Jed Brown

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Education

Ph.D. Glaciology, ETH Zürich, 2011. Thesis: Computational Methods for Ice Flow Simulation.

M.S. Mathematics, University of Alaska Fairbanks, 2006.

B.S. Mathematics, *magna cum laude*, University of Alaska Fairbanks, 2004.

B.S. Physics, *magna cum laude*, University of Alaska Fairbanks, 2004.

Employment

Argonne Scholar, Mathematics and Computer Science Division, Argonne National Laboratory, 2012–present

Postdoctoral Appointee, Mathematics and Computer Science Division, Argonne National Laboratory, 2011–2012

Research Assistant, ETH Zürich, 2007–2011

Research Technician, University of Alaska Fairbanks, 2006–2007

Research Assistant, University of Alaska Fairbanks, 2003–2006

Research

Scalable solvers for implicit multiphysics, high order PDE discretization in complex geometry, compatible discretizations for heterogeneous flows, PDE-constrained optimization.

Peer-reviewed articles

[1] Jed Brown, Barry F. Smith, and Aron Ahmadia. Achieving textbook multigrid efficiency for hydrostatic ice flow. *SIAM Journal on Scientific Computing*, accepted 2012.

[2] Tareq M. Malas, Aron J. Ahmadia, Jed Brown, John A. Gunnels, and David E. Keyes. Optimizing the performance of streaming numerical kernels on the IBM BlueGene/P PowerPC 450 processor. *International Journal of High Performance Computing Applications*, published online, 2012.

[3] J. Brown, M. G. Knepley, D. A. May, L. C. McInnes, and B. F. Smith. Composable linear solvers for multiphysics. In *Proceedings of the 11th International Symposium on Parallel and Distributed Computing (ISPDC 2012)*, pages 55–62. IEEE Computer Society, 2012. Also available as Argonne National Laboratory preprint ANL/MCS-P2017-0112.

[4] Rodney Biezuner, Jed Brown, Grey Ercole, and Eder Martins. Computing the first eigenpair of the p-Laplacian via inverse iteration of sublinear supersolutions. *Journal of Scientific Computing*, 52:180–201, 2012.

[5] Jed Brown. Efficient nonlinear solvers for nodal high-order finite elements in 3D. *Journal of Scientific Computing*, 45:48–63, 2010. 10.1007/s10915-010-9396-8.

[6] Jason M. Amundson, Mark Fahnestock, Martin Truffer, Jed Brown, Martin P. Lüthi, and Roman J. Motyka. Ice mélange dynamics and implications for terminus stability, Jakobshavn Isbræ, Greenland. *J. Geophys. Res*, 115:F01005, 2010.

[7] E. Bueler and J. Brown. Shallow shelf approximation as a "sliding law" in a thermomechanically coupled ice sheet model. *Journal of Geophysical Research-Earth Surface*, 114(F3):F03008, 2009.

[8] E. Bueler, J. Brown, and C. Lingle. Exact solutions to the thermomechanically coupled shallow ice approximation: effective tools for verification. *J. Glaciol*, 53:499–516, 2007.

[9] E. Bueler, C.S. Lingle, and J. Brown. Fast computation of a viscoelastic deformable Earth model for ice-sheet simulations. *Ann. Glaciol*, 46:97–105, 2007.

Software

Developer of the Portable Extensible Toolkit for Scientific computing (PETSc) since 2008, `http://mcs.anl.gov/petsc`.

Principal author of the Parallel Ice Sheet Model (PISM) 2004–2007, `http://pism-docs.org`.

Activities

Member of the Science Steering Committee for CIG (Computational Infrastructure for Geodynamics), Sep 2011 to Sep 2014.

Session convener at the American Geophysical Union Fall Meeting, 2009, 2010, 2011, 2012.

Technical program committee:

Supercomputing 2013

International Conference for Numerical and Mathematics and Computational Methods Applied to Nuclear Science and Engineering (MC2013)

Workshop on High Performance Computing and Hybrid Programming Concepts for Hyperbolic PDE Codes, KAUST, Feb 2012

Contributed to the MPI-3 standard.

Presentations and Teaching

10 to 25 presentations per year including invited presentations at SIAM Computational Science and Engineering (CSE), SIAM Parallel Processing (PP), SIAM Annual, Institute for Computational and Experimental Research in Mathematics (ICERM, Brown University), CScADS (panel discussion), American Geophysical Union (AGU), Norwegian High Performance Computing (NOTUR, plenary), High Performance Computing and Hybrid Programming Concepts for Hyperbolic PDE Codes ([HPC]³, KAUST), International Council for Industrial and Applied Mathematics (ICIAM), Community Earth System Model (CESM/CCSM), Computational Infrastructure for Geodynamics (CIG), International Glaciology Society (IGS), MIT Center for Computational Engineering Distinguished Speaker series, Institute for Computational Engineering and Sciences seminar series (ICES, UT Austin).

PETSc and advanced PETSc tutorials ranging from two hours to three days at National Renewable Energy Laboratory (2012), Texas Advanced Computing Center (2012), ACTS workshop at NERSC (2011), Arctic Region Supercomputing Center (2010), and Swiss National Supercomputing Center (2010).

Argonne summer students advised: Lulu Liu (KAUST, nonlinear solution methods for oil extraction problems), Abraham Taicher (UT Austin, compatible discretizations for Darcy-Stokes melt-migration), Xuan Zhou (IIT, scalable dense linear support in PETSc using Elemental).

Three-week mini-course *Scalable solvers for nonlinear equations: mini-course on Newton-Krylov methods*, at the University of Alaska Fairbanks, 2009-01-22 to 02-05.

Memberships

Society of Industrial and Applied Mathematics

American Geophysical Union

Honors & Awards

2009 Piolet d'Or international mountaineering award for first ascent of Xuelian West (6422 m, China) via 'The Great White Jade Heist'.

2005 NCAA All American in cross-country skiing

2004 Outstanding Mathematics Student of the Year, University of Alaska Fairbanks

2004 Outstanding Physics Student of the Year, University of Alaska Fairbanks

Last updated: 2012-11-22