Wolfgang Bangerth: Curriculum Vitae

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Born	May 14th, 1973, Ostfildern, Germany
Citizenship	Germany, United States

Contents

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 Appointments

2001	Exterior Research Fellow with Industrial Research Ltd., Wellington, New Zealand.
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.
2005–2009	Assistant Professor, Department of Mathematics, Texas A&M University.
2009–2012	Associate Professor, Department of Mathematics, Texas A&M University.
2013–2017	Professor, Department of Mathematics, Texas A&M University.
2016–	Professor, Department of Mathematics, Colorado State University.
2019–	Professor (by courtesy), Department of Geosciences, Colorado State University.

3 Professional experience

1998–	Principal author and maintainer of the deal.II finite element library (see http://www.dealii.org/).
2005–2015	Elected member of the Science Steering Committee (2005–2008, 2008–2011) and Executive Committee (2011–2015), Computational Infrastructure in Geodynamics, an NSF-funded center devoted to the creation of open source software in geophysics (see http://www.geodynamics.org/).
2009–2011	Member, Executive Committee of the Department of Mathematics, Texas A&M University.
2009–2014	Member, editorial board, SIAM Journal on Scientific Computing (SISC).
2010–2014	Member, Executive Committee of the Institute for Applied Mathematics and Computational Science (IAMCS), Texas A&M University.
2011–	Member, editorial board, ACM Transactions on Mathematical Software (ACM TOMS).
2013–2015	Member, Executive Committee, Council of Principal Investigators, Texas A&M University.
2016–2019	Member, NSF Advisory Committee on Software Infrastructure for Heterogeneous Computing.
2017–2020	Member, Executive Committee of the Department of Mathematics, Colorado State University.
2018–	Editor-in-Chief, ACM Transactions on Mathematical Software (ACM TOMS).
2020–	Member, NSF Advisory Committee on Reproducibility.

4 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	A program of mine based on deal.II finite element library software is accepted into the computing industry standard SPEC CPU2006 benchmark (see http://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
2014	Outstanding Teaching Award, Dept. of Mathematics, Texas &M University
2017	A program of mine based on deal.II finite element library software is accepted into the computing industry standard SPEC CPU2017 benchmark (see http://www.spec.org/); the award is $5,000
2019 and 2020	Outstanding Professor in Graduate Education, Dept. of Mathematics, Colorado State University.

5 Teaching and mentoring

5.1 Regular courses

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.
2012	MATH 601: Methods of applied mathematics I.
2013	MATH 676: Finite element methods in scientific computing. MATH 437: Principles of numerical analysis.
2014	MATH 689: Numerical optimization. MATH 442: Mathematical modeling.
2015	MATH 676: Finite element methods in scientific computing. MATH 442: Mathematical modeling.
2016	MATH 442: Mathematical modeling.
2017	MATH 561: Numerical analysis I.
2018	MATH 451: Introduction to numerical analysis II. MATH 676: Finite element methods in scientific computing. MATH 545: Partial differential equations I. MATH 620: Variational methods and optimization.
2019	MATH 651: Numerical analysis II. MATH 546: Partial differential equations II. DSCI 320: Optimization methods in data science.
2020	MATH 317: Advanced calculus of one variable. MATH 652: Advanced numerical methods for PDEs. MATH 620: Variational methods and optimization. DSCI 320: Optimization methods in data science.
2021	MATH 545: Partial differential equations I. MATH 592: First year graduate student seminar. DSCI 320: Optimization methods in data science.
2022	MATH 332: Partial differential equations. MATH 417: Advanced calculus I. MATH 592: First year graduate student seminar. MATH 651: Numerical analysis II.

Curriculum development
Developed the new course "MATH 676: Finite element methods in scientific computing" (taught as MATH 664 in the spring of 2006).

5.2 Summer and short courses

2012	2-week course *Finite element methods in scientific computing*, Heidelberg, Germany, March 19–30, 2012
	2-week course *Practical parameter estimation methods*, Heidelberg, Germany, July 9–20, 2012
2013	2-day course *Solving PDEs with finite elements via the deal.II library*, EU regional school 2013, Aachen Institute for Advanced Study in Computational Engineering Science, Aachen, Germany, May 8–10, 2013
	3-day course *Finite element methods in scientific computing*, Center for High Performance Computing, University of Cape Town, Cape Town, South Africa, August 5–7, 2013
2014	5-day course *Finite element methods in scientific computing*, Seoul National University, South Korea, June 16–20, 2014
	2-day course *Using and extending the mantle convection code ASPECT*, Earth-Life Institute Summer School, Tokyo, Japan, August 1–3, 2014
2017	5-day course *Using and extending the mantle convection code ASPECT*, Chinese Academy of Sciences, Beijing, China, June 19–26, 2017.
2018	5-day course *Finite element methods in scientific computing*, Beijing Computational Science Research Center, Beijing, China, May 21–25, 2018.
2022	2-day course *Using and extending the mantle convection code ASPECT*, Seoul National University, South Korea, June 16–17, 2022.

5.3 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 Now a postdoc at Queen's University, Canada.
Nate Fredette	Department of Nuclear Engineering, Texas A&M University; co-chair of M.Sc. committee; graduated in 2011 Now a designer at DoE's Knolls Atomic Power Laboratory.
Moritz Allmaras	Department of Mathematics, Texas A&M University; chair of Ph.D. committee; graduated in 2011 Now a researcher at Siemens, Germany
Jennifer Webster	Department of Mathematics, Texas A&M University; chair of Ph.D. committee; graduated in 2013 Now a researcher at Pacific Northwest National Lab
Kainan Wang	Department of Mathematics, Texas A&M University; chair of Ph.D. committee; graduated in 2014 Now a postdoc at the University of Texas at Austin
Fang Wang	Department of Mathematics, Texas A&M University; chair of Ph.D. committee; graduated in 2014 Now a software developer at Stata
Hung-Chieh Chu	Department of Mechanical Engineering, Texas A&M University; co-chair of Ph.D. committee; graduated in 2017
Arezou Ghesmati	Department of Mathematics, Texas A&M University; chair of Ph.D. committee; graduated in 2017
Justin O'Connor	Department of Mathematics, Colorado State University
Danny Long	Department of Mathematics, Colorado State University
Tyler Anderson	Department of Mathematics, Colorado State University

I have served more often than is worth counting as a member 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)
2014-2016	Lei Qiao (Aerospace Department, Northwestern Polytechnical University, China; Lei was a long-term visitor in my group for 18 months)
2015-2016	Juliane Dannberg (Geosciences Research Center – GFZ – Potsdam, Germany; Juliane was a long-term visitor in my group for the last year of her PhD time)
2018	Marc Fehling (Forschungszentrum Jülich, Germany; Marc was a long-term visitor in my group for 7 months)

5.4 Mentoring of postdocs

2008–2011	Jean Marie Linhart Now on the faculty of Central Washington University
2011–2013	Timo Heister Now on the faculty of Clemson University
2011, 2013	Jörg Frohne (as long-term visitor for several months) Now a postdoctoral researcher, Dortmund University and Siegen University, Germany
2012–2014	Markus Bürg Now at a private company in The Netherlands
2013–2015	Bruno Turcksin Now at Oak Ridge National Laboratory
2015–2018	Rene Gassmöller Now on the faculty of the University of Florida
2016–2018	Juliane Dannberg Now on the faculty of the University of Florida
2020–	Marc Fehling

6 Community involvement

6.1 Editorial boards

Member, editorial board, SIAM Journal on Scientific Computing (SISC), 2009–2014.

Member, editorial board, SIMAI Springer Series (a book series on computational science and applied mathematics; editor-in-chief: Luca Formaggia), 2012-2014.

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

Editor in Chief, ACM Transactions on Mathematical Software (ACM TOMS), since 2018.

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

6.2 Advisory councils, evaluation panels, reviewing

Member, NSF Advisory Committee on Software Infrastructure for Heterogeneous Computing, 2016–2019.

Elected member of the Science Steering Committee and later the Executive Committee, Center for Computational Infrastructure in Geodynamics (CIG), located first at Caltech and later at the University of California, Davis, 2005–2015, 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, 2010–2015.

Member, High Performance Computing Committee, Institute for Applied Mathematics and Computational Science, Texas A&M University; 2008–2015.

Member, Intellectual Property Constituent Committee, Texas A&M University; 2012–2015.

NSF Panelist for Cyberenabled Discovery and Innovation (CDI) Type II proposals, 2008.

NSF Panelist for Inverse Problems proposals, 2009.

Member, evaluation committee for Department of Energy SciDAC Applied Math Mid-Term Reviews, 2009.

Reviewer, Department of Energy Graduate Research Fellowship Program, 2010, 2012.

NSF Panelist for Sustained Innovation through Software Infrastructure (SI2) proposals, 2010, 2013, 2014, 2015.

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

6.3 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 Conference 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 Humanity (SPLASH), 2010", Reno/Tahoe, NV, 2010.

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

Co-organizer of session "Software in CS&E" and "Information Theory – Inversion Problems, Applications and Algorithms", SIAM Computational Science and Engineering Conference, Boston, February 2013.

Co-organizer of the session "Advances in Computational Methods in Solid Earth Geophysics", American Geophysical Union Fall Conference, San Francisco, December 2013.

Organizer, "Fourth deal.II users and developers workshop", College Station, TX, August 2013.

Organizer, "First ASPECT Users and Developers Hackathon", College Station, TX, May 2014.

Organizer, "Fifth deal.II users and developers workshop", College Station, TX, August 2015.

Organizer, "Second ASPECT Users and Developers Hackathon", Bodega Bay, CA, May 2015.

Member of the program committee of the annual "Supercomputing" conference, 2013, 2015, 2016.

Member of the program committee of the "IEEE Cluster" conference, 2016.

6.4 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, 2009–2015.

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.

7 Support

Currently funded support:

- NSF award EAR-1550901: "Computational Infrastructure for Geodynamics" (8/15/2016–7/31/2021): Member of proposal writing committee; PI is Louise Kellogg, University of California, Davis; $8,500,000.
- Subcontract from Computational Infrastructure for Geodynamics (an NSF-funded research center): "Geoinformatics: Facility Support: Computational Infrastructure for Geodynamics" (8/15/2016–7/31/2021): PI; $595,051.
- NSF award OAC-1743188: "SI2-S2I2 Conceptualization: Conceptualizing a US Research Software Sustainability Institute (URSSI)" (12/15/2017–6/30/2019): Senior personnel; PI is Karthik Ram, University of California, Berkeley; $499,999.
- NSF award DMS-1821210: "Collaborative Research: Efficient Coupling of Multilevel Partial Differential Equation Solvers and Advanced Sampling Methods" (9/1/2018–8/31/2022): PI; $260,000 (of this, $180,000 go to Colorado State University).
- NSF award OAC-1835673: "Collaborative Research: Frameworks: Software: Future Proofing the Finite Element Library deal.II – Development and Community Building" (10/1/2018–9/30/2023): PI; $1,700,000 (of this, $1,000,000 go to Colorado State University).
- NSF award EAR-1925595: "Collaborative Research: Development and Application of a Framework for Integrated Geodynamic Earth Models" (9/1/2019–8/31/2024): PI; $2,480,242 (of this, $679,697 go to Colorado State University).

Past support:

- Deutsche Forschungsgemeinschaft (DFG, German Science Foundation) postdoctoral 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.

- 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.

- 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.

- King Abdullah University of Science and Technology: "Institute for Applied Mathematics and Computational Science (IAMCS) at Texas A&M University" (6/1/2008–5/31/2014): collaborator; $24,720,657.

- Sloan Foundation Research Fellowship: "Inverse Problems and Computational Science" (9/1/2008–8/31/2010): PI; $50,000.

- 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.

- Institute for Applied Mathematics and Computational Science (Texas A&M University) Innovation Award: "Simulating chemically reactive, laminar flow" (6/1/2012–5/31/2013): PI; $25,000 + $15,000 for travel.

- Computational Infrastructure for Geodynamics: Workshop support for "Developer meeting for the ASPECT code" (5/14–23/2014): PI; $20,000.

- NSF award EAR-0949446: "Geoinformatics: Facility Support: Computational Infrastructure for Geodynamics" (7/1/2010–6/30/2016): 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" (7/1/2010–6/30/2016): PI; $814,221.

- NSF award OCI-1148116: "Collaborative Research: SI2-SSI: Open source support for massively parallel, generic finite element methods" (7/1/2012–6/30/2018): PI; $1,493,420 (of this, $1,311,834 go to Texas A&M University/Colorado State University).

- Korean National Science Foundation: "Implementation of nonconforming finite elements in the adaptive finite element package deal.II and development of nonconforming finite element library for the simulation of semiconductor" (11/2014-10/2016): Investigator; PI is Dongwoo Sheen; 200,000,000 Won (approximately $180,000).

8 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] W. 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] M. Downey. Bombs away. *Advance: Research, Scholarship and Creative Achievement at Texas A&M University*, pages 16–18, 2009.

[4] V. Patel. Texas A&M researcher receives $1.3 million to make supercomputing easier. College of Science, Texas A&M University: News & Events March 2013, see http://www.science.tamu.edu/articles/1001; this article was re-published in many other venues, including HPCwire, FreshNews, and the Dallas Business Journal.

[5] E. Mulvaney. Texas a&m researcher receives grant 'supercomputing' work. Houston Chronicle, March 28, 2013, see http://www.chron.com/news/houston-texas/houston/article/Texas-A-M-researcher-receives-grant-for-4391680.php.

[6] V. Patel. Researchers turn to Texas A&M software to visualize Earth's interior. College of Science, Texas A&M University: News & Events May 2013, see http://www.science.tamu.edu/articles/1066.

[7] S. Hutchins. Mathematics couple co-authors paper on supercomputing. College of Science, Texas A&M University: News & Events October 2014, see http://www.science.tamu.edu/news/story.php?story_ID=1290.

[8] A. Manning. Simulation software with humble beginnings receives $1.7 million from nsf. Colorado State University, SOURCE, September 23, 2018, see https://natsci.source.colostate.edu/simulation-software-with-humble-beginnings-receives-1-7-million-from-nsf.

Books

[1] W. Bangerth and R. Rannacher. *Adaptive Finite Element Methods for Differential Equations*. Birkhäuser Verlag, 2003.

Editorials

[1] W. Bangerth and T. Heister. Quo vadis, scientific software? Editorial, SIAM News, January 2014.

[2] W. Bangerth, J. Dannberg, R. Gassmöller, and T. Heister. Computational modeling of convection in the earths mantle. Editorial, SIAM News, March 2016.

Peer reviewed articles

[1] W. Bangerth and R. 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] W. Bangerth and R. Rannacher. Adaptive finite element techniques for the acoustic wave equation. *J. Comput. Acoustics*, 9(2):575–591, 2001.

[3] W. Bangerth. Starting threads in a C++ compatible fashion. *C/C++ Users Journal*, pages 21–24, October 2003.

[4] W. Bangerth, M. Grote, and C. 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] G. F. Carey, W. Barth, J. A. Woods, B. Kirk, M. L. Anderson, S. Chow, and W. Bangerth. Modeling error and constitutive relations in simulation of flow and transport. *International Journal for Numerical Methods in Fluids*, 46:1211–1236, 2004.

[6] H. Klie, W. Bangerth, M. Wheeler, M. Parashar, and V. 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] A. Joshi, W. Bangerth, and E. M. Sevick-Muraca. Adaptive finite element modeling of optical fluorescence-enhanced tomography. *Optics Express*, 12(22):5402–5417, November 2004.

[8] A. Joshi, W. Bangerth, A. B. Thompson, and E. 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] W. Bangerth, A. Joshi, and E. M. Sevick-Muraca. Adaptive finite element methods for increased resolution in fluorescence optical tomography. *Progr. Biomed. Optics Imag.*, 6:318–329, 2005.

[10] W. Bangerth, H. Klie, V. Matossian, M. Parashar, and M. Wheeler. An autonomic reservoir framework for the stochastic optimization of well placement. *Cluster Computing*, 8:255–269, 2005.

[11] M. Anderson, W. Bangerth, and G. 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] M. Parashar, H. Klie, U. Catalyurek, T. Kurc, W. Bangerth, V. Matossian, J. Saltz, and M. 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] A. Joshi, W. Bangerth, K. Hwang, J. C. Rasmussen, and E. M. Sevick-Muraca. Plane wave fluorescence tomography with adaptive finite elements. *Optics Letters*, 31:193–195, 2006.

[14] A. Joshi, W. Bangerth, and E. 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] A. Joshi, W. Bangerth, K. Hwang, J. C. Rasmussen, and E. 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] A. Joshi, W. Bangerth, and E. M. Sevick-Muraca. Non-contact fluorescence optical tomography with scanning patterned illumination. *Optics Express*, 14(14):6516–6534, 2006.

[17] W. Bangerth, H. Klie, M. F. Wheeler, P. Stoffa, and M. Sen. On optimization algorithms for the reservoir oil well placement problem. *Comp. Geosciences*, 10:303–319, 2006.

[18] H. Klie, W. Bangerth, X. Gai, M. F. Wheeler, P. L. Stoffa, M. Sen, M. Parashar, U. Catalyurek, J. Saltz, and T. Kurc. Models, methods and middleware for Grid-enabled multiphysics oil reservoir management. *Engineering with Computers*, 22:349–370, 2006.

[19] K. Hwang, T. Pan, A. Joshi, J. C. Rasmussen, W. Bangerth, and E. M. Sevick-Muraca. Influence of excitation light rejection on forward model mismatch in optical tomography. *Phys. Med. Biol.*, 51(22):5889–5902, 2006.

[20] W. Bangerth, R. Hartmann, and G. Kanschat. deal.II – a general purpose object oriented finite element library. *ACM Trans. Math. Softw.*, 33(4):24/1–24/27, 2007.

[21] A. Joshi, W. Bangerth, R. Sharma, W. Wang, and E. 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] W. Bangerth, A. Joshi, and E. 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] W. Bangerth. A framework for the adaptive finite element solution of large inverse problems. *SIAM J. Sc. Comput.*, 30:2965–2989, 2008.

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Freely available versions of the Open Source deal.II software are periodically released. The latest release 9.2 was made available in May 2020, see

http://www.dealii.org/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/publications.html

I am also the author of the ASPECT code to simulate convection in the earth mantle and that is used in the geosciences, see http://aspect.geodynamics.org. It is accompanied by a 580-page manual. Its version 2.2 was released in June 2020.

Video lectures

Starting in the spring 2013 semester, I have recorded a sequence of 71 lectures on computational science that are available on YouTube. The YouTube channel for these lectures can be found here. The primary site for these videos, providing a description of every lecture and other material is at https://www.math.colostate.edu/~bangerth/videos.html.
The videos are used in teaching at a number of universities around the world, as well as by users of the deal.II library referenced in the previous section. Collectively, they are viewed approximately 1,800 times per month.

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