

## Richard T. Mills

Computational Scientist

Oak Ridge National Laboratory

Computer Science and Mathematics and Environmental Sciences Divisions

(865) 241-3198

Email: [rmills@ornl.gov](mailto:rmills@ornl.gov)

## Education and Training

- 2004 Computer Science, with concentration in Computational Science, College of William and Mary, PhD
- 2001 Computer Science, with concentration in Computational Science, College of William and Mary, MS
- 1999 College Scholars Program, emphasis in Geology and Geophysics, The University of Tennessee, Knoxville, BA (Summa Cum Laude)

## Research and Professional Experience

- 2008-present Adjunct Assistant Professor of Computer Science, The University of Tennessee, Knoxville
- 2004-2001 DOE Computational Science Graduate Fellow, College of William & Mary

## Publications

1. F. M. Hoffman, R. T. Mills, J. Kumar, S. S. Vulli, and W. W. Hargrove. 2010. Geospatiotemporal data mining in an early warning system for forest threats in the United States. *Proceedings of the 2010 IEEE International Geoscience and Remote Sensing Symposium (IGARSS 2010), July 25, 2010, Honolulu, Hawaii, U.S.A.* Invited paper.
2. R. T. Mills, V. Sripathi, G. Mahinthakumar, G. E. Hammond, P. C. Lichtner, and B. F. Smith. 2010. Engineering PFLOTRAN for scalable performance on Cray XT and IBM BlueGene architectures. *Proceedings of SciDAC 2010, July 11-15, 2010, Chattanooga, Tennessee, U.S.A.* Invited paper.
3. C. Lu, P. C. Lichtner, G. E. Hammond, and R. T. Mills. 2010. Evaluating variable switching and flash methods in modeling carbon sequestration in deep geologic formations using PFLOTRAN. *Proceedings of SciDAC 2010, July 11-15, 2010, Chattanooga, Tennessee, U.S.A.* Invited paper.
4. R. T. Mills, G. E. Hammond, P. C. Lichtner, V. Sripathi, G. Mahinthakumar, and B. F. Smith. 2009. Modeling subsurface reactive flows using leadership-class computing. *Journal of Physics: Conference Series 180 (Proceedings of SciDAC 2009)*, p. 012062  
DOI: 10.1088/1742-6596/180/1/012062. *Invited paper.*
5. G. E. Hammond, P. C. Lichtner, R. T. Mills, and C. Lu. 2008. Towards petascale computing in geosciences: *Application to the Hanford 300 Area.* *Journal of Physics: Conference Series 125 (Proceedings of SciDAC 2008)*, 012051  
DOI 10.1088/1742-6596/125/1/012051. *Invited paper.*
6. F. M. Hoffman, W. W. Hargrove, R. T. Mills, S. Mahajan, D. J. Erickson, and R. J. Oglesby. 2008. Multivariate spatio-temporal clustering (MSTC) as a data mining tool for environmental applications. *Proceedings of the iEMSs Fourth Biennial Meeting: International Congress on Environmental Modelling and Software (iEMSs 2008)*, ISBN 978-84-7653-074-0, International Environmental Modelling and Software Society, Barcelona, Catalonia, Spain.
7. D. J. Erickson III, R. T. Mills, J. Gregg, T. J. Blasing, F. M. Hoffman, R. J. Andres, M. Devries, Z. Zhu, and S. R. Kawa. 2008. An estimate of monthly global emissions of anthropogenic CO<sub>2</sub>: Impact on the seasonal cycle of atmospheric CO<sub>2</sub>. *Journal of Geophysical Research - Biogeosciences* 113, G01023.
8. R. T. Mills, C. Lu, P. C. Lichtner, and G. E. Hammond. 2007. Simulating subsurface flow and transport on ultrascale computers using PFLOTRAN. *Journal of Physics: Conference Series 78 (Proceedings of SciDAC 2007)*. DOI 10.1088/1742-6596/78/1/012051. *Invited paper.*

9. R. T. Mills, C. Yue, A. Stathopoulos, and D. S. Nikolopoulos. 2007. Runtime and programming support for memory adaptation in scientific applications via local disk and remote memory. *Journal of Grid Computing* 5: 2: 213-234. DOI 10.1007/s10723-007-9075-7.
10. R. T. Mills, E. F. D'Azevedo, and M. R. Fahey. 2005. Progress towards optimizing the PETSc numerical toolkit on the Cray X1. *Proceedings of the Cray User Group 2005 Technical Meeting, Albuquerque, NM, May 16-19, 2005*.
11. E. F. D'Azevedo, M. R. Fahey, and R. T. Mills. 2005. Vectorized sparse matrix multiply for compressed row storage format. *Lecture Notes in Computer Science* 3514: 99-106.
12. J. R. McCombs, R. T. Mills, and A. Stathopoulos 2003. Dynamic load balancing of an iterative eigensolver on networks of heterogeneous clusters. *Proceedings of the 17th International Parallel and Distributed Processing Symposium (IPDPS 2003)*.
13. R. T. Mills, A. Stathopoulos, and E. Smirni. 2001. Algorithmic modifications to a Jacobi-Davidson parallel eigensolver to dynamically balance external CPU and memory load. *Proceedings of the 15th International Conference on Supercomputing, pp. 454-463. Sorrento, Naples, Italy, June 2001. ACM Press*.
14. H. H. Mills and R. T. Mills. 2001. Evolution of undercut slopes on abandoned incised meanders in the Eastern Highland Rim of Tennessee, U.S.A. *Geomorphology* 38: 317-336. DOI 10.1016/S0169-555X(00)00104-5.

#### **Synergistic Activities:**

1. Contributor to multiple open-source projects, including PETSc and PFLOTRAN (a principal author)
2. Frequent reviewer for DOE INCITE, DOE SBIR, DOE EPSCoR, DOE Early Career, ORNL LDRD and
3. ORNL Seed Money proposals
4. Reviewer for IJHPCA and JACT; Program committee for PDSEC-08
5. ORNL Computer Science and Mathematics Division seminar series committee (2008)
6. Member of National Center for Computational Sciences (NCCS) User Council (2008-2009)

#### **Graduate Advisor**

*Graduate advisor:* Dr. Peter Lichtner, Earth and Environmental Sciences Division, Los Alamos National Laboratory, Fellowship Practicum

*Chancellor's Scholar,* studying Geology and Physics at the University of Tennessee, Knoxville