecosystem Modeling on High Performance Computing Platforms (PI, Oak Ridge National Laboratory (ORNL)/University of Tennessee (UT) Computational Science Initiatives)
- Grid Computing for Ecological Modeling and Spatial Control (HPC Lead, NSF)
- Parallel and Grid Computing for Ecological Multimodeling (HPC Lead, NSF)
- Environmental Transport Modeling on High Performance Computational Platforms (RPI-EEE/CS/SCOREC) (PHD thesis)
- Investigation of Turbulent Fluctuations in Liquid Encapsulted Czochralski (LEC) Crystal Growth Systems (DOD/AFOSR) (MS thesis)
- Spontaneous Intellilink Wireless Network (Pitney Bowes)
- Computer Aided Design for Activated Sludge Model to Treat High Concentration Organic Wastewaters using Patented Technology (co-PI, MST, China)
- An Optimization Model for Environmental Monitoring Networks (co-PI, Chinese NSF)

Publications (Journal papers)

1. **Dali Wang**, Eric. A. Carr, Louis. J. Gross, Michael W. Berry, Toward Ecosystem Modeling on Computing Grids, IEEE Computing in Science and Engineering, p44-52, Sep/Oct 2005
2. Michael M. Fuller**, Dali Wang**, Louis. J. Gross, Michael W. Berry, Current Problems and Future Directions in Computational Science for Natural Resource Management, IEEE Computing in Science and Engineering, p40-48, July, 2007
3. **Dali Wang**, Eric. A. Carr, Michael W. Berry, Louis. J. Gross, A Grid Service for Natural Resource Managers, IEEE Internet Computing, pp35-41, Jan/Feb 2005,
4. Alphons Immanuel, Michael W. Berry, Louis. J. Gross, Mark Palmer, **Dali Wang**, A parallel Implementation of ALFISH: Compartmentalization Effects on Fish Dynamics in the Florida Everglades, Simulation Practice and Theory, Vol. 13, No. 1, pp55-76, 2005.

5. **Dali Wang**, Eric. A. Carr, Michael W. Berry, Louis. J. Gross, A Parallel Fish Model for Ecosystem Modeling, Simulation: Transactions of The Society of Simulation and Modeling International, pp451-465, July 2006
6. **Dali Wang**, Michael W. Berry, Eric. A. Carr, Louis J. Gross. On Parallelization of a Spatially-Explicit Structured Ecological Model, International Journal on High Performance Computer Applications, pp571-581, 2006
7. J. Russell Manson, Steve G. Wallis, **Dali Wang**, Conservative, Semi-Lagrangian Fate and Transport Model for Fluvial Systems: Part 2 Numerical Testing and Practical Applications, Water Research Vol.34, No. 15, pp 3778-3785, 2000
8. Yongsheng Chen, Qijun Sun, **Dali Wang**, Biosorption of heavy metallic ions by Saccharomyces cerevisiae and Spirulina subsala, Shanghai Environmental Sciences, vol. 17, No. 7, pp14-16 and pp23. 1999
9. **Dali Wang**, Liansheng Yu, Research on Accounting of Environmental Investment in Highway Project, The Applications of Environmental Economic in China, Chinese Environmental Science Press, pp 298-305. 1997
10. Liansheng Yu, Chunsheng Fang, **Dali Wang**, Wenjin Zhao, Ju Wang, Guihua Zhai, Jing Zhao: the Application of Fuzzy Sets Approaches to Regional Noise Monitoring. Acta Scientiarum Naturalium Universitatis Jilinensis 4, 71-74. 1996

Publications (peer-reviewed conference papers)

1. **Dali Wang**, Michael Harmon, Michael W. Berry, Louis. J. Gross, On Design of a Coupling Component for Parallel Multimodeling, IEEE International Parallel & Distributed Processing Symposium (2010, in press)
2. J. Russell Manson, **Dali Wang**, Steve Wallis, Richard Page, Machael Laielli, A massively parallel semi-Lagrangian algorithm for solving the transport equation, International Conference on Computational Science,2010 (in press)
3. **Dali Wang**, Michael W. Berry, Jane Comiskey, Louis. J. Gross, A Parallel Simulation Framework for Integrated Regional Ecosystem Modeling, The 2007 International Conference on Parallel and Distributed, Processing Techniques and Applications PDPTA'07: June 25-28, 2007
4. **Dali Wang**, Michael W. Berry, Nick Buchanan, Louis. J. Gross, A GIS-enabled Distributed Simulation Framework for High Performance Ecosystem Modeling, ESRI International User Conference, June 1-5, 2006
5. **Dali Wang**, Michael W. Berry, Louis. J. Gross, A Parallel Structured Ecological Model for High End Shared Memory Computers, Proceedings of the First International Workshop on OpenMP June 1-5, 2005, Eugene, OR. Lecture Notes on Computer Science, Volume 4315/2008
6. **Dali Wang**, Louis. J. Gross, Eric. A. Carr, Michael W. Berry, The Design and Implementation of Parallel Fish Model for South Florida, Proceedings of the 37th Hawaii International Conference on System Sciences, Jan. 4-7, 2004, Big Island, HI
7. **Dali Wang**, J. Russell Manson, Steve G. Wallis, Toward Parallel Environmental Transport Modeling on Computing Grids, the second International Workshop on Grid and Cooperative Computing, Dec. 26-28, 2003, Shanghai, China
8. **Dali Wang,** Joseph E. Flaherty, Kenneth E. Jansen, Mark Shepard, Investigation of Turbulent Melt Flow in a Crystal Growth Systems, Proceedings of 2004 International Conference on Parallel Processing Workshops (ICPPW'04), pp.214-221, August 15-18, 2004, Montreal, Canada
9. J. Russell Manson, Steve G. Wallis, **Dali Wang**, Application of Two-Dimensional Conservative Semi-Lagrangian Transport Algorithm on Parallel Computers, Proceedings of

XIV International Conference on Computational Methods in Water Resources, June, 2002, Delft, Netherlands.

10. Russell Manson, Steve G. Wallis, **Dali Wang**, Semi-Lagrangian Transport Algorithm for Episodic Atmospheric Pollution, Proceedings of Air Pollution 2000, Cambridge University, United Kingdom
11. **Dali Wang**, Yongsheng Chen, Research on the Cleaner Production Design for Chinese Electroplating Enterprise, Proceedings of the 5th Annual Conference of Applied Chemistry Committee, Chinese Chemistry Society, Shanghai, China, April 22-24, 1997
12. Tan Zhu, **Dali Wang**, Hong Liao, Research on Sustainable Development of Tianjin Economic-Technique Development Area, Proceedings of the 3rd National Conference on Urban Ecology, Hong-Long, December 9-11,1997.
13. **Dali Wang**, Research on Strategy for Urban Air Pollution Control, Proceedings of International Symposium on Building and Urban Engineering, Tianjin, China, September 24-26,1997.
14. Tan Zhu, **Dali Wang**, Hong Liao, Basic Requirements of Teaching in the Specialization of Environmental Planning and Management at Universities in People's Republic of China, paper and poster presented at Professional Development of Environmental Managers: A vision of the 21st Century (United Nations Environment Programme (UNEP)), Thailand, December 1996.
15. Liansheng Yu, Chunsheng Fang, Ju Wang, **Dali Wang**, Maximum Element Theorem and its Applications on Environmental Monitoring, Proceedings of Second International Conference on Application of Fuzzy Systems and Soft Computing, Siegen, German, July 25-27, 1996

Membership: IEEE, Computer Society Technical Committee, International Society for Environmental Information Sciences, America Geophysics Union; Association of American Geographer, (committee member of AAG Cyberinfrastructure Specialty Group), Editorial Board Member of The 1st Encyclopedia of Grid Computing Technologies and Applications, Idea Group Inc.
Journal Review: IEEE Computer, Parallel Processing Letter, Journal of Supercomputing, Nonlinear Analysis: Real World Applications, Journal of Environmental Management, etc.
Proposal review: NOAA, NSF, NIH, DOE etc.

Conference Organization

- SURAgrid ALL-HANDS meeting (Washington, DC, 35 Universities/Institutes, Spring/Fall, 2007- 2009
- Joint SURAgrid Session with The Coalition for Academic Scientific Computation (CASC) Spring Meeting (Washington DC, 2008-2009)
- Program Committee member for 3rd International Conference on Virtual Computing Initiative (RTP, NC, 2009)

Selected Presentations, Invited and Panel Discussions

1. Some Comments on Environmental Modeling and SURAgrid Data Infrastructure Initiatives (Interview Presentation), Oak Ridge National Laboratory, 2009
2. Some Opinions on Sustainable Development of Campus HPC Center (invited), CSI, City University of New York, 2009
3. High Performance Environmental Modeling (invited), Georgia Institute of Technology, 2009
4. Microsoft HPC Platform for eSciences, Renaissance Computing Institute, 2009
5. SURAgrid – Regional Cyberinfrastructure for Science and Engineering, North Caronia Agricultural & Technological State University, 2009

6. SURAgrid – Bridging the Gaps between National and Campus Cyberinfrasture, Elisabeth City State University, 2008
7. SURAgrid – A Platform for Infrastructure Federation, TeraGrid, 2008
8. Panel Discussion: HPC University and Campus Champion Program, TeraGrid, 2008
9. SURA-Microsoft Testbed for eScience, IEEE International Conference on e-Science, 2008
10. High Performance Computing for Coastal Modeling (invited), University of Massachusetts, Dartmouth, 2008
11. SURA Coastal Ocean Observation Program (IT Infrastructure), Ocean Science 2008
12. Microsoft Theater Presentation: SURA-MS HPC Platform for Academic Research, Supercomputing 2008
13. BoF: HPC Outreach and Training Opportunity (co-HOST with TACC), Supercomputing 2008
14. IBM Theater Presentation: IBM-empowered SURAgrid for Scientific Simulation, Supercomputing, 2007
15. Infrastructure and Community: Experience from SURAgrid, Louisiana State University, 2007
16. A Parallel Simulation Framework for Integrated Regional Ecosystem Modeling, International Conference on Parallel and Distributed, Processing Techniques and Applications, 2007
17. Integrated Ecosystem Modeling on High Performance Grids (invited), Pennsylvania State University, 2007
18. Some Considerations on Distributed Systems for National Environmental Data Network(invited), Computer Sciences Corporation, 2007
19. Some Current Challenges in Computational Ecology (invited), ORNL-CCS Workshop on Computational Science at Scale, 2005
20. A Parallel Structured Ecological Model for High End Shared Memory Computers, 1st International Workshop on OpenMP, 2005
21. New Computational Suites for South Florida Regional Ecosystem Restorations, 1st National Conference on Ecosystem Restoration, 2004
22. Grid Computing for Regional Ecosystem Restoration, Supercomputing, 2004
23. The Design and Implementation of Parallel Fish Model for South Florida, 37th Hawaii International Conference on System Sciences**,** 2004
24. Investigation of Turbulent Melt Flow in a Crystal Growth Systems, 33rd International Conference on Parallel Processing Workshops, 2004
25. Evaluations of Parallel South Florida Fish Ecological Model on Difference Parallel Architectures, Supercomputing, 2003

Advisees: 2 Bachelor students (Environmental Science/Nankai), 4 Master students (Computer Science/UTK), 1 Ph.D. student (Computer Science and Software Engineering/Auburn)

Teaching Experience
Grid Computing for Natural Resource Management (UT Graduate level, jointly listed as CS and EEB course), Lecturer, Enrollment (15)
Applied Hydrology (RPI Graduate level), 1/3 of lecture, Computer labs, Enrollment (42)
Environmental Management (NEPA professional training), Lecturer, Enrollment (local 74, long-distance 18)
Environmental Planning (Nankai University, Graduate level), Lecturer, Enrollment (61))
Information Systems (Nankai University, Undergraduate level), Lecturer, Enrollment (83)