

WOLFGANG BANGERTH: CURRICULUM VITAE

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Born May 14th, 1973, Ostfildern, Germany
Parents Friedrich Karl Bangerth, Professor at the University of
 Stuttgart-Hohenheim, Germany;
 Ulrike Bangerth, System administrator
Married to Jill Louise Zarestky, June 11th, 2005
Nationality German, United States permanent resident (“greencard”)

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1 Education

1979–1983 Primary School Wolfschlugen
1983–1992 Gymnasium Nürtingen; Abitur with grades “very good”
1992–1993 Military Service in a telecommunications unit
1993–1995 Study of Physics at the University of Stuttgart;
 Vordiplom (Bachelor) with grades “very good – good”

- 1995–1999 Study of Physics at the University of Heidelberg; Diploma thesis on adaptive finite element methods for the wave equation; Grades: “very good, with distinction”
- 1999–2002 Work on a Ph.D. thesis on “Adaptive Finite Element Methods for the Identification of Distributed Parameters in Partial Differential Equations” under the supervision of Prof. R. Rannacher (Heidelberg). Member of the Graduiertenkolleg “Modellierung und Wissenschaftliches Rechnen in Mathematik und Naturwissenschaften”;
Grades: “summa cum laude” (“with distinction”).

2 Professional Experience

- 1994–1995 Work with Prof. W. Wendland and Prof. A. Saendig (Stuttgart), doing calculations with Mathematica and typesetting.
- 1996 Work with Prof. H.-C. Pauli (Heidelberg), writing a lecture script on “Quantum field theory”.
- 1997 Work with the Robert Bosch AG, doing simulations on fluid flow in the automobile motor industry using the FIRE CFD code.
- 1997–2002 Work with Prof. R. Rannacher (Heidelberg), on flow simulations, implementation of the finite element library deal.II, computations on adaptive methods, organization of the ENUMATH 97 conference.
- 1998– Principal author and maintainer of the deal.II finite element library (see <http://www.dealii.org/>).
- 2001 Exterior Research Fellow with Industrial Research Ltd., Wellington, New Zealand.
- 2002 Assistant at the ETH Zürich, Switzerland, in the group of Prof. C. Schwab.
- 2002–2003 Postdoctoral Research Fellow at the Institute for Computational Engineering and Sciences (ICES), University of Texas at Austin.
- 2003–2005 Postdoctoral Research Fellow with joint position at the Institute for Computational Engineering and Sciences (ICES) and the Institute for Geophysics, University of Texas at Austin.
- 2005 Consultant (Research Scientist) for the Department of Chemistry, Texas A&M University.
- 2006–2007 External Research Fellow, Institute for Geophysics, University of Texas at Austin.

- 2005– Elected member of the Science Steering Committee (2005–2008, 2008–2011) and Executive Committee (2011–), Computational Infrastructure in Geodynamics, an NSF-funded center devoted to the creation of open source software in geophysics (see <http://www.geodynamics.org/>).
- 2005–2009 Assistant Professor, Department of Mathematics, Texas A&M University.
- 2009– Associate Professor, Department of Mathematics, Texas A&M University.
- 2009–2011 Member, Executive Committee of the Department of Mathematics, Texas A&M University.
- 2010– Member, Executive Committee of the Institute for Applied Mathematics and Computational Science (IAMCS), Texas A&M University.

3 Awards

- 1999–2001 Ph.D. fellowship from Graduiertenkolleg “Modellierung und Wissenschaftliches Rechnen in Mathematik und Naturwissenschaften” (Modeling and scientific computing in mathematics and natural sciences), University of Heidelberg, Germany
- 2002–2003 Postdoctoral Research Fellowship from the Institute for Computational Engineering and Sciences (ICES), University of Texas at Austin
- 2003–2005 Palisades Geophysical Institute (PGI) Postdoctoral Fellowship from the Institute for Geophysics, University of Texas at Austin
- 2006 My deal.II finite element library software is accepted into the computing industry standard SPEC CPU2006 benchmark (see www.spec.org); the award is \$5,000
- 2007 Recipient (with G. Kanschat and R. Hartmann) of the J. H. Wilkinson Prize for Numerical Software for the deal.II software; the award is \$3,000
- 2008 Alfred P. Sloan Research Fellowship; the award consists of unrestricted research funds to the amount of \$50,000.

4 Other Experience

- Computers Knowledge of the Unix operating system, profound knowledge of and experience in object oriented programming with C++ and knowledge of several other programming languages.

	Maintainer of the deal.II finite element library
	Maintainer of the GNU GCC compiler
Languages	Fluent in English, knowledge of French and remnants of Japanese; native speaker of German.
Memberships	Society for Industrial and Applied Mathematics (SIAM), American Association for the Advancement of Science (AAAS).

5 Research Interests

Inverse problems and medical imaging in the optical frequency range;

Numerical finite element software;

Finite element theory, adaptivity, and a posteriori error estimation;

Geophysical modeling, optimization with PDE models of reservoirs, simulation of convection in the earth mantle.

6 Teaching experience

Classes taught:

2002	One semester practical course in Advanced Finite Element Software, ETH Zurich, Switzerland.
2005	MATH 609: Numerical Methods for Engineers.
2006	MATH 664: Computational Software for Large-Scale PDE Solvers. MATH 412: Theory of partial differential equations. MATH 417: Numerical Analysis.
2007	MATH 417: Numerical Analysis. MATH 151: Engineering calculus I. MATH 412: Theory of partial differential equations. Informal weekly class on Numerical Algorithms for Inverse Problems (spring). Working seminar on Inverse Problems (fall).
2008	MATH 676: Finite element methods in scientific computing.
2009	MATH 651: Optimization I.
2010	MATH 652: Optimization II. MATH 442: Mathematical modeling.
2011	MATH 676: Finite element methods in scientific computing.

Supervision of students:

I served as chair or co-chair for the following graduate students:

Chih-Che Chueh	Department of Mechanical Engineering, University of Victoria, Canada; co-chair of Ph.D. committee; graduated in 2010
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Nate Fredette	Department of Nuclear Engineering, Texas A&M University; co-chair of M.Sc. committee; graduated in 2011
Moritz Allmaras	Department of Mathematics, Texas A&M University; chair of Ph.D. committee; graduated in 2011
Kainan Wang	Department of Mathematics, Texas A&M University; chair of Ph.D. committee; current
Fang Wang	Department of Mathematics, Texas A&M University; chair of Ph.D. committee; current
Jennifer Webster	Department of Mathematics, Texas A&M University; chair of Ph.D. committee; current

I have served as a member more often than is worth counting on M.Sc. and Ph.D. committees of at least half a dozen departments on campus.

Mentoring of students:

2006 Gregory Thoreson (Nuclear Engineering, Undergraduate Summer Research Grant in Engineering)

Curriculum development:

Developed the new course “MATH 676: Finite element methods in scientific computing” (taught as MATH 664 in the spring of 2006, and in the fall of 2008).

7 Community involvement

7.1 Editorial boards

Member, editorial board, SIAM Journal on Scientific Computing (SISC), since 2009.

Member, editorial board, ACM Transactions on Mathematical Software (ACM TOMS), since 2011.

Member, editorial board, Archive of Numerical Software (ANS), since 2011.

Member, editorial board, [SIMAI Springer Series](#) (a book series on computational science and applied mathematics; editor-in-chief: Luca Formaggia), since 2012.

7.2 Advisory councils, evaluation panels, reviewing

Elected member of the Science Steering Committee and later the Executive Committee, Center for Computational Infrastructure in Geodynamics (CIG), located at Caltech, 2005–, re-elected 2008, 2011.

Member, Executive Committee of the Department of Mathematics, Texas A&M University, 2009–2011.

Member, Executive Committee of the Institute for Applied Mathematics and Computational Science (IAMCS), Texas A&M University, 2010–.

Member, High Performance Computing Committee, Institute for Applied Mathematics and Computational Science, Texas A&M University; 2008–.

NSF Panelist for Cyberenabled Discovery and Innovation (CDI) Type II proposals, Arlington, VA, June 5–6, 2008.

NSF Panelist for Inverse Problems proposals, Arlington, VA, April 20, 2009.

Member, evaluation committee for Department of Energy SciDAC Applied Math Mid-Term Reviews, Washington, D.C., April 22, 2009.

Reviewer, Department of Energy Graduate Research Fellowship Program, 2010.

Reviewer for Advances in Engineering Software, Applied Numerical Mathematics, Computer Methods in Applied Mechanics and Engineering (CMAME), Communications in Numerical Methods in Engineering, Engineering with Computers, International Journal of Numerical Methods in Engineering (IJNME), Inverse Problems, Journal of Computational Physics (JCP), Journal of Mathematical Analysis and Applications, Journal of Numerical Analysis, Journal of Petroleum Sciences and Engineering, Mathematics of Computation, Medical Physics, Numerical Methods in Partial Differential Equations (NMPDE), Numerische Mathematik, Optics Express, SIAM Journal on Optimization (SICON), SIAM Journal on Numerical Analysis (SINUM), SIAM Journal on Scientific Computing (SISC), ACM Transactions on Mathematics Software (ACM TOMS)

Reviewer, complete draft of a book in scientific computing, 2010

7.3 Organization of workshops, minisymposia and conferences

Member of the organizing team of the ENUMATH'97 conference, Heidelberg, Germany, 1997

Co-organizer of a mini-symposium on adaptive methods at the GAMM Jahrestagung (GAMM Annual Conference), Zurich, Switzerland, 2001.

Member of the program committee of a workshop on “Parallel/High-Performance Object-Oriented Scientific Computing (POOSC 05)” at the “European Confer-

ence on Object-Oriented Programming (ECOOP 2005)”, Glasgow, UK, 2005.

Member of the program committee of a workshop on “Parallel/High-Performance Object-Oriented Scientific Computing (POOSC 06)” at the “European Conference on Object-Oriented Programming (ECOOP 2006)”, Tours, France, 2006.

Organizer of a “Workshop on Computational Science Issues in Geodynamics Applications”, Austin, TX, October 16-17, 2006.

Organizer of a minisymposium “High-level software for the numerical solution of partial differential equations” at ICIAM 2007, Zurich, Switzerland, July 16-20, 2007.

Organizer and main speaker (19 hours) of a “Workshop on Adaptive Mesh Refinement Techniques in Geodynamics Applications”, Boulder, CO, October 24-27, 2007.

Member of the program committee of a workshop on “Parallel/High-Performance Object-Oriented Scientific Computing (POOSC 08)” at the “European Conference on Object-Oriented Programming (ECOOP 2008)”, Paphos, Cyprus, 2008.

Organizer of the workshop “Mathematical and Computational Issues in the Solid Earth Geosciences”, Santa Fe, NM, September 15–17, 2008.

Organizer of the “CBMS Conference on Adaptive Finite Element Methods for Partial Differential Equations”, College Station, TX, May 18–22, 2009.

Member of the program committee of a workshop on “Parallel/High-Performance Object-Oriented Scientific Computing” at “Systems, Programming, Languages and Applications: Software for Humanit (SPLASH), 2010”, Reno/Tahoe, NV, 2010.

Co-organizer of the “IAMCS Workshop in Large-Scale Inverse Problems and Uncertainty Quantification”, College Station, TX, 2011.

7.4 Other service activities

Elected member of the Texas A&M University Faculty Senate, 2006–2009.

Member of the nominating committee for candidates to the Science Steering Committee and Executive Committee of the Center for Computational Infrastructure in Geodynamics, 2006.

Co-author of the report “The Path to Peta-scale Computing in Geodynamics. A report by the Science Steering Committee, Computational Infrastructure for Geodynamics (CIG)” to the National Science Foundation, November 2006.

Chair of the nominating committee for candidates to the Science Steering Committee and Executive Committee of the Center for Computational Infrastructure in Geodynamics, 2009.

Elected member of the Texas A&M University Council of Principal Investigators, 2009–

Member, Institute for Applied Mathematics and Computational Sciences (IAMCS), Institute for Scientific Computation (ISC), Center for Large Scale Scientific Computing (CLASS), all at Texas A&M University.

8 Presentations at conferences

Invited presentations are marked with an asterisk *. Co-organization of the respective event/mini-symposium is marked by a plus +.

- 1999 * International Conference on Theoretical and Computational Acoustics, Trieste, Italy
 European Conference on Numerical Mathematics and Applications, Jyvaeskylae, Finland
- 2000 GAMM Workshop on Numerical Mathematics, Kiel, Germany
 Waves 2000, Santiago de Compostela, Spain
 Numerical Modelling in Continuum Mechanics, Prague, Czech Republic
- * 16th IMACS World Congress, Lausanne, Switzerland
- 2001 *+ GAMM Jahrestagung (GAMM Annual Conference), Zurich, Switzerland
- 2002 * International Conference on Multifield Problems, Stuttgart, Germany
- * World Congress on Computational Mathematics, Vienna, Austria
- 2003 Finite Element Rodeo, Houston, TX, USA
 SIAM Conference on Computational Science and Engineering, San Diego, CA, USA
 SIAM Conference on Mathematical and Computational Issues in the Geosciences, Austin, TX, USA
 USNCCM, Albuquerque, NM, USA

- 2004 * Computational Infrastructure in Geodynamics (www.geodynamics.org), planning workshop, Los Angeles, CA, USA
 Finite Element Rodeo, Austin, TX, USA
- * Supercomputing 2004, Pittsburgh, PA, USA
- 2005 * Photonics West/Optical Tomography and Spectroscopy of Tissue VII, San Jose, CA, USA
 SIAM Conference on Computational Science and Engineering, Orlando, FL, USA
- 2006 *+ deal.II User Workshop, Heidelberg, Germany
 IEEE International Symposium on Biomedical Imaging (ISBI), Arlington, VA, USA, 2006
 SIAM Conference on Imaging, Minneapolis, MN, USA, 2006
- *+ European Conference on Object Oriented Programming (ECOOP), Nantes, France, 2006
- *+ Workshop on Computational Science Issues in Geodynamics Applications, Austin, TX, 2006
- 2007 * SIAM Conference on Computational Science and Engineering, Costa Mesa, CA, 2007
- * IEEE International Symposium on Biomedical Imaging (ISBI), Arlington, VA, USA, 2007
- * Oberwolfach seminar on adaptivity and error estimation Oberwolfach, Germany, 2007
- * Applied Inverse Problems conference, Vancouver, Canada, 2007
- * ICCOPT-MOPTA 2007 conference, Hamilton, Canada, 2007
- * MAMOS workshop, Austin, TX, October, 2007
- *+ Main speaker (19 hours) of a “Workshop on Adaptive Mesh Refinement Techniques in Geodynamics Applications”, Boulder, CO, October 24-27, 2007
- 2008 * CT 2008 – Tomography Confluence, An International Conference on the Applications of Computerized Tomography; Indian Institute of Technology Kanpur, India, February 15–17, 2008
- * SIAM Conference on Parallel Processing for Scientific Computing; Atlanta, GA, March 12–14, 2008
- *+ Mathematical and Computational Issues in the Solid Earth Geosciences; Santa Fe, NM, September 15–17, 2008
- 2009 * SIAM Conference on Computational Science and Engineering; Miami, FL, March 2–6, 2009
 ACM Symposium on Applied Computing; Honolulu, HI, March 9–12, 2009
- * Finite Elements in Fluids 2009; Tokyo, Japan, April 1–3, 2009

- * Compatible and Innovative Discretizations for Partial Differential Equations; Oslo, Norway, June 17–19, 2009
- * Numerical Modeling of Crustal Deformation and Earthquake Faulting; Golden, CO, June 22–26, 2009
- * Banff workshop on Mathematical Methods in Emerging Modalities of Medical Imaging; Banff, Canada, October 25–30, 2009
- 2010 * SIAM Conference on Parallel Processing; Seattle, WA, February 24–26, 2010
- * IAMCS Workshop on Computational and Mathematical Challenges in Material Science and Engineering: Complex Fluid Dynamics; Thuwal, Saudi Arabia, March 22–25, 2010
- * Second deal.II Users Meeting; Heidelberg, Germany, August 23–25, 2010
- 2011 * SIAM Conference on Computational Science and Engineering; Reno, NV, February 28–March 4, 2011
- * Phys-Math-Viz workshop, Cook’s Branch, TX, March 12, 2011
- + American Geophysical Union Fall Meeting, San Francisco, CA, December 6–10, 2011

Other presentations:

- Colloquium, Institute for Geophysics, Technical University of Munich (1999)
- Colloquium, Institute for Geophysics, Technical University of Munich (2001)
- Presentation, Industrial Research Ltd., Wellington, New Zealand (2001)
- Colloquium, Seminar for Applied Mathematics, ETH Zürich (2002)
- Colloquium, Photon Migration Laboratories, Texas A&M University (2003)
- Colloquium, Applied Mathematics, University of Heidelberg (2003)
- Colloquium, Computational and Applied Mathematics, Rice University (2004)
- Colloquium, Department of Mathematics, University of Pittsburgh (2004)
- Colloquium, Department of Mathematics, University of Pittsburgh (2005)
- Colloquium, Department of Mathematics, University of Colorado/Denver (2005)
- Colloquium, Department of Mathematics, Colorado State University (2005)
- Colloquium, Department of Mathematics, Texas A&M University (2005)
- Colloquium, Division of Mathematics, Sandia National Laboratories (2005)
- Colloquium, Department of Mathematics, Colorado State University (2005)
- Colloquium, Applied Mathematics, University of Heidelberg (2006)
- Colloquium, Institute for Computational and Applied Mathematics (ICES), University of Texas at Austin (2007)
- Colloquium, Electrical Engineering Department, Katholieke Universiteit Leuven, Belgium (2007)
- Colloquium, Department of Mathematics, University of Houston (2007)
- Colloquium, Department of Mathematics, Indian Institute of Technology Kanpur, India (2008)
- Colloquium, Department of Mathematics and Statistics, McGill University, Montreal, Canada (2008)
- Colloquium, Department of Mathematics, Southern Methodist University (2009)
- Colloquium, Institute for Computational Engineering and Sciences, University

of Texas at Austin (2009)
Colloquium, Applied Mathematics, University of Heidelberg, Germany (2010)
Seminar, Mathematical and Computer Sciences and Engineering Division, King
Abdullah University of Science and Technology (KAUST), Saudi
Arabia (2011)
Colloquium, Mathematics, University of Stuttgart, Germany (2012)

9 Support

Funded support:

- NSF award CBET-0736202 (transferred to the Department of Homeland Security, grant 2008-DN-077-ARI018-02): “A framework for developing novel detection systems focused on interdicting shielded HEU” (9/1/2007–8/31/2012): co-PI; PI: Warren Miller, Texas A&M; \$7,496,076.
- Sloan Foundation Research Fellowship: “Inverse Problems and Computational Science” (9/1/2008–8/31/2010): PI; \$50,000.
- King Abdullah University of Science and Technology: “Institute for Applied Mathematics and Computational Science (IAMCS) at Texas A&M University” (4/1/2008–3/31/2013): collaborator; \$24,720,657.
- NSF award EAR-0949446: “Geoinformatics: Facility Support: Computational Infrastructure for Geodynamics” (7/1/2010–6/30/2015): Member of proposal writing committee; PI is Louise Kellogg, University of California, Davis; \$8,175,001.
- Subcontract from Computational Infrastructure for Geodynamics (an NSF-funded research center): “Geoinformatics: Facility Support: Computational Infrastructure for Geodynamics” (7/1/2010–6/30/2015): PI; \$814,221.

Past support:

- Deutsche Forschungsgemeinschaft (DFG, German Science Foundation) post-doctoral stipend for research at the University of Texas at Austin (9/2002–8/2003); declined in favor of a stipend from the Institute for Computational Engineering and Sciences, The University of Texas at Austin.
- NIH: “Diagnostic cancer imaging with NIR fluorescence” (7/1/2005–6/30/2008): PI; subaward over \$173,124 to a grant of \$3M.
- NSF award DGE-0549487: “IGERT: New materials and mathematical modeling” (6/1/2006–5/31/2011): Research advisor; PI: Joe Ross, Texas A&M; \$2,817,300.
- DoE: “3-D deep penetration neutron imaging of thick absorbing and diffusive objects using transport theory” (5/1/2007–4/30/2011): co-PI; PI: Jean Ragusa, Texas A&M; \$283,093.

- NSF award DMS-0604778: “Mathematical Methods for Novel Modalities of Medical Imaging” (9/1/2006-8/31/2009), co-PI; PI: Peter Kuchment, Texas A&M; \$330,276 + a supplement of \$55,905.
- Computational Infrastructure in Geodynamics (an NSF-funded research center): “A suite of simple geodynamics applications using adaptive finite element methods” (4/1/2008–10/31/2009): PI; \$100,458.
- NSF award DMS-0834176: “NSF/CBMS Regional Conference in the Mathematical Sciences - Adaptive Finite Element Methods for Partial Differential Equations” (5/18/09–5/22/09): co-PI; PI: Guido Kanschat, Texas A&M; \$33,731.
- NSF award DMS-0922866: “Cluster Computing for Mathematical Sciences at Texas A& M University” (6/1/2009-5/31/2010): co-PI; PI: Frank Sottile, Texas A& M; \$59,480.
- Institute for Applied Mathematics and Computational Science (Texas A&M University) Innovation Award: “Exploiting sparsity in solving geoscience inverse problems” (1/1/2010–8/31/2010): PI; \$20,000.

10 Publications

The following is a list of all my publications and what others have written about my work. Metrics and citation counts can be found on [my Google Scholar page](#).

Articles written about my work

- [1] William Bell. Good prospects. *Access, the quarterly journal of NCSA*, 18(1):1–4, 2005.
This article also appeared in the *GRIDSTART Business Newsletter*, March 2005, pp. 6–8, as well as *GRID today*, edition of March 28, 2005.
- [2] Developers of finite element library receive Wilkinson prize for numerical software. *SIAM News*, 40(9):7–8, November 2007.
- [3] Mike Downey. Bombs away. *Advance: Research, Scholarship and Creative Achievement at Texas A&M University*, pages 16–18, 2009.

Books

- [1] Wolfgang Bangerth and Rolf Rannacher. *Adaptive Finite Element Methods for Differential Equations*. Birkhäuser Verlag, 2003.

Peer reviewed articles

- [1] Wolfgang Bangerth and Rolf Rannacher. Finite element approximation of the acoustic wave equation: Error control and mesh adaptation. *East–West J. Numer. Math.*, 7(4):263–282, 1999.
- [2] Wolfgang Bangerth and Rolf Rannacher. Adaptive finite element techniques for the acoustic wave equation. *J. Comput. Acoustics*, 9(2):575–591, 2001.
- [3] Wolfgang Bangerth. Starting threads in a C++ compatible fashion. *C/C++ Users Journal*, pages 21–24, October 2003.
- [4] Wolfgang Bangerth, Marcus Grote, and Christel Hohenegger. Finite element method for time dependent scattering: Nonreflecting boundary condition, adaptivity, and energy decay. *Comp. Meth. Appl. Mech. Engrg.*, 193:2453–2482, 2004.
- [5] Graham F. Carey, William Barth, Juliette A. Woods, Ben Kirk, Michael L. Anderson, Sum Chow, and Wolfgang Bangerth. Modeling error and constitutive relations in simulation of flow and transport. *International Journal for Numerical Methods in Fluids*, 46:1211–1236, 2004.
- [6] Hector Klie, Wolfgang Bangerth, Mary Wheeler, Manish Parashar, and Vincent Matossian. Parallel well location optimization using stochastic algorithms on the grid computational framework. In *Proceedings of the 9th European Conference on the Mathematics of Oil Recovery (ECMOR IX), Cannes, France*, 2004.

- [7] Amit Joshi, Wolfgang Bangerth, and Eva M. Sevick-Muraca. Adaptive finite element modeling of optical fluorescence-enhanced tomography. *Optics Express*, 12(22):5402–5417, November 2004.
- [8] Amit Joshi, Wolfgang Bangerth, Alan B. Thompson, and Eva M. Sevick-Muraca. Experimental fluorescence optical tomography using adaptive finite elements and planar illumination with modulated excitation light. *Progr. Biomed. Optics Imag.*, 6:351–358, 2005.
- [9] Wolfgang Bangerth, Amit Joshi, and Eva M. Sevick-Muraca. Adaptive finite element methods for increased resolution in fluorescence optical tomography. *Progr. Biomed. Optics Imag.*, 6:318–329, 2005.
- [10] Wolfgang Bangerth, Hector Klie, Vincent Matossian, Manish Parashar, and Mary Wheeler. An autonomic reservoir framework for the stochastic optimization of well placement. *Cluster Computing*, 8:255–269, 2005.
- [11] Michael Anderson, Wolfgang Bangerth, and Graham F. Carey. Analysis of parameter sensitivity and experimental design for a class of nonlinear partial differential equations. *Int. J. Numer. Meth. Fluids*, 48:583–605, 2005.
- [12] Manish Parashar, Hector Klie, Umit Catalyurek, Tahsin Kurc, Wolfgang Bangerth, Vincent Matossian, Joel Saltz, and Mary F. Wheeler. Application of grid-enabled technologies for solving optimization problems in data-driven reservoir studies. *Future Generation Computer Systems*, 21:19–26, 2005.
- [13] Amit Joshi, Wolfgang Bangerth, Kildong Hwang, John C. Rasmussen, and Eva M. Sevick-Muraca. Plane wave fluorescence tomography with adaptive finite elements. *Optics Letters*, 31:193–195, 2006.
- [14] Amit Joshi, Wolfgang Bangerth, and Eva M. Sevick-Muraca. Non-contact fluorescence optical tomography with scanning area illumination. In *Proceedings of the IEEE International Symposium on Biomedical Imaging, Arlington, VA, 2006*, pages 582–585. IEEE, 2006.
- [15] Amit Joshi, Wolfgang Bangerth, Kildong Hwang, John C. Rasmussen, and Eva M. Sevick-Muraca. Fully adaptive FEM based fluorescence optical tomography from time-dependent measurements with area illumination and detection. *Med. Phys.*, 33(5):1299–1310, 2006.
- [16] Amit Joshi, Wolfgang Bangerth, and Eva M. Sevick-Muraca. Non-contact fluorescence optical tomography with scanning patterned illumination. *Optics Express*, 14(14):6516–6534, 2006.
- [17] Wolfgang Bangerth, Hector Klie, Mary F. Wheeler, Paul Stoffa, and Mrinal Sen. On optimization algorithms for the reservoir oil well placement problem. *Comp. Geosciences*, 10:303–319, 2006.

- [18] Hector Klie, Wolfgang Bangerth, Xiuli Gai, Mary F. Wheeler, Paul L. Stoffa, Mrinal Sen, M. Parashar, Umit Catalyurek, Joel Saltz, and Tahsin Kurc. Models, methods and middleware for Grid-enabled multiphysics oil reservoir management. *Engineering with Computers*, 22:349–370, 2006.
- [19] Kildong Hwang, Tianshu Pan, Amit Joshi, John C. Rasmussen, Wolfgang Bangerth, and Eva M. Sevick-Muraca. Influence of excitation light rejection on forward model mismatch in optical tomography. *Phys. Med. Biol.*, 51(22):5889–5902, 2006.
- [20] Wolfgang Bangerth, Ralf Hartmann, and Guido Kanschat. deal.II – a general purpose object oriented finite element library. *ACM Trans. Math. Softw.*, 33(4):24/1–24/27, 2007.
- [21] Amit Joshi, Wolfgang Bangerth, Ruchi Sharma, Wei Wang, and Eva M. Sevick-Muraca. Molecular tomographic imaging of lymph nodes with NIR fluorescence. In *Proceedings of the IEEE International Symposium on Biomedical Imaging, Arlington, VA, 2007*, pages 564–567. IEEE, 2007.
- [22] Wolfgang Bangerth, Amit Joshi, and Eva M. Sevick-Muraca. Inverse biomedical imaging using separately adapted meshes for parameters and forward model variables. In *Proceedings of the IEEE International Symposium on Biomedical Imaging, Arlington, VA, 2007*, pages 1368–1371. IEEE, 2007.
- [23] Wolfgang Bangerth. A framework for the adaptive finite element solution of large inverse problems. *SIAM J. Sc. Comput.*, 30:2965–2989, 2008.
- [24] Wolfgang Bangerth and Amit Joshi. Adaptive finite element methods for the solution of inverse problems in optical tomography. *Inverse Problems*, 24:034011/1–22, 2008¹
- [25] Marc Bartels, Amit Joshi, John C. Rasmussen, Eva M. Sevick-Muraca, and Wolfgang Bangerth. Post-image acquisition excitation light mitigation in NIR fluorescent tomography. In *Proceedings of the IEEE International Symposium on Biomedical Imaging, Arlington, VA, 2008*. IEEE, 2008.
- [26] Amit Joshi, Wolfgang Bangerth, and Eva Sevick. Non-contact fluorescence optical tomography with adaptive finite element methods. In Y. Censor, M. Jiang, and A. K. Louis, editors, *Mathematical Methods in Biomedical Imaging and Intensity-Modulated Radiation Therapy (IMRT)*, pages 185–200. Birkhäuser, 2008.
- [27] Wolfgang Bangerth and Oliver Kayser-Herold. Data structures and requirements for *hp* finite element software. *ACM Trans. Math. Softw.*, 36(1):4/1–4/31, 2009.
- [28] Yaqi Wang, Wolfgang Bangerth, and Jean Ragusa. Three-dimensional *h*-adaptivity for the multigroup neutron diffusion equations. *Progr. Nucl. Energy*, 51:543–555, 2009.

¹This article was selected for the Editorial Board Highlights 2008 of the Journal “Inverse Problems”.

- [29] B. Turcksin, J. C. Ragusa, and W. Bangerth. Goal-oriented h -adaptivity for the multigroup SP_N equations. *Nuclear Science and Engineering*, 165:305–319, 2010.
- [30] Wolfgang Bangerth, Michael Geiger, and Rolf Rannacher. Adaptive Galerkin finite element methods for the wave equation. *Computational Methods in Applied Mathematics*, 10:3–48, 2010.
- [31] Chih-Che Chueh, Marc Secanell, Wolfgang Bangerth, and Ned Djilali. Multi-level adaptive simulation of transient two-phase flow in heterogeneous porous media. *Comp. Fluids*, 39:1585–1596, 2010.
- [32] Wolfgang Bangerth, Carsten Burstedde, Timo Heister, and Martin Kronbichler. Algorithms and data structures for massively parallel generic adaptive finite element codes. *ACM Trans. Math. Softw.*, 38:14/1–28, 2011.
- [33] Moritz Allmaras and Wolfgang Bangerth. Reconstructions in ultrasound modulated optical tomography. *J. Inv. Ill-posed problems*, 19:801–823, 2011.
- [34] Moritz Allmaras, Wolfgang Bangerth, Jean Marie Linhart, Javier Polanco, Fang Wang, Kainan Wang, Jennifer Webster, and Sarah Zedler. Estimating parameters in physical models through Bayesian inversion: A complete example. *Accepted for publication in SIAM Review*, 2011.

Software

- [1] Wolfgang Bangerth, Ralf Hartmann, and Guido Kanschat. `deal.II` *Differential Equations Analysis Library*. <http://www.dealii.org/>.

Freely available versions of the Open Source `deal.II` software are periodically released. The latest release 7.1 was made available in October 2011, see

<http://www.dealii.org/developer/news/news.html>

`deal.II` is widely used around the world in research and teaching. An attempt at listing all publications prepared using the library can be found at

<http://www.dealii.org/developer/publications/index.html>

Proceedings articles (not peer reviewed)

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