

Prof. Burak Aksoylu

(i) Professional Preparation

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|--|-----------------------------------|-----------|
| Middle East Technical University, Turkey | Mathematics and Science Education | BSc 1993 |
| University of California, Irvine | Mathematics | MS 1996 |
| University of California, San Diego | Mathematics | PhD 2001 |
| University of California, San Diego | Biochemistry Postdoc | 2001 |
| California Institute of Technology | Computer Science Postdoc | 2001-2003 |
| The University of Texas at Austin | ICES Postdoctoral Fellowship | 2003-2005 |

(ii) Appointments

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| 2005-Present | Assistant Professor, Department of Mathematics, Louisiana State University |
| 2005-Present | Assistant Professor, Center for Computation and Technology, Louisiana State University |

(iii) Publications

Related to Current Proposal

Towards a rigorously justified algebraic preconditioner for high-contrast diffusion problems, B. Aksoylu, I. G. Graham, R. Scheichl, and H. Klie, *Comput. Vis. Sci.*, (2007), submitted for publication.

Physics-based preconditioners for solving PDEs on highly heterogeneous media, B. Aksoylu and H. Klie, *Appl. Num. Math.*, (2007), submitted for publication.

Physics-Based Preconditioners for Porous Media Flow Applications, B. Aksoylu, H. Klie, and M. F. Wheeler, tech. rep., The University of Texas at Austin, Institute for Computational Engineering and Sciences, ICES Report 07-08, April, 2007.

Optimality of multilevel preconditioners for local mesh refinement in three dimensions, B. Aksoylu and M. Holst, *SIAM J. Numer. Anal.*, 44 (2006), pp. 1005-1025.

An odyssey into local refinement and multilevel preconditioning III: Implementation and numerical experiments, B. Aksoylu, S. Bond, and M. Holst, *SIAM J. Sci. Comput.*, 25 (2003), pp. 478–498.

Other Significant Publications

Multilevel solvers for unstructured surface meshes, B. Aksoylu, A. Khodakovsky, and P. Schröder, *SIAM J. Sci. Comput.*, 26 (2005), pp. 1146–1165.

An odyssey into local refinement and multilevel preconditioning II: Stabilizing hierarchical basis methods, B. Aksoylu and M. Holst, ICES Technical Report 05-04, (2005).

An odyssey into local refinement and multilevel preconditioning I: Optimality of the BPX preconditioner, B. Aksoylu and M. Holst, ICES Technical Report 05-03, (2005).

Theoretical and implementation aspects of the BPX preconditioner in the three dimensional local mesh refinement setting, B. Aksoylu, M. Holst, and S. Bond, ICES Technical Report 04-50, (2004).

(iv) Recent Grants

NSF - DDDAS - TMPR : DynaCode: A General DDDAS Framework with Coast and Environment Modeling Applications; \$220,000; 01.01.06 – 12.31.06, Co-PI

(v) Students

Zuhal Yeter (PhD, Mathematics)
Oleg Korobkin (PhD, Physics)
Irina Craciun (Undergraduate, Mathematics)

(vi) Synergistic Activities

Honors and Awards

Recipient of the ICES postdoctoral fellowship

Recipient of the Burroughs Wellcome Fund interdisciplinary LJIS predoctoral fellowship.

Presentations and Activities

Invited talk, Emory University, Atlanta, Georgia, 2007, *Physics-based preconditioners for solving PDEs on highly heterogeneous media*,

Minisymposium presentation, 6th International Congress on Industrial and Applied Mathematics, Zurich, Switzerland, 2007, *Physics-based preconditioners for solving PDEs on highly heterogeneous media*,

Contributed presentation, Conference on Preconditioning Techniques for Large Sparse Matrix Problems in Scientific and Industrial Applications, 2007, Toulouse, France, *Two-stage physics-based preconditioners for porous media flow applications*,

Minisymposium presentation, SIAM Conference of Mathematical and Computational Issues in the Geosciences, Santa Fe, New Mexico, 2007, *Physics-based preconditioners for porous media flow applications*,

Plenary talk, Workshop on "Numerical Methods for Differential Equations", 2006, Izmir Institute of Technology, Turkey, *Local Refinement and Multilevel Preconditioning with Applications in Biophysics, Computer Graphics, and Geosciences*,

Minisymposium organizer and presenter, SIAM Conference of Mathematical and Computational Issues in the Geosciences, Avignon, France, 2005, *Iterative Solvers for PDEs with Highly Discontinuous Coefficients*,

Referees of SIAM Journal on Numerical Analysis, SIAM Journal on Scientific Computing, AMS Mathematics of Computation, Applied Numerical Mathematics, Proceedings of the Domain Decomposition Methods Conference, Proceedings 7th IEEE International Symposium on Cluster Computing and the Grid (CCGrid 2007).

(vii) Collaborators and Other Affiliations

(a) Collaborators and Co-Editors: Ivan Graham, Robert Scheichl (U. Bath, UK, Mathematical Sciences), Clint Dawson, Hector Klie, Mary Wheeler (UT-Austin, ICES); Peter Schröder, Andrei Khodakovskiy, (CalTech, Computer Science); Steven Bond, (UIUC, Computer Science); Andrew McCammon, (UCSD, Biochemistry)

(b) Graduate and Postdoctoral Advisors: Prof Michael Holst (UCSD), Prof Peter Schröder (CalTech), Prof Clint Dawson (UT-Austin)