Amanda Randles

http://amandarandles.com
arandles@jimmy.harvard.edu
(617) 858-1520

Education

Harvard University, Cambridge, MA
Harvard Catalyst Certificate in Applied Biostatistics, 2015

Harvard University, Cambridge, MA
Ph.D. in Applied Physics, 2013
Modeling Cardiovascular Hemodynamics Using the Lattice Boltzmann Method on Massively Parallel Supercomputers. Advisors: Efthimios Kaxiras and Hanspeter Pfister
Secondary Field in Computational Science
S.M. in Computer Science, 2010

Duke University, Durham, NC
B.A. in Physics and Computer Science, 2005

Areas of Research

• Modeling Physical/Biological Phenonema and Systems • High Performance Computing

Awards and Fellowships

Best Paper, IEEE International Conference on Computational Science (ICCS) 2015
NIH Early Independence Award, 2014
Computing in Cardiology Young Investigator Award, Honorable Mention, 2014
Best Poster, Lawrence Livermore National Laboratory Computation Poster Symposium, 2014
Lawrence Fellowship, Lawrence Livermore National Laboratory, 2013
U.S. Delegate for Heidelberg Laureate Forum in Heidelberg, Germany, 2013
ACM/IEEE-CS George Michael Memorial High Performance Computing Fellowship, Honorable Mention 2009, Recipient 2010, 2012
Google Anita Borg Memorial Scholarship Recipient, 2012
U.S. Delegate for Nobel Laureates and Students Meeting Dedicated to Physics in Lindau, Germany, 2012
NSF Travel Award, PASI: Scientific Computing in the Americas: The Challenge of Massive Parallelism, 2011
DOE Computational Science Graduate Fellowship, 2010
ACM Gordon Bell Prize Finalist, 2010
National Science Foundation Graduate Research Fellowship, 2009
Grace Hopper Scholarship, 2008
IBM Early Tenure Innovator, 2008
Duke University Addy Fellowship, 2005
Duke University Startup Challenge Finalist, 2005

Research Funding

2014-2019. **PI.** *Toward coupled multiphysics models of hemodynamics on leadership systems,* $2,500,000. NIH Early Independence Award.
2014-2016. **PI.** *Validating Large Fluid Dynamics Simulations of Complex Geometries with 3D Printing,* $600,000. DOE Lab Directed Research and Development (LDRD) Lab-wide Research Grant.

Time Allocation Grants

2014-2015. **PI,** *Studying the Impact of Physiological Conditions on Cardiac Risk Factors*, Lawrence Livermore National Laboratory, Tier-Two Grand Challenge Award.

2013-2014. **PI,** *Toward Coupled Multiphysics Models of the Mechanics Driving Cancer Metastasis*, Lawrence Livermore National Laboratory, Tier-Two Grand Challenge Award.

2013-2014. **Co-PI,** *Spatial Modeling of the Brain Tumor Perivascular Niche*, 90,000 core-hours. Co-PI Franziska Michor, Dana-Farber Cancer Institute. NSF XSEDE Allocation.

2012-2013. **PI**. *HARVEY: Multiscale Hemodynamics*, 150,000 core-hours. Argonne National Laboratory, ALCF Discretionary Award.

2010-2013. **PI**. *MUPHY: Massively Parallel Simulation of Hemodynamics*, 2,750,000 core-hours. Argonne National Laboratory, ALCF Discretionary Allocation.

Research Experience

Biomedical Engineering Department, Duke University,
Durham, NC. Assistant Professor, July 2015 – present.
Investigating the use of computational models in treatment planning for cardiovascular disease.
Developing a multiscale model of cancer metastasis with deformable suspended bodies captured using the Immersed Boundary Method coupled to the lattice Boltzmann Method.
Enabling the study of large-scale cell dynamics in patient-specific vessel geometries using massively parallel models.

Center for Applied Scientific Computing, Lawrence Livermore National Laboratory,
Livermore, CA. Lawrence Fellow, September 2013 – July 2015
Enabling full circulatory simulation through the optimization of HARVEY, a large-scale lattice Boltzmann parallel code.

Department of Biostatistics and Computational Biology, Dana-Farber Cancer Institute, and Harvard School of Public Health, Boston, MA. Visiting Scientist, September 2013 – July 2015
Designing a cellular-based computational model to study optimal dosage scheduling of radiation and chemotherapy treatment of glioblastoma.

Department of Biostatistics and Computational Biology, Dana-Farber Cancer Institute, Boston, MA. Research Fellow, Advisor: Franziska Michor, June 2013 – August 2013
Implemented a stochastic computational model to study intra-tumor genetic diversity and growth patterns during chemotherapeutic treatment.

School of Engineering and Applied Sciences, Harvard University, Cambridge, MA.
Ph.D. Candidate, Advisors: Hanspeter Pfister and Efthimios Kaxiras, 2008 – 2013
Developed a multi-scale model of cardiovascular hemodynamics coupled to the red blood cell motion using the Lattice Boltzmann method. Collaborated with physicians to enable patient-specific models and enabled efficient scaling of the application to up to 294,912 processors.
Designed and implemented a hierarchical model of evolutionary game dynamics that allows for the study of extended memory steps and led the effort to write an MPI/OpenMP code for large-scale supercomputers that exhibited 99% weak scaling efficiency to 294,912 processors.

Institute for Scientific Computing Research, Lawrence Livermore National Laboratory,
Livermore, CA. Research Assistant, June 2011 – September 2011
Established a method to calculate thermal and electronic conductivity in dense hydrogen plasmas.

Implemented method in a classical molecular dynamics code and conducted sensitivity studies for different statistical potentials.

Wireless Communications Group, MIT Lincoln Laboratory, Lexington, MA.
Graduate Research Intern, May 2009 – April 2011
Created a parallel simulation of wireless communications using the ALOHA protocol with capture and packet erasure coding to reduce the loss and delay of multi-slot messages and extended this work to encapsulate the simulation of large RFID tag arrays.

Fitzpatrick Center, Duke University, Durham, NC. Undergraduate Research Assistant, Advisors: Bob Guenther and David Brady, 2004 – 2005
Completed a research project in hyperspectral imaging. Created a spatio-spectral imaging system to recognize the optical signal of nanoparticles coated with fluorescent biosensors in the presence of predetermined antigens. Also managed a team of undergraduate physics students to complete the prototype of a laser entryway control.

Biophysics Laboratory, Emory University, Atlanta, GA. Undergraduate Researcher, Advisor: Keith Berland, May 2004 – August 2004
Programmed controller and image acquisition software for an inverted home-built two-photon microscope for fluorescence correlation spectroscopy.

Genetics and Bioinformatics Laboratory, Duke University, Durham, NC.
Undergraduate Researcher, Advisor: Joseph Nevins, 2002 – 2004
Created programs to analyze and optimize potential weight matrices to predict transcription factor binding sites. Worked in a lab setting conducting PCR, western blots, and similar experiments focused on the role of the Rb/E2F pathway in the control of cell proliferation.

The Optics Institute, University of Rochester, Rochester, NY. Undergraduate Researcher, Advisor: Andrew Berger, May 2003 – August 2003
Constructed programs to acquire the data from a two-laser system and model photon propagation. Designed an experiment to use near-infrared spectroscopy (NIRS) to non-invasively study hemodynamics in live-tissue.

Nanomechanics and Atomic Force Microscopy Laboratory, Duke University,
Durham, NC. Undergraduate Researcher, Advisor: Stefan Zauscher, 2002 – 2003
Designed the enhancements to a single molecule AFM-based force spectrometer in Auto-CAD.

Industry Experience

IBM, Rochester, MN. Software Engineer, 2005 – 2009
Enabled hardware performance monitor (HPM) library support for Blue Gene/P High Throughput Computing mode. Ported, validated, and optimized life sciences applications for IBM's massively parallel supercomputer. Designed an automated test harness for running, analyzing, and recording performance tests and data. Optimized MPI collective performance. Worked with development teams to improve the overall system performance of the Blue Gene (L, P, and Q) supercomputer.

Publications

Journal Publications

1. **A. Randles**, E.W. Draeger, and P.E. Bailey, "Massively Parallel Simulations of Hemodynamics in the Human Vasculature." Journal of Computational Science 9 (2015): 70-75.
2. **A. Randles** and L. Zeger. "Capture Diversity to Speed RFID Tag Reading." (submitted).
3. H.D. Whitley, Ch.R. Scullard, L.X. Benedict, J.I. Castor, **A. Randles**, J.N. Glosli, D.F. Richards, M.P. Desjarlais, and F.R. Graziani. "Lenard-Balescu Calculations and Classical Molecular Dynamics Simulations of Electrical and Thermal Conductivities of Hydrogen Plasmas." Contributions to Plasma Physics, 2014.
4. Y. You, H. Fu, S. Song, **A. Randles**, D. Kerbyson, A. Marquez, G. Yang, and A. Hoisie, "Scaling Support Vector Machines on modern HPC platforms." Journal of Parallel and Distributed Computing. (accepted).
5. **A. Randles** and E. Kaxiras. "Parallel in Time Approximation of the Lattice Boltzmann Method for Laminar Flows." Journal of Computational Physics, Volume 270, 1 August 2014, Pages 577-586.
6. V. Almendro, Y.K. Chen, **A. Randles**, M. Gonen, S. Itzkovitz, A. Marusyk, E. Ametller, X. Gonzalez-Farre, M. Munoz, H. Russnes, A. Helland, I. Rye, A.L. Borressen-Dale, R. Maruyam, A. van Oudenaarden, M. Dowsett, R. Jones, J. Reis-Fiho, P. Gascon, F. Michor, and K. Polyak. "Inference of Tumor Evolution during Chemotherapy by Computational Modeling and In Situ Analysis of Genetic and Phenotypic Cellular Diversity." Cell Reports, 6, 1-14.
7. D.E. Keyes, L. Curfman McInnes, C.l Woodward, W. Gropp, E. Myra, M. Pernice, J. Bell, J. Brown, A. Clo, J. Connors, E. Constantinescu, D. Estep, K. Evans, C. Farhat, A. Hakim, G. Hammond, G. Hansen, J. Hill, T. Isaac, X. Jiao, K. Jordan, D. Kaushik, E. Kaxiras, A. Koniges, K. Lee, A. Lott, Q. Lu, J. Magerlein, R. Maxwell, M. McCourt, M. Mehl, R. Pawlowski, **A. Peters Randles**, D. Reynolds, B. Rivière, U. Rüde, T. Scheibe, J. Shadid, B. Sheehan, M. Shephard, A. Siegel, B. Smith, X. Tang, C. Wilson, and B. Wohlmuth. "Multiphysics Simulations: Challenges and Opportunities." *International Journal of High Performance Computing Applications*, 27(1): 4–83.
8. **A. Peters Randles**, M. Baecher, H. Pfister, and E. Kaxiras, "A Lattice Boltzmann Simulation of Hemodynamics in a Patient-Specific Aortic Coarctation Model", Proceedings of Statistical Atlases and Computational Models of the Heart (STACOM) Computational Fluid Dynamics Challenge, LNCS vol. 7746, Springer 2012.
9. M. Borkin, K. Gajos, **A. Peters**, D. Mitsouras, S. Melchionna, F. Rybicki, C. Feldman, and H. Pfister. "Evaluation of artery visualizations for heart disease diagnosis." *IEEE Transactions on Visualization and Computer Graphics (Proceedings of Information Visualization 2011)*, 17(12), December 2011.
10. B. Robson, J. Li, R. Dettinger, **A. Peters**, and S. K. Boyer, "Drug discovery using very large numbers of patents: general strategy with extensive use of match and edit operations.", *Journal of Computer-Aided Molecular Design*, vol. 25, no. 5, pp. 427-441, 2011.
11. Y.P. Pang, T. Mullins, B. Swartz, J. McAllister, B. Smith, C.J. Archer, R. Musselman, **A. Peters**, B. Wallenfelt, and K. Pinnow. "EUDOC on the IBM Blue Gene/L system: Accelerating the transfer of drug discoveries from laboratory to patient", *IBM Journal of Research and Development*, vol. 52, no. 1, Feb. 2008.
12. K. Jiang, O. Thorsen, **A. Peters**, B. Smith, and C. P. Sosa, "An Efficient Parallel Implementation of the Hidden Markov Methods for Genomic Sequence-Search on a Massively Parallel System." *IEEE Transactions in Parallel Distributed Systems*, Vol 19, no. 1, 2008.

Refereed Conference Publications

1. **A. Randles**, E.W. Draeger, T. Oppelstrup, W. Kraus, and J.A. Gunnels, "Massively Parallel Models of the Human Circulatory System." (submitted).
2. **A. Randles**, M. Driscoll, E. Draeger, and F. Michor, "A Feasibility Study using Image-based Parallel Modeling for Treatment Planning." Proceedings of the 41st Annual International Conference of Computing in Cardiology, CinC14, 2014. **Young Investigator Award Honorable Mention.**
3. **A. Randles** and E. Kaxiras, "A Spatio-Temporal Coupling Method to Reduce the Time-to-Solution of Cardiovascular Simulations." Proceedings of the 28th IEEE International Parallel and Distributed Processing Symposium, IPDPS14, 2014. Acceptance Rate: 21%.
4. Y. You, S.L. Song, H. Fu, A. Marquez, G. Yang, K. Barker, K.W. Cameron, M. Mehri Dehnavi, and **A. Peters Randles**, "MIC-SVM: Designing A Highly Efficient Support Vector Machine For Advanced Modern Multi-Core and Many-Core Architectures." Proceedings of the 28th IEEE International Parallel and Distributed Processing Symposium, IPDPS14, 2014. Acceptance Rate: 21%.
5. **A. Peters Randles**, V. Kale, J.R. Hammond, W. Gropp, and E. Kaxiras, "Performance analysis of the lattice Boltzmann model beyond Navier-Stokes", Proceedings of the 27th IEEE International Parallel and Distributed Processing Symposium, IPDPS13, 2013. Acceptance Rate: 21%.
6. **A. Peters Randles**, D. Rand, C. Lee, G. Morrisett, M. Nowak, and H. Pfister, "Massively Parallel Model of Extended Memory Use In Evolutionary Game Dynamics", Proceedings of the 27th IEEE International Parallel and Distributed Processing Symposium, IPDPS13, 2013. Acceptance Rate: 21%.
7. **A. Peters**, L. Zeger, "Efficient Resource Allocation for Broadcasting Multi-Slot Messages With Random Access with Capture", Proceedings of IEEE Military Communications Conference (MILCOM), October 2011.
8. **A. Peters**, S. Melchionna, E. Kaxiras, J. Latt, J. Sircar, M. Bernaschi, M. Bisson, and S. Succi, "Multiscale simulation of cardiovascular flows on the IBM Bluegene/P: full heart-circulation system at red-blood cell resolution." Proceedings of the 2010 ACM/IEEE International Conference for High Performance Computing, Networking, Storage, and Analysis (SC), New Orleans, LA. Acceptance Rate: 20%. **Gordon Bell Finalist**.
9. **A. Peters**, S. Melchionna, S. Succi, and E. Kaxiras, "Leveraging Theory From Cosmodynamics for Multi-Scale Cardiovascular Simulation", in Fifth European Conference on Computational Fluid Dynamics ECCOMAS CFD, 2010.
10. S. Melchionna, J. Latt, E. Kaxiras, **A. Peters**, M. Bernaschi, and S. Succi, "Endothelial Shear Stress From Large-Scale Blood Flow Simulations", in Fifth European Conference on Computational Fluid Dynamics, 2010.
11. **A. Peters**, A. King, T. Budnik, P. J. McCarthy, and P. Michaud, "Asynchronous task dispatch for high throughput computing for the eServer IBM Blue Gene", Proceedings of the IEEE International Parallel and Distributed Processing Symposium, IPDPS 08, 2008. Acceptance Rate: 26%.
12. O. Thorsen, K. Jiang, **A. Peters**, B. Smith, H. Lin, W. Feng, C. P. Sosa, "Parallel Genomic Sequence-Search on a Massively Parallel System", ACM International Conference on Computing Frontiers, May 2007.

Posters

1. V. Kale, **A. Randles**, and W. Gropp. "Locality-Optimized Mixed Static/Dynamic Scheduling for Load Balancing on SMPs", EuroMPI/ASIA, Kyoto, Japan, September 9-12, 2014. Poster Paper.
2. **A. Randles**, M. Driscoll, E. Draeger, and F. Michor. "Massively Parallel Model of Cardiovascular Hemodynamics", Lawrence Livermore National Laboratory Computation Poster Symposium, April 2014. **Best Poster**.

3. **A. Randles**, E. Draeger, E. Kaxiras, and F. Michor. "Massively Parallel Model of Cardiovascular Hemodynamics", Computational Aspects of Biological Information 2013 (CABI 2013), Cambridge, MA, December 16, 2013.
4. **A. Peters Randles**, "Massively Parallel Model of Evolutionary Game Dynamics", ACM/IEEE International Conference for High Performance Computing, Networking, Storage, and Analysis (SC), Salt Lake City, Utah, November 10-16, 2012. ACM Student Research Competition.
5. M. Borkin, **A. Peters**, D. Mitsouras, H. Pfister, and E. Kaxiras, "Simulated Blood Flow through a Patient's Coronary Arteries", Gallery of Fluid Motion, Proceedings of the 63rd annual meeting of the APS Division of Fluid Dynamics, to be held November 21-23, 2010 in Long Beach, CA, USA
6. **A. Peters**, G. Lakatos, M. Fyta, and E Kaxiras. "Massively Parallel Simulations of Large DNA Molecules Using the IBM Blue Gene Supercomputer." ACM/IEEE International Conference for High Performance Computing, Networking, Storage, and Analysis (SC), Portland, Oregon, November 14-20, 2009.
7. M.Borkin, **A. Peters**, and S. Mandre. "A Numerical Model for Time-Dependent Gravity-Driven Flow in a Collapsible Tube", Poster, Proceedings of the 62nd Annual Meeting of the APS Division of Fluid Dynamics, Minneapolis MN, November 22-24, 2009.
8. **A. Peters**. "Model of Evolutionary Game Dynamics Accelerated by GPU Hardware." Poster. GPU Technology Conference, San Jose, CA, September 30-October 2, 2009.
9. **A. Peters**, R. Dettinger, and M. Megerian. "Acceleration of the Drug Discovery Process through Massively Parallel Computation and Data Integration." Poster. Grace Hopper Celebration. Keystone, CO, October 1-4, 2008.
10. **A. Peters**, M. Lundberg, P. T. Lang, and C. P. Sosa. "High Throughput Computing Validation for Drug Discovery using the DOCK Program on a Massively Parallel System." 1st Annual MSCBB, Northwestern University, Evanston, IL, September 2007.
11. O. Thorsen, K. Jiang, **A. Peters**, M. Lundberg, and C. Sosa. "Next Generation of Selected Bioinformatics Applications Using Massively Parallel Supercomputers." 1st Annual MSCBB, Northwestern University, Evanston, IL, September 2007.
12. **A. Peters**. "Drug Discovery on Blue Gene/L: The Integration of Massively Parallel Computation and Textual Annotation for Virtual Screening." IBM Early Career Conference, Armonk, NY, September 2007.
13. K. Pinnow, R. Musselman, **A. Peters**, and B. Swartz. "Blue Gene Application Performance Optimization". ScicomP12-SP-XXL, 2006.
14. **A.E. Peters**, M. E. Gehm, B. D. Guenther, and D. J. Brady, "Multiplex Design for High-Performance Microspectrometers," in Adaptive Optics: Analysis and Methods/Computational Optical Sensing and Imaging/Information Photonics/Signal Recovery and Synthesis Topical Meetings (COSI), 2005.

Technical Reports and Unrefereed Proceedings

1. **A. Peters**, D. Rand, Martin Nowak et al. (2010) Juelich Blue Gene/P Extreme Scaling Workshop 2009: PEBS: Parallel Evolutionary Biology Suite, 14-16.
2. **A. Peters**, D. Rand, J. Sircar, G. Morrisett, M. Nowak, and H. Pfister, "Leveraging GPUs for Evolutionary Game Theory." GPU Technology Conference, San Jose, CA, September 20-23, 2010. September 20-23, 2010.
3. **A. Peters**, S. Melchionna, E. Kaxiras et al. (2010) Juelich Blue Gene/P Extreme Scaling Workshop 2010: Full Scale Simulation of Coronary Arteries in Presence of Red Blood Cells, 23-26.
4. **A. Peters**, M. Lundberg, P. T. Lang, and C. P. Sosa. "High Throughput Computing Validation for Drug Discovery Using the DOCK Program on a Massively Parallel System", Redpaper 4410, Poughkeepsie, NY, April, 16 2008.

Contributed Presentations

Investigation of Spatio-Temporal Coupling Applied to Computational Models of Virtual Surgery. A. Randles, E. Draeger, and F. Michor. 2014 Biomedical Engineering Society (BMES) Annual Meeting, San Antonio, Texas, October 22-25, 2014.

Understanding disease through massively parallel simulation A. Randles. Inaugural Lawrence Fellowship Symposium, Livermore, CA, August 14, 2014.

A Parallel-in-time Method Applied to Lattice Boltzmann Simulations of Cardiovascular Flow. A. Randles, and E. Kaxiras. 23rd International Conference on Discrete Simulation of Fluid Dynamics (DSFD 2014), Paris, France, July 28 - August 1, 2014.

Scaling the Lattice Boltzmann Method on Massively Parallel Systems. A. Randles, E. Draeger, and F. Michor. SIAM Conference on Parallel Processing for Scientific Computing (SIAM PP14), Portland, Oregon, February 18-February 24, 2014.

Simulations of Cardiovascular Blood Flow Accounting for Time Dependent Deformational Forces. A. Peters Randles, S. Melchionna, J. Latt, S. Succi, and E. Kaxiras. Proceedings of the APS March Meeting 2012, Boston, MA, February 27-March 2, 2012.

Accounting for Time Dependent Deformational Forces in Large-scale Hemodynamics Simulations. A. Peters Randles, E. Kaxiras. SIAM Parallel Processing for Scientific Computing, Savannah, Georgia, February 15-17, 2012.

Cardiovascular Hemodynamics Simulation including Time Dependent Deformational Forces. ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis, Seattle, Washington, November 2011.

Multiscale Simulation of Blood Flow in the Coronary Arteries. A. Peters, S. Melchionna, E. Kaxiras, J. Latt, J. Sircar, M. Bernaschi, M. Bisson, and S. Succi. SIAM CS&E Conference, Reno, Nevada, February 28-March 4, 2011.

Leveraging theory from cosmodynamics to study the the effect of the pulsating heart on coronary arteries in a large-scale Lattice Boltzmann simulation. A. Peters, S. Melchionna, J. Latt, S. Succi, and E. Kaxiras, Proceedings of the 63rd annual meeting of the APS Division of Fluid Dynamics, November 21-23, 2010 in Long Beach, CA, USA.

High Throughput Computing on Blue Gene. A. Peters. Paradyn/Condor Week April 30-May 3, 2007.

Invited Talks

June 2015, Quantitative Biology: From Molecules to Man, New York, NY

March 2015, University of Texas at Austin, Department of Aerospace and Engineering Mechanics, Austin, TX

March 2015, Northeastern University, Department of Bioengineering, Boston, MA

February 2015, Workshop on Spatiotemporal Dynamics of Single Cell Trafficking, University of Southern California, Los Angeles, CA

February 2015, TTI Vanguard, Biotech and Beyond, San Diego, CA

February 2015, University of Southern California, Department of Aerospace and Mechanical Engineering, Los Angeles, CA

January 2015, University of California San Diego, Department of Computer Science and

Engineering, San Diego, CA

January 2015, Duke University, Department of Biomedical Engineering, Durham, NC

January 2015, University of California San Diego, Department of Mechanical and Aerospace Engineering, San Diego, CA

November 2014, Massachusetts Institute of Technology, Cambridge, MA

October 2014, Harvard Medical School, BAASiC Workshop, Boston, MA

September 2014, Emory University, Predictive Pathophysiology Workshop, Atlanta, CA

August 2014, The Scripps Research Institute, The Department of Cellular Biology, San Diego, CA

August 2014, MIT, Harvard-MIT Biomedical Engineering Center, Cambridge, MA

July 2014, Georgia Tech, Cardiovascular Mechanics Laboratory, Atlanta, GA

March 2013, Georgia Institute of Technology, School of Computational Science, Atlanta, GA

February 2013, GE Global Research Center, Niskayuna, NY

February 2013, Lawrence Livermore National Laboratory, Livermore, CA

January 2013, Lawrence Berkeley National Laboratory, Computational Research Division, Berkeley, CA

December 2012, MIT, Harvard-MIT Biomedical Engineering Center, Cambridge, MA

December 2012, Intel Corporation, Santa Clara, CA

December 2012, Dana-Farber Cancer Institute, Boston, MA

May 2011, Brown University, Division of Applied Mathematics, Providence, RI

Teaching

Interdisciplinary Seminar in Computational Science & Engineering (AC 298r)
Harvard University, Cambridge, MA
Teaching Fellow with Prof. Efthimios Kaxiras and Prof. Daniel Weistock, 2013

Computational Fluid Dynamics (AM 274)
Harvard University, Cambridge, MA
Head Teaching Fellow with Dr. David Knezevic, 2012

Kinetic Methods for Fluids: Theory and Application (AM 272r)
Harvard University, Cambridge, MA
Head Teaching Fellow with Prof. Hudong Chen, 2011

Capstone Design in Applied Science (Physics 193)
Duke University, Durham, NC
Teaching Assistant with Prof. Bob Guenther, 2005

Mentoring

High School Students

1. Michael Remondi, May 2012 – August 2012

Undergraduate Students

1. William Juan, June 2012 – October 2012
2. Christopher Lee, May 2010 – September 2010
3. Charles Gomez, January 2005 – May 2005

Master's Students

1. Elizabeth Cheever, December 2014 – present

IBM Student Interns

1. Marcus Lundberg, 2007
2. Oystein Thorsten, 2006-2007
3. Tom Milledge, 2006
4. Dr. Gaolin Milledge, 2006
5. Karl Jiang, 2006

Professional Service

Paper Committee

Performance Area, IEEE Supercomputing Conference (SC), 2015
State of the Practice, IEEE Supercomputing Conference (SC), 2014
Cluster Algorithms, Applications, and Performance, IEEE Cluster, 2014, 2015

Poster Committee

IEEE Supercomputing Conference (SC), 2010-2014

Referee

Journal of Computational Physics, 2014
SIAM Journal on Scientific Computing (SISC), 2014
Blue Waters Graduate Fellowship, 2014
International HPC Summer School, 2014
Concurrency and Computation: Practice and Experience, 2013-2014
Journal of Computational Physics, 2013-2014
NSF Directorate for Computer & Information Science & Engineering, 2012
Medical Image Computing and Computer Assisted Intervention Society Conference, 2012
International Journal of High Performance Computing Applications, 2012

Organizing Committee

Predictive Vascular Modeling Workshop, Livermore, CA, 2015
Lawrence Fellowship Symposium, Livermore, CA, 2014

Member

American Physical Society (APS)
Association for Computing Machinery (ACM)
Biomedical Engineering Society (BMES)
Institute of Electrical and Electronics Engineers (IEEE)

Related Professional Experience

Duke Alumni Interviewer, 2006-2014
Volunteer for Harvard Applied Physics Big Sister/Big Brother Program, 2010-2013
Founder of High Performance Computing Journal Club at Harvard, 2009-2013
Board Member of Harvard Graduate Women in Science and Engineering (HGWISE), 2010-2013
Organizer of Harvard Science Soiree, 2009-2012
Volunteer for IBM Exploring Interests in Technology and Engineering (EXCITE) Camp, 2007-2008
Founder of IBM New Inventor Connection, 2006-2008
Volunter for Rochester Public Schools Engineering Week, 2006-2008
Member of IBM Invention Review Board, 2007-2008
Member of IBM Technical Vitality Council, 2007-2008

Patents

Granted

1. Scheduling jobs of a multi-node computer system based on environmental impact , E. Barsness, D.L. Darrington, **A.E. Peters**, and J.M. Santosuosso. U.S. Patent No. 9,015,726, April 21, 2015.
2. Determining a path for network traffic between nodes in a parallel computer, C.J. Archer, **A. Peters**, B.E. Smith, and B.A. Swartz. U.S. Patent No. 9,009,350, April 14, 2015.
3. Inserting data into an in-memory distributed nodal database, E. Barsness, D.L. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,892,558, November 18, 2014.
4. Interactive tool for visualizing performance data in real-time to enable adaptive performance optimization and feedback , T.M. Gooding, D.L. Hermsmeier, R.G. Musselman, **A. Peters**, K.W. Minnow, and B.A. Swartz. U.S. Patent No. 8,874,722, October 28, 2014.
5. Enhanced garbage collection in a multi-node environment, E. Barsness, D.L. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,868,623, October 21, 2014.
6. Optimized peer-to-peer file transfers on a multi-node computer system, E. Barsness, D.L. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,856,286, October 7, 2014.
7. Optimized peer-to-peer file transfers on a multi-node computer system, E. Barsness, D.L. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,856,275, October 7, 2014.
8. Enhanced garbage collection in a multi-node environment, E. Barsness, D.L. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,868,623, October 21, 2014.
9. Management of persistent memory in a multi-node computer system, E. Barsness, D.L. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,812,818, August 19, 2014.
10. Query optimization in a parallel computer system with multiple networks, E. Barsness, D.L. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,812,645, August 19, 2014.
11. Balancing a data processing load among a plurality of compute nodes in a parallel computer, C.J. Archer, **A. Randles**, and B.E. Smith. U.S. Patent No. 8,799,917 , August 5, 2014.
12. Performing an all-to-all data exchange on a plurality of data buffers by performing swap operations, C.J. Archer, **A. Peters**, and B.E. Smith. U.S. Patent No. 8,775,698, July 22, 2014.
13. Query execution and optimization with autonomic error recovery from network failures in a parallel computer system with multiple networks, E. Barsness, D.L. Darrington, **A. Randles**, and J.M. Santosuosso. U.S. Patent No. 8,774,057, July 8, 2014.
14. Performing an all-to-all data exchange on a plurality of data buffers by performing swap operations, C.J. Archer, **A.E. Peters**, and B.E. Smith. U.S. Patent No. 8,788,660, July 8, 2014.
15. Query optimization in a parallel computer system with multiple networks, E. Barsness, D.L. Darrington, **A. Randles**, and J.M. Santosuosso. U.S. Patent No. 8,688,819, April 1, 2014.
16. Optimizing power consumption and performance in a hybrid computer environment, E. Barsness, D.L. Darrington, **A. Randles**, and J.M. Santosuosso. U.S. Patent No. 8,677,161, March 18, 2014.
17. Environment modification in a hybrid node computing environment, E. Barsness, D.L. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,671,418, March 11, 2014.
18. Program invocation from a query interface to parallel computing system, R.D. Dettinger, M.G. Megerian, and **A. Peters**. U.S. Patent No. 8,650,205, February 11, 2014.
19. Executing a distributed java application on a plurality of compute nodes in accordance with a just-in-time compilation history, E. Barsness, D.L. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,595,742, November 26, 2013.
20. Parsing an application to find serial and parallel data segments to minimize mitigation overhead between serial and parallel compute nodes, E. Barsness, D.L. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,595,736, November 26, 2013.

21. Environment based node selection for work scheduling in a parallel computing system, E. Barsness, D.L. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,589,931, November 19, 2013.
22. Utilizing virtual private networks to provide object level security on a multi-node computer system, E. Barsness, D.L. Darrington, **A. Randles**, and J.M. Santosuosso. U.S. Patent No. 8,572,723, October 19, 2013.
23. Dataspace protection utilizing virtual private networks on a multi-node computer system, C.J. Archer, **A.E. Peters**, G.R. Ricard, A. Sidelnik, and B.E. Smith. U.S. Patent No. 8,544,065, September 24, 2013.
24. Global detection of resource leaks in a multi-node computer system, E. Barsness, D.L. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,537,662, September 17, 2013.
25. Optimizing power consumption and performance in a hybrid computer environment, E. Barsness, D.L. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,539,256, September 17, 2013.
26. Profiling an application for power consumption during execution on a compute node, C.J. Archer, M.A. Blocksome, **A.E. Peters**, J.R. Ratterman, and B.E. Smith. U.S. Patent No. 8,539,270, September 17, 2013.
27. Reducing power consumption during execution of an application on a plurality of compute nodes, C.J. Archer, M.A. Blocksome, **A.E. Peters**, J.R. Ratterman, and B.E. Smith. U.S. Patent No. 8,533,504, September 10, 2013.
28. Executing an application on a parallel computer, E. Barsness, M.B. Brutman, D.L. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,516,494, August 20, 2013.
29. Program development tool configured to compile source code according to energy consumption requirements, E. Barsness, D.L. Darrington, P.J. McCarthy, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,522,193, August 27, 2013.
30. Management of persistent memory in a multi-node computer system, E. Barsness, D.L. Darrington, P.J. McCarthy, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,458,433, June 4, 2013.
31. Thread selection according to predefined power characteristics during context switching on compute nodes, C.J. Archer, M.A. Blocksome, **A.E. Peters**, J.D. Ratterman, and B.E. Smith. U.S. Patent No. 8,458,722, June 4, 2013.
32. Interactive tool for visualizing performance data in real-time to enable adaptive performance optimization and feedback, T.M. Gooding, D. Hermsmeier, R.G. Musselman, **A. Peters**, K.W. Pinnow, and B.A. Swartz. U.S. Patent No. 8,443,287, May 14, 2013.
33. Routing performance analysis and optimization within a massively parallel computer, C.J. Archer, **A. Peters**, K.W. Pinnow, and B.A. Swartz. U.S. Patent No. 8,423,987, April 16, 2013.
34. Utilizing virtual private networks to provide object level security on a multi-node computer system, E. Barsness, D. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,424,076, April 16, 2013.
35. Optimizing just-in-time compiling for a java application executing on a compute node, E. Barsness, D. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,397,225, March 12, 2013.
36. Balancing a data processing load among a plurality of compute nodes in a parallel computer, C.J. Archer, **A.E. Peters**, and B.E. Smith. U.S. Patent No. 8,387,064, February 26, 2013.
37. Program invocation from a query interface to parallel computing system, R.D. Dettinger, M.G. Megerian, and **A.E. Peters**. U.S. Patent No. 8,380,730, February 19, 2013.
38. Job scheduling and distribution on a partitioned compute tree based on job priority and network utilization, E. Barsness, D. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,381,220, February 19, 2013.

39. Budget-based power consumption for application execution on a plurality of compute nodes, C.J. Archer, M.A. Blocksome, **A.E. Peters**, J.D. Ratterman, and B.E. Smith. U.S. Patent No. 8,370,661, February 5, 2013.
40. Mechanism for process migration on a massively parallel computer, C.J. Archer, D. Darrington, P.J. McCarthy, **A. Peters**, and A. Sidelnik. U.S. Patent No. 8,370,844, February 5, 2013.
41. Migrating program objects in a multi-node computer system, E. Barsness, D. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,364,908, January 29, 2013.
42. Proactive analytic data set reduction via parameter condition injection, R. Dettinger, F.A. Kulack, and **A. Peters**. U.S. Patent No. 8,326,848, December 4, 2012.
43. Presenting energy consumption information in an integrated development environment tool, E. Barsness, D. Darrington, **A. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,312,441, November 13, 2012.
44. Budget-based power consumption for application execution on a plurality of compute nodes, C.J. Archer, M.A. Blocksome, **A.E. Peters**, J.D. Ratterman, and B.E. Smith. U.S. Patent No. 8,296,590, October 23, 2012.
45. Scheduling applications for execution on a plurality of compute nodes of a parallel computer to manage temperature of the nodes during execution, C.J. Archer, M.A. Blocksome, **A.E. Peters**, J.D. Ratterman, and B.E. Smith. U.S. Patent No. 8,291,427, October 16, 2012.
46. Executing a distributed software application on a plurality of compute nodes according to a compilation history, E.L. Barsness, D.L. Darrington, **A.E. Peters**, and J.M. Santosuosso. U.S. Patent No. 8,281,311, October 2, 2012.
47. Performing an all-to-all data exchange on a plurality of data buffers by performing swap operations, C.J. Archer, **A.E. Peters**, and B.E. Smith. U.S. Patent No. 8,281,053, October 2, 2012.
48. Profiling an application for power consumption during execution on a plurality of compute nodes, C.J. Archer, M.A. Blocksome, **A.E. Peters**, J.D. Ratterman, and B.E. Smith. U.S. Patent No. 8,250,389, August 21, 2012.
49. Database query optimizer that takes network choice into consideration, E. Barsness, D. Darrington, **A. Peters**, and J. Santosuosso. U.S. Patent No. 8,229,955, July 24, 2012.
50. Sharing compiler optimizations in a multi-node system, E. Barsness, D. Darrington, **A. Peters**, and J. Santosuosso. U.S. Patent No. 8,214,814, July 3, 2012.
51. Selectively generating program objects on remote node of a multi-node computer system, E. Barsness, D. Darrington, **A. Peters**, and J. Santosuosso. U.S. Patent No. 8,209,299, June 26, 2012.
52. Global detection of resource leaks in a multi-node computer system, E. Barsness, D. Darrington, **A. Peters**, and J. Santosuosso. U.S. Patent No. 8,203,937, June 19, 2012.
53. Query interface configured to invoke an analysis routine on a parallel computing system as part of database query processing, R. Dettinger, M. Megerian, and **A. Peters**. U.S. Patent No. 8,200,654, June 12, 2012.
54. Timestamp synchronization for queries to database portions in nodes that have independent clocks in a parallel computer system,E. Barsness, D. Darrington, **A. Peters**, and J. Santosuosso. U.S. Patent No. 8,200,846, June 12, 2012.
55. Reducing power consumption during execution of an application on a plurality of compute nodes, C. Archer, M. Blocksome, **A. Peters**, J. Ratterman, B. Smith. U.S. Patent No. 8,195,967, June 5, 2012.
56. Partial indexes for multi-node database, E. Barsness, D. Darrington, **A. Peters**, and J. Santosuosso. U.S. Patent No. 8,195,642, June 5, 2012.

57. Resource sharing techniques in a parallel processing computing system utilizing locks by replicating or shadowing execution contexts, E. Barsness, D. Darrington, **A. Peters**, and J. Santosuosso. U.S. Patent No. 8,195,896, June 5, 2012.
58. Parsing an application to find serial and parallel data segments to minimize migration overhead between serial and parallel compute nodes, E. Barsness, D. Darrington, **A. Peters**, and J. Santosuosso. U.S. Patent No. 8,185,901, May 22, 2012.
59. Query execution and optimization utilizing a combining network in a parallel computer system, E. Barsness, D. Darrington, **A. Peters**, and J. Santosuosso. U.S. Patent No. 8,171,047, May 1, 2012.
60. Configuring a parallel computer based on an interleave rate of an application containing serial and parallel segments, E. Barsness, D. Darrington, **A. Peters**, and J. Santosuosso. U.S. Patent No. 8,161,483, April 17, 2012.
61. Reducing power consumption while synchronizing a plurality of compute nodes during execution of a parallel application, C. Archer, M. Blocksome, **A. Peters**, J. Ratterman, and B. Smith. U.S. Patent No. 8,161,307, April 17, 2012.
62. Power adjustment based on completion times in a parallel computing system, E. Barsness, D. Darrington, **A. Peters**, and J. Santosuosso. U.S. Patent No. 8,132,031, March 6, 2012.
63. Node selection for executing a Java application among a plurality of nodes, E. Barsness, D. Darrington, **A. Peters**, and J. Santosuosso. U.S. Patent No. 8,127,273, February 28, 2012.
64. Sharing compiler optimizations in a multi-node system, E. Barsness, D. Darrington, **A. Peters**, and J. Santosuosso. U.S. Patent No. 8,122,441, February 21, 2012.
65. Process migration based on service availability in a multi-node environment , E. Barsness, D. Darrington, **A. Peters**, and J. Santosuosso. U.S. Patent No. 8,112,526, February 7, 2012.
66. Managing database resources used for optimizing query execution on a parallel computer system, E. Barsness, D. Darrington, **A. Peters**, and J. Santosuosso. U.S. Patent No. 8,095,512, January 10, 2012.
67. Index maintenance in a multi-node database, E. L. Barsness, D. L. Darrington, **A. Peters**, and J. M. Santosuosso, U.S. Patent 8,090,710, January 3, 2012.
68. IDatabase retrieval with a non-unique key on a parallel computer system, C. Archer, **A. Peters**, G. Ricard, A. Sidelnik, and B. Smith, U.S. Patent 8,090,704, January 3, 2012.
69. Distribution of join operations on a multi-node computer system, E. L. Barsness, **A. Peters**, and J. M. Santosuosso. U.S. Patent 8,055,651, November 8, 2011.
70. Distribution of join operations on a multi-node computer system, E. L. Barsness, **A. Peters**, and J. M. Santosuosso. United States Patent: 8,055,651, Novemer 8, 2011.
71. Tracking network contention, C. J. Archer, **A. Peters**, B. E. Smith, and B. A. Swartz. U.S. Patent No. 8,055,879, November 8, 2011.
72. Managing database resources used for optimizing query execution on a parallel computer system , C. J. Archer, M. A. Blocksome, **A.E. Peters**, J. D. Ratterman, and B. E. Smith. U.S. Patent No. 8,041,969, October, 18, 2011.
73. Query governor with network monitoring in a parallel computer system, E. L. Barsness, D. L. Darrington, **A. Peters**, and J. M. Santosuosso. U.S. Patent 8,037,184, October 11, 2011.
74. Method and apparatus for routing data in an inter-nodal communications lattice of a massively parallel computer system by dynamic global mapping of contended links, C. J. Archer, R. G. Musselman, **A. Peters**, K. W. Pinnow, B. A. Swartz, and B. P. Wallenfelt. U.S. Patent 8031614, October 4, 2011.
75. Nodal data normalization, E. L. Barsness, **A. Peters**, and J. M. Santosuosso. U.S. Patent 8,027,972, September 27, 2011.

76. Commitment control for less than an entire record in an in-memory database in a parallel computer system, E. L. Barsness, **A. Peters**, and J. M. Santosuosso. U.S. Patent 8,027,996, September 27, 2011.
77. Re-executing launcher program upon termination of launched programs in MIMD mode booted SIMD partitions , T. A. Inglett, P. J. McCarthy, **A. Peters**, T. A. Budnik, M. B. Mundy, and G. G. Stewart. U.S. Patent 7,979,674, July 12, 2011.
78. Database journaling in a multi-node environment, E. L. Barsness, D. L. Darrington, **A. Peters**, and J. M. Santosuosso. U.S. Patent 7,979,399, July 12, 2011.
79. Database journaling in a multi-node environment, E. L. Barsness, D. L. Darrington, **A. Peters**, and J. M. Santosuosso, Database journaling in a multi-node environment. U.S. Patent 7,979,400, July 12, 2011.
80. Network virtualization in a multi-node system with multiple networks, E. L. Barsness, D. L. Darrington, **A. Peters**, and J. M. Santosuosso. U.S. Patent 7958184, June 7, 2011.
81. Analysis and selection of optimal function implementations in massively parallel computer, C. J. Archer, **A. Peters**, and J. D. Ratterman, Analysis and selection of optimal function implementations in massively parallel computer. U.S. Patent 7954095. May 31, 2011.
82. Reducing occurrences of two-phase commits in a multi-node computing system, E. L. Barsness, D. L. Darrington, **A. Peters**, and J. M. Santosuosso. U.S. Patent 7,921,220, April 5, 2011.
83. Performing process migration with allreduce operations, C. J. Archer, **A. Peters**, and B. P. Wallenfelt. U.S. Patent 7,853,639, December 14, 2010.
84. Real time data replication for query execution in a massively parallel computer, E. L. Barsness, D. L. Darrington, **A. Peters**, and J. M. Santosuosso. U.S. Patent 7,844,620, November 30, 2010.
85. Methods and apparatus for restoring a node state, E. L. Barsness, D. L. Darrington, **A.E. Peters**, and J. M. Santosuosso. U.S. Patent 7,844,853, November 30, 2010.
86. Method and apparatus for routing data in an inter-nodal communications lattice of a massively parallel computer system by semi-randomly varying routing policies for different packets, C. J. Archer, R. G. Musselman, **A. Peters**, K. W. Pinnow, B. A. Swartz, and B. P. Wallenfelt. U.S. Patent 7,839,786. November 23, 2010.
87. Method and apparatus for routing data in an inter-nodal communications lattice of a massively parallel computer system by routing through transporter nodes, C. J. Archer, R. G. Musselman, **A. Peters**, K. W. Pinnow, B. A. Swartz, and B. P. Wallenfelt. U.S. Patent 7,835,284, November 16, 2010.
88. Database retrieval with a unique key search on a parallel computer system, C. J. Archer, **A. Peters**, G. R. Ricard, A. Sidelnik, and B. E. Smith.U.S. Patent 7,783,627, August 24, 2010.
89. Executing multiple instructions multiple date (MIMD) programs on a single instruction multiple data ('SIMD') machine, T. A. Inglet, A. J. King, P. J. McCarthy, **A. Peters**, and J. C. Sexton. U.S. Patent 7,831,803, November 09, 2010.
90. Executing Multiple Instructions Multiple Data ('MIMD') programs on a Single Instruction Multiple Data ('SIMD') machine, T. Budnik, A.J. King, P.J. McCarthy, M. Mundy, **A. Peters**, J.C. Sexton, and G. Stewart. U.S. Patent 7,831,802, November 9, 2010.
91. Moving processing operations from one MIMD booted SIMD partition to another to enlarge a SIMD partition, T. A. Inglett, P. J. McCarthy, and **A. Peters**. U.S. Patent 7,814,295, October 12, 2010.
92. Fault recovery on a parallel computer system with a torus network, D. L. Darrington, P. J. McCarthy, **A. Peters**, and A. Sidelnik. U.S. Patent 7,765,385, July 27, 2010.

93. Parallel-prefix broadcast for a parallel-prefix operation on a parallel computer , C. J. Archer, **A. Peters**, G. R. Ricard, A. Sidelnik, and B. E. Smith. U.S. Patent No. 7,752,421, July 6, 2010.
94. Method and apparatus for routing data in an inter-nodal communications lattice of a massively parallel computer system by employing bandwidth shells at areas of overutilization, C. J. Archer, R. G. Musselman, **A. Peters**, K. W. Pinnow, B. A. Swartz, and B. P. Wallenfelt. U.S. Patent 7706275, April 27, 2010.
95. Method and apparatus for routing data in an inter-nodal communications lattice of a massively parallel computer system by dynamically adjusting local routing strategies, C. J. Archer, R. G. Musselman, **A. Peters**, K. W. Pinnow, B. A. Swartz, and B. P. Wallenfelt. U.S. Patent 7,680,048, March 16, 2010.
96. Low-impact performance sampling within a massively parallel computer, E. L. Barsness, D. L. Darrington, **A.E. Peters**, and J. M. Santosuosso. U.S. Patent 7,647,484, January 12, 2010.
97. Routing data packets with hint bit for each six orthogonal directions in three dimensional torus computer system set to avoid nodes in problem list, D. L. Darrington, P. J. McCarthy, A. Peters, A. Sidelnik, B. E. Smith, and B. A. Swartz. U.S. Patent 7,644,254, January 5, 2010.
98. Fault recovery on a massively parallel computer system to handle node failures without ending an executing job, D. L. Darrington, P. J. McCarthy, **A. Peters**, and A. Sidelnik. U.S. Patent 7,631,169, December 8, 2009.
99. Fast backup of compute nodes in failing midplane by copying to nodes in backup midplane via link chips operating in pass through and normal modes in massively parallel computing system, D. L. Darrington, P. J. McCarthy, **A. Peters**, and A. Sidelnik, U.S. Patent 7,512,836, March 31, 2009.
100. Warning systems, devices and methods for radiation emitting devices, D. B. Jones, R. G. Swagart, **A.E. Peters**, R. D. Guenther, and B. E. Edwards. U.S. Patent 7,411,516, August 12, 2008.

Pending and International

133 patent applications filed with the U. S. Patent Office primarily in the field of parallel computing. 6 issued patents from the Chinese Patent Office. 1 issued patent from the Japanese Patent Office. 4 issued patents from the European Patent Office. 4 issued patents from the Korean Patent Office. 11 WIPO Application Publications.