

BOBBY PHILIP

CURRICULUM VITAE

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EDUCATION

Ph.D., Department of Applied Mathematics, University of Colorado at Boulder 2001
Thesis: Asynchronous Fast Adaptive Composite Grid Methods for Elliptic Problems on Curvilinear Grids
Advisor: Professor Stephen F. McCormick

M.Sc., Department of Mathematics, Indian Institute of Technology, Delhi 1996
Thesis: Some Problems in the Parallelization of Finite Element Methods

EXPERTISE

Multilevel and multigrid solution methods
Adaptive mesh refinement(AMR) techniques
Nonlinear and linear solvers
Preconditioning methods
Object oriented design of scientific computing packages
High performance computing
Compiler optimizations

RESEARCH EXPERIENCE

Staff Member: Dec, 2002 - present
Computer and Computational Sciences Division, Los Alamos National Laboratory

Postdoctoral Researcher: June, 2001 - Dec, 2002
Computation Division, Lawrence Livermore National Laboratory (LLNL)

Research Associate Trainee: Sept, 2000 - June 2001
Computation Division, LLNL

Research Assistant: Nov, 1998 - Sept, 2000
Computation Division, LLNL (Contractor) and Front Range Scientific Computations, Inc.

Graduate Research Assistant: May, 1998 - Aug, 1998
Los Alamos National Laboratory

TEACHING EXPERIENCE

Teaching Assistant: Aug, 1997 - May, 1998
Department of Applied Mathematics, University of Colorado

INDUSTRY EXPERIENCE

Software Engineer: Aug, 1996 - June, 1997
Delsoft (India) Pvt. Ltd.

Software Engineer: June, 1996 - Aug, 1996
Network Programs (India) Ltd.

HONORS & AWARDS

Certificate of Appreciation, Center for Applied Scientific Computing, LLNL 2002
University of Colorado Fellowship 1998, 1999
Institute Silver Medal, Indian Institute of Technology, Delhi 1996

PROFESSIONAL ACTIVITIES

Reviewer, SIAM Journal on Scientific Computing
Reviewer, SIAM Journal on Numerical Analysis
Reviewer, Journal of Computational Physics
Organizer, Workshop on Adaptive Mesh Refinement, 2004 LACSI Symposium, October 12-14, 2004.
Co-organizer, Mini-Symposium on Advances in Computational Magnetohydrodynamics, SIAM Annual Meeting, July, 2006.

MEMBERSHIPS

Full Member, Sigma Xi Research Society 2002 - present
Society for Industrial and Applied Mathematics 1999 - present

PUBLICATIONS

- [1] B. Philip, M. Pernice, and L. Chacon. Solution of Reduced Resistive Magnetohydrodynamics using Implicit Adaptive Mesh Refinement. In *Proceedings of the 16th International Conference on Domain Decomposition Methods*, 2005. accepted for publication.
- [2] M. Pernice and B. Philip. Solution of Equilibrium Radiation Diffusion Problems Using Adaptive Mesh Refinement. *SIAM Journal on Scientific Computing*, 27(5):1709–1726, 2006.
- [3] B. Philip, B. Lee, S. McCormick, and D. Quinlan. Asynchronous Fast Adaptive Composite Grid Methods: Theoretical Foundations. *SIAM Journal on Numerical Analysis*, 42(1):130–152, 2004.
- [4] B. Philip, B. Lee, S. McCormick, and D. Quinlan. Asynchronous Fast Adaptive Composite Grid Methods: Numerical Results. *SIAM Journal on Scientific Computing*, 25(2):682–700, 2003.
- [5] D. Quinlan, B. Miller, B. Philip, and M. Schordan. Treating a user-defined parallel library as a domain-specific language. In *Proceedings of the International Parallel and Distributed Processing Symposium (IPDPS'02)*. IEEE Computer Society, 2002.
- [6] D. Quinlan, M. Schordan, B. Philip, and M. Kowarschik. The specification of source-to-source transformations for the compile-time optimization of parallel object oriented scientific applications. In H.G. Dietz, editor, *Languages and Compilers for Parallel Computing*, volume 2624 of *Lecture Notes in Computer Science*, pages 383–394. Springer-Verlag, 2001.

- [7] Bobby Philip. *Asynchronous Fast Adaptive Composite Grid Methods for Elliptic Problems on Adaptively-Refined Curvilinear Grids*. PhD thesis, University of Colorado at Boulder, August 2001.
- [8] D. Quinlan and B. Philip. Rosetta: The compile-time recognition of object-oriented library abstractions and their use within user applications. In *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA 2001)*, 2001.
- [9] B. Miller, B. Philip, D. Quinlan, and A. Wissink. Amrsim: An object-oriented performance simulator for parallel adaptive mesh refinement. In *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA 2001)*, 2001.
- [10] D. Quinlan and B. Philip. Amr++: Object-oriented parallel adaptive mesh refinement. Technical report, Lawrence Livermore National Laboratory, 2001. Available as UCRL-ID-137373.
- [11] F. Bassetti, Davis, M. K., Marathe, B. Philip, and D. Quinlan. Improving cache utilization of linear relaxation methods: Theory and practice. In S. Matsuoka, R. Oldehoeft, and M. Tholburn, editors, *Computing in Object-Oriented Parallel Environments*, volume 1732 of *Lecture Notes in Computer Science*, pages 25–36. Springer-Verlag, 1999.

PRESENTATIONS

- Philip, B., Pernice, M., Chacon, L., Fully Implicit Adaptive Mesh Refinement for Reduced Resistive Magnetohydrodynamics, SIAM Annual Meeting, July, 2006.
- Philip, B., Pernice, M., Chacon, L., Resistive Magnetohydrodynamics with Implicit Adaptive Mesh Refinement, 9th Copper Mountain Conference on Iterative Methods, April, 2006.
- Philip, B., Pernice, M., Performance of FAC Preconditioners for Multi-Material Equilibrium Radiation Diffusion on Adaptively Refined Grids, 12th Copper Mountain Conference on Multigrid Methods, 2005.
- Philip, B., Multi-Level Techniques on Overlapping Grids with Refinement, Numerical Analysis Seminar, Los Alamos National Laboratory, July 2, 2002.
- Philip, B., Multilevel Solvers for Elliptic Problems on Adaptively Refined Overlapping Grids, Scalable Linear Solvers Workshop, Livermore, California, June 11-13, 2001.
- Philip, B., Elliptic Solvers with Adaptive Mesh Refinement on Complex Geometries, Center for Data Intensive Computing, Brookhaven National Laboratory, May 9, 2001.
- Philip, B., Elliptic Solvers with Adaptive Mesh Refinement and First-Order System Least-Squares (FOSLS) Methodologies. Copper Mountain Conference on Multigrid Methods, April 2001.
- Philip, B., Quinlan, D., Adaptive Mesh Refinement for Elliptic Equations. Poster Session, Yosemite Educational Symposium, Oct 29-Nov 1, 2000.
- Philip, B., Elliptic Solvers with Adaptive Mesh Refinement on Complex Geometries. Sandia National Laboratories Student Symposium, Aug 10, 2000.
- Philip, B., Quinlan, D., Elliptic Solvers with Adaptive Mesh Refinement on Complex Geometries. Copper Mountain Conference on Iterative Methods, April 2000.

COMPUTER SKILLS

Languages: C++, C, Fortran, VC++, Visual Basic, Pascal, Cobol, 80x86 assembly, scripting languages

Operating Systems: Linux, Mac OS X, Solaris, AIX, OpenBSD, Windows NT, VME