

CURRICULUM VITAE

Michael J. Holst

Department of Mathematics
University of California, San Diego
9500 Gilman Drive, Dept. 0112
La Jolla, CA 92093-0112 USA

Phone: 858-534-4899
FAX: 858-534-5273
Email: mholst@math.ucsd.edu
URL: <http://ccom.ucsd.edu/~mholst>

APPOINTMENTS

Professor of Mathematics	University of California, San Diego	2003–
Visiting Associate in Physics	California Institute of Technology	2002–
Associate Professor of Mathematics	University of California, San Diego	2000–2003
Assistant Professor of Mathematics	University of California, San Diego	1998–2000
Assistant Professor of Mathematics	University of California, Irvine	1997–1998

EDUCATION

California Institute of Technology	Applied Mathematics	von Karman Instructor	1995–1997
California Institute of Technology	Applied Mathematics	Prize Research Fellow	1993–1995
University of Illinois	Numerical Analysis	Ph.D.	1993
University of Illinois	Numerical Analysis	M.S.	1990
Colorado State University	Mathematics	B.S.	1987

RESEARCH AREAS

General: Applied Analysis, Computational Mathematics, Partial Differential Equations.

Specific: Adaptive Finite Element Methods, Geometric PDE, Biophysics, General Relativity.

STUDENTS

Doctoral students (4 completed, 4 current): B. Aksoylu (2001; Louisiana State University); N. Baker (2001; Washington University); K. Scully (2003; Aerospace Corporation); J. Fenwick (2005; Far-Tech Corporation). Current: R. Szymowski (2008; UCSD); D. McAllaster (2009; UCSD); J. Serencsa (2010; UCSD); M. Ebrahimi (2010; UCSD).

Postdoctoral scholars (7 completed, 7 current): F. Wang (2000-2001; Oracle); S. Bond (2000-2003; University of Illinois at Urbana-Champaign); H. MacMillan (2001-2003; Clemson University); J. Suen (2002-2004; UCLA); O. Sarbach (2005-2006; Univ. Michoacana); L. Chen (2005-2006; UC Irvine); A. Malqvist (2006-2007; Uppsala). Current: G. Nagy (2004-; Max-Planck); D. Reynolds (2005-; LLNL); Y. Zhou (2006-; Michigan State); Z. Yu (2006-; UT Austin); G. Tsogtgerel (2006-; Utrecht); E. Lunasin (2006-; UC Irvine); Y. Zhu (2008-; Penn State).

Undergraduate research/thesis students (6 completed, 4 current): J. Kleint (2002; UCSD); J. Noble (2003; UCSD); R. Page (2006; UC Berkeley); P. Sanan (2006; UCSD); B. Nguyen (2006; UCSD); J. Kommemi (2006,2007; UCSD); Current: E. Eldridge (2007,2008; UCSD); C. Wood (2008; UCSD); K. Farrell (2008; UCSD); N. Miller (2008; UCSD);

AWARDS AND FELLOWSHIPS

UCSD Outstanding Faculty Mentor Award (2005–2006)
NSF CAREER Award (1999–2004)
UCSD Hellman Fellow (1999)
UCI COR Award (1998)
Caltech Prize Research Fellow (1993–1995)

SELECTED SERVICE ACTIVITIES

Co-Director, Center for Computational Mathematics (<http://ccom.ucsd.edu/>).

Co-Director, Computational Science, Mathematics, & Engineering (<http://csme.ucsd.edu/>).

Senior Scientist, Center for Theoretical Biological Physics (<http://ctbp.ucsd.edu/>).

Core Investigator, National Biomedical Computation Resource (<http://nbcrc.ucsd.edu/>).

Executive Committee, San Diego Supercomputer Center (<http://www.sdsc.edu/>).

Steering Committee, La Jolla Interfaces in Science (<http://ljis.ucsd.edu/>).

Participating Faculty, Interfaces Ph.D. Program (<http://interfaces.ucsd.edu/>).

Participating Faculty, Bioinformatics Ph.D. Program (<http://bioinformatics.ucsd.edu/>).

Founding Member, Center for Computational Mathematics (<http://ccom.ucsd.edu/>).

Director, HRG Research Group (<http://ccom.ucsd.edu/~mholst/group/>).

Project Lead, FETK: The Finite Element ToolKit (<http://www.FETK.org/>).

Advisor, UCSD Mathematics Honors Program.

Advisor, Cal(IT)² Undergraduate Summer Research Program.

Advisor, UC STARS Undergraduate Summer Research Program.

Advisor, UC LEADS Undergraduate Summer Research Program.

Lecturer, UCSD Freshman Seminar Program.

Chairman, Warren College Executive Committee (<http://provost.ucsd.edu/warren/>).

Member, UCSD Academic Senate Committee on Academic Information Technology (CAIT).

Member, UCSD Center for Nonlinear Science (CNLS) Sunset Review Committee.

Member, UCSD Campus-wide promotion ad-hoc committees.

AMS, SIAM, ACM Memberships.

Technical Reviewer: SIAM, AMS, Springer, and other books and technical journals.

Technical Reviewer: NSF, DOE, and NIH funding proposals (panels and individual reviews).

Editorial Boards: SIAM J. Numer. Anal. (2004–), SIAM Rev. (2003–2006),
Comm. in Math. Sci. (2003–2006)

University of Chicago Review Committee, ANL Math and CS Division (MCS).

Steering Committee, So. Cal. Applied Mathematics Symposium (<http://socams.ucsd.edu/>).

Caltech Program on Numerical GR Organizing Committee: Evolution Equation Formulation
(Fall 2002, <http://www.tapir.caltech.edu/GWSourceSimulation/>).

Caltech Program on Numerical GR Organizing Committee: Initial Data Problem
(Winter–Spring 2003, <http://www.tapir.caltech.edu/GWSourceSimulation/>).

University of Miami Waves 2004 Session Organizer: Numerical GR
(Winter 2004, <http://www.math.miami.edu/anno/waves/>).

IPAM Workshop Organizing Committee: Relativistic Astrophysics
(Spring 2005, <http://www.ipam.ucla.edu/programs/pcaws3/>).

Beijing Workshop Organizing Committee: Adaptive and Multilevel Methods for PDE
(August 2006, <http://ccse.pku.edu.cn/06summerschool/conference.html>)

MSRI Workshop Organizing Committee: Recent Developments in Numerical Methods
and Algorithms for Geometric Evolution Equations
(Spring 2007, http://www.msri.org/calendar/workshops/WorkshopInfo/417/show_workshop).

IMA Workshop Organizing Committee: Mathematics and Chemistry
(Fall 2008, <http://www.ima.umn.edu/2008-2009/>).

FUNDING AWARDS

17. NSF DMS/CM 0715146, (*PI; with D. Estep, G. Nagy*), \$180,000, 2007–2010.
16. NSF SCREMS 0619173, (*PI; with R. Bank, L.-T. Cheng, P. Gill, B. Li*), \$130,000, 2006.
15. DOE DE-FG02-05ER25707, (*PI; with B. Li, J. Weare*), \$797,032, 2005–2008.
14. NSF DMS/CM 0511766, (*Co-PI; with R. Bank, L.-T. Cheng, P. Gill*), \$505,108, 2005–2008.

13. NSF DMS/CM 0411723, (*PI; single investigator*), \$239,000, 2004–2007.
12. DOE DE-FG02-04ER25620, (*Co-PI; with D. Estep, S. Tavener*), \$940,972, 2004–2007.
11. NIH P41 RR08605, (*Co-PI; with P. Arzberger, K. Baldrige, C. Baru, M. Ellisman, M. Gribskov, A. McCammon, A. McCulloch, A. Mihaylova, P. Papadopoulos W.-J. Rappel*), \$8,998,955, 2004–2009.
10. NSF ITR 0225630, (*Co-PI; with H. Levine, J.N. Onuchic, K.K. Baldrige, W.-J. Rappel*), \$5,000,000, 2002–2007.
9. NSF DMS/CM 0208449, (*Co-PI; with P. Gill, R. Bank, L.-T. Cheng*), \$431,000, 2002–2005.
8. NSF DMS/CM CAREER AWARD 9875856, (*PI; single investigator*), \$200,000, 1999–2004.
7. DOE SCI-DAC 21-6993, (*Co-PI; with J. Mitchell, L. Ten Eyck, A. McCammon, V. Roberts, B. Rosen*), \$1,044,240, 2001–2004.
6. NSF SCREMS 0112413, (*PI; with R. Bank, L.-T. Cheng, P. Gill*), \$45,000, 2001.
5. NSF DMS/CM 9973276, (*Co-PI; with R. Bank, P. Gill*), \$245,000, 1999–2002.
4. DASSAULT AVIATION, (*Co-PI; with R. Bank*), \$20,000, 1999–2000.
3. UCSD HELLMAN FELLOWSHIP, (*PI; single investigator*), \$27,300, 1999–2000.
2. UCI COR AWARD, (*PI; single investigator*), \$3,500, 1998–1999.
1. CALTECH PRIZE RESEARCH FELLOWSHIP, (*PI; single investigator*), 1993–1995.

JOURNAL ARTICLES

56. M. HOLST AND G. TSOGTGEREL, *Convergent adaptive finite element approximation of the Einstein constraints*. Preprint.
55. B. AKSOYLU, D. BERNSTEIN, S. BOND, AND M. HOLST, *Generating initial data in general relativity using adaptive finite element methods*. Submitted to *Class. Quantum Grav.* Available as arXiv:0801.3142 [gr-qc].
54. O. KOROBKIN, B. AKSOYLU, M. HOLST, E. PAZOS, AND M. TIGLIO, *Solving the Einstein constraints on multi-block triangulations using finite elements*. Submitted to *J. Comput. Phys.* Available as arXiv:0801.1823 [gr-qc].
53. M. HOLST, Z. YU, AND Y. ZHOU, *Practical adaptive finite element modeling techniques for the Poisson-Boltzmann equation*. Preprint.
52. Y. CHENG, C. CHANG, Z. YU, Y. ZHANG, M. SUN, T. S. LEYH, M. HOLST, AND J. A. MCCAMMON, *Diffusional channeling in the sulfate activating complex: combined continuum modeling and coarse-grained Brownian dynamics studies*. Submitted to *Biophys. J.*
51. M. HOLST AND A. MALQVIST, *Existence of weak solutions to the coupled nonlinear Joule heating problem*. Submitted to *Comm. Math. Sci.*
50. M. HOLST, J. KOMMEMI, AND G. NAGY, *Rough solutions of the Einstein constraint equations with nonconstant mean curvature*. Submitted to *Comm. Math. Phys.* Available as arXiv:0708.3410 [gr-qc].
49. M. HOLST, G. NAGY, AND G. TSOGTGEREL, *Far-from-constant mean curvature solutions of Einstein's constraint equations with positive Yamabe metrics*, *Physical Review Letters*, 100 (2008), pp. 161101.1–161101.4. Available as arXiv:0802.1031 [gr-qc].
48. M. HOLST, G. NAGY, AND G. TSOGTGEREL, *Rough solutions of the Einstein constraints on closed manifolds without near-CMC conditions*. Accepted for Publication in *Comm. Math. Phys.* Available as arXiv:0712.0798 [gr-qc].
47. T. HAYASHI, M. MARTONE, Z. YU, A. THOR, M. DOI, M. HOLST, M. ELLISMAN, AND M. HOSHIJIMA, *Three-dimensional reconstruction reveals new details of membrane systems for calcium signaling in the heart*. Submitted to *Journal of Cell Biology*.
46. Z. YU, M. HOLST, T. HAYASHI, C. BAJAJ, M. ELLISMAN, J. A. MCCAMMON, AND M. HOSHIJIMA, *Multiscale geometric modeling of ventricular myocytes: bridging the gap between imaging and simulation*. Submitted to *Journal of Structural Biology*.

45. S. LU, A. MICHAILOVA, J. SAUCERMAN, Y. CHENG, Z. YU, T. KAISER, W. LI, R. BANK, M. HOLST, A. MCCAMMON, T. HAYASHI, M. HOSHIJIMA, P. ARZBERGER, AND A. MCCULLOCH, *Multi-scale modeling of ventricular myocytes: Contributions of structural and functional heterogeneities to excitation-contraction coupling in the normal and failing rodent heart*. Accepted for Publication in IEEE Journal on Engineering in Medicine and Biology.
44. B. LU, Y. ZHOU, M. HOLST, AND J. MCCAMMON, *Recent progress in numerical methods for the Poisson-Boltzmann equation in biophysical applications*, Comm. Comp. Phys., 3 (2008), pp. 973–1009.
43. Z. YU, M. HOLST, Y. CHENG, AND J. MCCAMMON, *Feature-preserving adaptive mesh generation for molecular shape modeling and simulation*, Journal of Molecular Graphics and Modeling, 26 (2008), pp. 1370–1380.
42. Z. YU, M. HOLST, AND J. MCCAMMON, *High-fidelity geometric modelling for biomedical applications*. Accepted for Publication in Finite Elements in Analysis and Design.
41. Y. ZHOU, B. LU, G. HUBER, M. HOLST, AND J. MCCAMMON, *Continuum simulations of acetylcholine consumption by acetylcholinesterase: A Poisson-Nernst-Planck approach*, J. Phys. Chem. B, 112 (2008), pp. 270–275.
40. B. LU, Y. ZHOU, G. HUBER, S. BOND, M. HOLST, AND J. MCCAMMON, *Electrodiffusion: A continuum-modeling framework for biomolecular systems with realistic spatiotemporal resolution*, Phys. J. Chem. Phys., 127 (2007), pp. 135102.1–135101.16.
39. Y. ZHOU, M. HOLST, AND J. MCCAMMON, *Nonlinear elastic modeling of macromolecular conformational change induced by electrostatic forces*, J. Math. Anal. Appl., 340 (2008), pp. 135–164.
38. L. CHEN, M. HOLST, AND J. XU, *The finite element approximation of the nonlinear Poisson-Boltzmann Equation*, SIAM J. Numer. Anal., 45 (2007), pp. 2298–2320.
37. L. CHEN, M. HOLST, AND J. XU, *Convergence and optimality of adaptive mixed finite element methods*. Accepted for Publication in Math. Comp.
36. W. LI, N. BAKER, K. BALDRIDGE, J. MCCAMMON, M. ELLISMAN, A. GUPTA, M. HOLST, A. MCCULLOCH, A. MICHAILOVA, P. PAPADOPOULOS, A. OLSON, M. SANNER, AND P. ARZBERGER, *National Biomedical Computation Resource (NBCR): Developing End-to-End Cyberinfrastructure for Multiscale Modeling in Biomedical Research*, CTWatch Quarterly: Trends and Tools in Bioinformatics and Computational Biology, 2 (2006), pp. 6–17.
35. Y. CHENG, J. SUEN, D. ZHANG, S. BOND, Y. ZHANG, N. BAKER, C. BAJAJ, M. HOLST, AND J. A. MCCAMMON, *Finite element analysis of the time-dependent smoluchowski equation for acetylcholinesterase reaction rate calculations*, Biophys. J., 92 (2007), pp. 3397–3406.
34. Y. CHENG, J. SUEN, Z. RADIC, S. BOND, M. HOLST, AND J. A. MCCAMMON, *Continuum simulations of acetylcholine diffusion with reaction-determined boundaries in neuromuscular junction models*, Biophys. Chem., 127 (2007), pp. 129–139.
33. B. AKSOYLU AND M. HOLST, *Optimality of multilevel preconditioners for local mesh refinement in three dimensions*, SIAM J. Numer. Anal., 44 (2006), pp. 1005–1025.
32. D. ZHANG, J. SUEN, Y. ZHANG, Y. SONG, Z. RADIC, P. TAYLOR, M. HOLST, C. BAJAJ, N. BAKER, AND J. A. MCCAMMON, *Tetrameric mouse acetylcholinesterase: Continuum diffusion rate calculations by solving the steady-state smoluchowski equation using finite element methods*, Biophys. J., 88 (2005), pp. 1659–1665.
31. M. HOLST, L. LINDBLOM, R. OWEN, H. PFEIFFER, M. SCHEEL, AND L. KIDDER, *Optimal constraint projection for hyperbolic evolution systems*, Phys. Rev. D, 70 (2004), pp. 84017(1)–84017(17). Available as arXiv:gr-qc/0407011.
30. D. ESTEP, M. HOLST, AND M. LARSON, *Generalized Green’s functions and the effective domain of influence*, SIAM J. Sci. Comput., 26 (2005), pp. 1314–1339.
29. B. AKSOYLU, S. BOND, AND M. HOLST, *An odyssey into local refinement and multilevel preconditioning III: Implementation and numerical experiments*, SIAM J. Sci. Comput., 25 (2003), pp. 478–498.
28. R. BANK AND M. HOLST, *A new paradigm for parallel adaptive mesh refinement*, SIAM Rev., 45 (2003), pp. 291–323.

27. K. TAI, S. BOND, H. MACMILLAN, N. BAKER, M. HOLST, AND J. A. MCCAMMON, *Finite element simulations of acetylcholine diffusion in neuromuscular junctions*, *Biophys. J.*, 84 (2003), pp. 2234–2241.
26. M. HOLST, *Applications of domain decomposition and partition of unity methods in physics and geometry (plenary paper)*, in Proceedings of the fourteenth international conference on domain decomposition methods, Cocoyoc, Mexico, I. Herrera, D. Keyes, O. Widlund, and R. Yates, eds., Domain Decomposition Methods in Science and Engineering, Mexico City, Mexico, June 2003, National Autonomous University of Mexico (UNAM), pp. 63–78.
25. D. ESTEP, M. HOLST, AND D. MIKULENCAK, *Accounting for stability: a posteriori error estimates for finite element methods based on residuals and variational analysis*, *Communications in Numerical Methods in Engineering*, 18 (2002), pp. 15–30.
24. M. HOLST, *Adaptive numerical treatment of elliptic systems on manifolds*, *Advances in Computational Mathematics*, 15 (2001), pp. 139–191.
23. N. BAKER, D. SEPT, S. JOSEPH, M. HOLST, AND J. A. MCCAMMON, *Electrostatics of nanosystems: Application to microtubules and the ribosome*, *Proc. Natl. Acad. Sci. USA*, 98 (2001), pp. 10037–10041.
22. N. BAKER, K. TAI, R. HENCHMAN, D. SEPT, A. ELCOCK, M. HOLST, AND J. A. MCCAMMON, *Mathematics and molecular neurobiology*, in Proceedings of the 3rd International Workshop on Methods for Macromolecular Modeling, New York City, October 12-14, 2000., H. Gan and T. Schlick, eds., Computational Methods for Macromolecules: Challenges and Applications, New York, NY, 2002, Springer-Verlag.
21. N. BAKER, D. SEPT, M. HOLST, AND J. A. MCCAMMON, *The adaptive multilevel finite element solution of the Poisson-Boltzmann equation on massively parallel computers*, *IBM Journal of Research and Development*, 45 (2001), pp. 427–438.
20. N. BAKER, M. HOLST, AND F. WANG, *Adaptive multilevel finite element solution of the Poisson-Boltzmann equation II: refinement at solvent accessible surfaces in biomolecular systems*, *J. Comput. Chem.*, 21 (2000), pp. 1343–1352.
19. M. HOLST, N. BAKER, AND F. WANG, *Adaptive multilevel finite element solution of the Poisson-Boltzmann equation I: algorithms and examples*, *J. Comput. Chem.*, 21 (2000), pp. 1319–1342.
18. R. BANK AND M. HOLST, *A new paradigm for parallel adaptive mesh refinement*, *SIAM J. Sci. Comput.*, 22 (2000), pp. 1411–1443.
17. S. ASHBY, M. HOLST, T. MANTEUFFEL, AND P. SAYLOR, *The role of the inner product in stopping criteria for conjugate gradient iterations*, *BIT*, 41 (2001), pp. 26–53.
16. R. E. BANK, M. HOLST, B. MANTEL, J. PERIAUX, AND C. H. ZHOU, *CFD PPLTMG: Using a posteriori error estimates and domain decomposition*, in ECCOMAS 98, New York, NY, 1998, John Wiley & Sons.
15. M. HOLST AND S. VANDEWALLE, *Schwarz methods: to symmetrize or not to symmetrize*, *SIAM J. Numer. Anal.*, 34 (1997), pp. 699–722.
14. D. ZORIN, M. HOLST, AND P. SCHROEDER, *Subdivision-based surface representations*, in TeamCAD 97 Workshop, Atlanta, GA, 1997, pp. 35–38.
13. M. HOLST AND E. TITI, *Determining projections and functionals for weak solutions of the Navier-Stokes equations*, in Recent Developments in Optimization Theory and Nonlinear Analysis, Y. Censor and S. Reich, eds., vol. 204 of Contemporary Mathematics, Providence, Rhode Island, 1997, American Mathematical Society.
12. D. BERNSTEIN AND M. HOLST, *A 3D finite element solver for the initial-value problem*, in Proceedings of the Eighteenth Texas Symposium on Relativistic Astrophysics and Cosmology, December 16-20, 1996, Chicago, Illinois, A. Olinto, J. A. Frieman, and D. N. Schramm, eds., Singapore, 1998, World Scientific.
11. M. HOLST AND F. SAIED, *Multigrid and domain decomposition methods for electrostatics problems*, in Domain Decomposition Methods in Science and Engineering (Proceedings of the Seventh International Conference on Domain Decomposition, October 27-30, 1993, The Pennsylvania State University), D. E. Keyes and J. Xu, eds., American Mathematical Society, Providence, 1995.

10. M. HOLST AND F. SAIED, *Numerical solution of the nonlinear Poisson-Boltzmann equation: Developing more robust and efficient methods*, J. Comput. Chem., 16 (1995), pp. 337–364.
9. M. HOLST AND S. VANDEWALLE, *Schwarz methods: To symmetrize or not to symmetrize*, in Proceedings of the Seventh Copper Mountain Conference on Multigrid Methods, April 2-7, 1995, Copper Mountain, Colorado, J. Mandel and S. McCormick, eds., NASA Langley Research Center, 1995.
8. M. HOLST, *Kansas hosts macromolecular modeling workshop*, SIAM News, 28 (March 1995), pp. 11–11.
7. M. HOLST, *Symposium honors Herbert B. Keller*, SIAM News, 28 (December 1995), pp. 3–3.
6. M. HOLST, R. KOZACK, F. SAIED, AND S. SUBRAMANIAM, *Protein electrostatics: Rapid multigrid-based Newton algorithm for solution of the full nonlinear Poisson-Boltzmann equation*, J. Biomol. Struct. Dyn., 11 (1994), pp. 1437–1445.
5. M. HOLST, R. KOZACK, F. SAIED, AND S. SUBRAMANIAM, *Treatment of electrostatic effects in proteins: Multigrid-based-Newton iterative method for solution of the full nonlinear Poisson-Boltzmann equation*, Proteins: Structure, Function, and Genetics, 18 (1994), pp. 231–245.
4. M. HOLST, R. KOZACK, F. SAIED, AND S. SUBRAMANIAM, *Multigrid-based Newton iterative method for solving the full nonlinear Poisson-Boltzmann equation*, Biophysical Journal, 66 (1994), pp. A130–A130.
3. M. HOLST AND F. SAIED, *Multigrid solution of the Poisson-Boltzmann equation*, J. Comput. Chem., 14 (1993), pp. 105–113.
2. M. HOLST AND F. SAIED, *Multigrid methods for computational ocean acoustics on vector and parallel computers*, in Proceedings of the Third IMACS Symposium on Computational Acoustics, New York, NY, North Holland, 1993.
1. F. BODINE, M. HOLST, AND T. KERKHOVEN, *The three-dimensional depletion approximation computed with multigrid*, in Proceedings of the International Workshop on Computational Electronics, Leeds, UK, North Holland, 1993.

BOOKS, MONOGRAPHS, THESES, NOTES, REPORTS, MANUALS

19. B. AKSOYLU AND M. HOLST, *An odyssey into local refinement and multilevel preconditioning II: Stabilizing hierarchical basis methods*, Tech. Rep. ICES 05-04, Institute for Computational Engineering and Sciences, The University of Texas at Austin, 2005.
18. B. AKSOYLU AND M. HOLST, *An odyssey into local refinement and multilevel preconditioning I: Optimality of the BPX preconditioner*, Tech. Rep. ICES 05-03, Institute for Computational Engineering and Sciences, The University of Texas at Austin, 2005.
17. B. AKSOYLU, S. BOND, AND M. HOLST, *Implementation and theoretical aspects of the BPX preconditioner in the three-dimensional local mesh refinement setting*, Tech. Rep. ICES 04-50, Institute for Computational Engineering and Sciences, The University of Texas at Austin, 2004.
16. M. HOLST AND E. TITI, *Determining projections and functionals for weak solutions of the Navier-Stokes equations*, Tech. Rep. CRPC-96-4, Applied Mathematics and CRPC, California Institute of Technology, 1996.
15. M. HOLST AND S. VANDEWALLE, *Schwarz methods: to symmetrize or not to symmetrize*, Tech. Rep. CRPC-94-13, Applied Mathematics and CRPC, California Institute of Technology, 1994.
14. M. HOLST, R. KOZACK, F. SAIED, AND S. SUBRAMANIAM, *Treatment of electrostatic effects in proteins: Multigrid-based Newton iterative method for solution of the full nonlinear Poisson-Boltzmann equation*, Tech. Rep. UIUC-BI-MB-93-01, The Beckman Institute for Advanced Science and Technology, 1993.
13. S. ASHBY, M. HOLST, T. MANTEUFFEL, AND P. SAYLOR, *The role of the inner product in stopping criteria for conjugate gradient iterations*, Tech. Rep. UCRL-JC-112586, Lawrence Livermore National Laboratory, 1992.

12. M. HOLST AND F. SAIED, *Multigrid solution of the Poisson-Boltzmann equation*, Tech. Rep. UIUCDCS-R-92-1744, Numerical Computing Group, University of Illinois at Urbana-Champaign, 1992.
11. M. HOLST, *MCLite: An adaptive multilevel finite element MATLAB package for scalar nonlinear elliptic equations in the plane*. User's Guide to the MCLite software package.
10. M. HOLST, *Some bounds on the number of determining nodes for weak solutions of the Navier-Stokes equations*, Tech. Rep. CRPC-95-1, Applied Mathematics and CRPC, California Institute of Technology, 1995.
9. M. HOLST, *An Algebraic Schwarz Theory*, Tech. Rep. CRPC-94-12, Applied Mathematics and CRPC, California Institute of Technology, 1994.
8. M. HOLST AND F. SAIED, *A short note comparing multigrid and domain decomposition for protein modeling equations*, Tech. Rep. CRPC-94-10, Applied Mathematics and CRPC, California Institute of Technology, 1994.
7. M. HOLST, *A robust and efficient numerical method for nonlinear protein modeling equations*, Tech. Rep. CRPC-94-9, Applied Mathematics and CRPC, California Institute of Technology, 1994.
6. M. HOLST, *The Poisson-Boltzmann equation: Analysis and multilevel numerical solution (Monograph based on the Ph.D. Thesis: Multilevel Methods for the Poisson-Boltzmann Equation)*, tech. rep., Applied Mathematics and CRPC, California Institute of Technology, 1994.
5. M. HOLST, *Notes on the KIVA-II software and chemically reactive fluid mechanics*, Tech. Rep. UCRL-ID-112019, Lawrence Livermore National Laboratory, 1993.
4. M. HOLST, *Multilevel Methods for the Poisson-Boltzmann Equation*, PhD thesis, Numerical Computing Group, University of Illinois at Urbana-Champaign, 1993. (Published as Technical Report UIUCDCS-R-93-1821.).
3. M. HOLST AND F. SAIED, *Parallel performance of some multigrid solvers for three-dimensional parabolic equations*, Tech. Rep. UIUCDCS-R-91-1697, Numerical Computing Group, University of Illinois at Urbana-Champaign, 1991.
2. M. HOLST AND F. SAIED, *Vector multigrid: An accuracy and performance study*, Tech. Rep. UIUCDCS-R-90-1636, Numerical Computing Group, University of Illinois at Urbana-Champaign, 1990.
1. M. HOLST, *CgCode: Software for solving linear systems with conjugate gradient methods*, Master's thesis, Numerical Computing Group, University of Illinois at Urbana-Champaign, May 1990.

LECTURES

123. Invited Minisymposium Lecture on Recent Advances in A Posteriori Error Estimation and Adaptive Methods, SIAM Annual Meeting, San Diego, CA, July 2008.
122. Invited Minisymposium Lecture on PDE Software and Applications, SIAM Annual Meeting, San Diego, CA, July 2008.
121. Invited Lecture, Foundations of Computational Mathematics, Hong Kong, June 2008.
120. Invited Lecture, Schnelle Löser für partielle Differentialgleichungen, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany, May 2008.
119. Fachbereichs-Kolloquium, Department of Mathematik, Freie Universität Berlin, Berlin, Germany, May 2008.
118. Invited Lecture, Max Planck Institute for Gravitational Physics (Albert Einstein Institute – AEI), Golm, Germany, May 2008.
117. Colloquium, Department of Mathematics, Oxford, UK, May 2008.
116. Colloquium, Department of Mathematics, University of Arizona, Tucson, AZ, May 2008.
115. Colloquium, Department of Mathematics, California State University Northridge, Northridge, CA, April 2008.
114. Lecture, 24th Pacific Coast Gravity Meeting (PCGM24), Santa Barbara, CA, March 2008.
113. Plenary Lecture, 18th International Conference on Domain Decomposition Methods, Jerusalem, Israel, January 2008.

112. Colloquium, Applied and Computational Mathematics, California Institute of Technology, Pasadena, CA, November 2007.
111. Invited Minisymposium Lecture on Computational Geometry and Analysis, Ninth US National Congress on Computational Mechanics, San Francisco, CA, July 2007.
110. Invited Minisymposium Lecture on Adaptive and Multilevel Methods: Design, Analysis and Application, ICIAM Conference, Zurich, Switzerland, July 2007.
109. Invited Minisymposium Lecture on Applications and Numerical Approximation of Geometric Partial Differential Equations, ICIAM Conference, Zurich, Switzerland, July 2007.
108. Lecture, CTBP Site Visit, La Jolla, CA, June 2007.
107. Invited Lecture, CCR/IDA, La Jolla, CA, June 2007.
106. Colloquium, Department of Mathematics, Michigan State University, Lansing, MI, April 2007.
105. Keynote Speaker, CSE Symposium, University of Illinois at Urbana-Champaign, Champaign, IL, April 2007.
104. Invited Minisymposium Lecture on the Development and Application of Adaptive Methods for Partial Differential Equations, SIAM Conference on Computational Science and Engineering, Costa Mesa, CA, February 2007.
103. Invited Panelist, Special Session on CSE Research Directions and Enabling Technology, SIAM Conference on Computational Science and Engineering, Costa Mesa, CA, February 2007.
102. Invited Panelist, Special Session on CSE Programs and Disciplinary Degree Programs, SIAM Conference on Computational Science and Engineering, Costa Mesa, CA, February 2007.
101. Invited Lecture, Special Session on Numerical General Relativity, Joint AMS Conference, New Orleans, LA, January 2007.
100. Seminar, Department of Mathematics, University of Arizona, Tucson, AZ, November 2006.
99. Colloquium, Department of Mathematics, University of Arizona, Tucson, AZ, November 2006.
98. Lecture, NSF/CTBP Site Visit, University of California, San Diego, CA, November 2006.
97. Seminar, Department of Mathematics, University of California at Irvine, Irvine CA, October 2006.
96. Lecture, Second Multiscale Workshop, Department of Mathematics, Colorado State University, Fort Collins, CO, September 2006.
95. Invited Lecture, Institute of Computational Mathematics, Chinese Academy of Sciences, Beijing, China, August 2006.
94. Invited Lecture, International Conference on Multilevel Iterative Methods, Peking University, Beijing, China, August 2006.
93. Seminar, Mechanical and Aerospace Engineering, University of California, San Diego, CA, June 2006.
92. Lecture, NBCR PI Meeting, University of California, San Diego, CA, June 2006.
91. Invited Lecture, Global Problems in Mathematical Relativity, Isaac Newton Institute for Mathematical Sciences, University of Cambridge, Cambridge, U.K., December 2005.
90. Invited Lecture, IPAM/UCLA Workshop on Bridging Time and Length Scales in Materials Science and Bio-Physics, UCLA, Los Angeles, CA, September 2005.
89. Invited Lecture, IPAM/UCLA Workshop on Bridging Time and Length Scales in Materials Science and Bio-Physics, UCLA, Los Angeles, CA, September 2005.
88. Invited Lecture, 14th International Meshing Roundtable, San Diego, CA, September 2005.
87. Invited Lecture, Workshop on Geometry and Symmetry in Numerical Computation, Colorado State University, Fort Collins, CO, August 2005.
86. Invited Lecture, BIRS Numerical Relativity Workshop, Pacific Institute for the Mathematical Sciences, Banff International Research Station (BIRS), Banff AB, Canada, April 2005.
85. Invited Lecture, Computing the Future Lecture Series, Center for Computation and Technology, Louisiana State University, Baton Rouge, LA, February 2005.
84. Invited Lecture, CTBP Summer Workshop, University of California, San Diego, CA, August 2004.
83. Invited Lecture, Third DOE Workshop on Multiscale Modeling, Broomfield, CO, July 2004.
82. Colloquium, Department of Mathematics, University of Utah, Salt Lake City, UT, April 2004.

81. Colloquium, Applied and Computational Mathematics, California Institute of Technology, Pasadena, CA, April 2004.
80. Invited Lecture, Conference on Multiscale Computational Modeling for Biomedical Research, University of California, San Diego, CA, March 2004.
79. Applied Mathematics Seminar, Department of Mathematics, Colorado State University, Fort Collins, CO, March 2004.
78. Colloquium, Department of Mathematics, Colorado State University, Fort Collins, CO, March 2004.
77. Invited Lecture, IPAM/UCLA Geometric Flows Workshop, UCLA, Los Angeles, CA, February 2004.
76. Invited Lecture, AIM/Stanford Relativity Workshop, Stanford University, Stanford, CA, November 2003.
75. CIMMS Seminar, California Institute of Technology, Pasadena, CA, February 2003.
74. Invited Minisymposium Lecture on Multiscale Numerical Methods, SIAM Conference on Computational Science and Engineering, San Diego, CA, February 2003.
73. Numerical Relativity Seminar, California Institute of Technology, Pasadena, CA, January 2003.
72. Four Invited Lectures, Parallel Scientific Computing Workshop, Peking University, Beijing, China, July 2002.
71. Invited Lecture, Hot Topics Workshop on Numerical Relativity, Institute for Mathematics and its Applications, Minneapolis, MN, June 2002.
70. CACR Seminar, California Institute of Technology, Pasadena, CA, April 2002.
69. Plenary Lecture, 14th International Conference on Domain Decomposition Methods, Mexico City, Mexico, January 2002.
68. Invited Lecture, Schnelle Löser für partielle Differentialgleichungen, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany, May 2001.
67. Seminar, Department of Mathematics, Colorado State University, February 2001.
66. Seminar, KTH, Stockholm, Sweden, September 2000.
65. Seminar, Chalmers University of Technology, Goteborg, Sweden, September 2000.
64. Seminar, Center for Applied Scientific Computing, Lawrence Livermore National Laboratory, Livermore, CA, August 2000.
63. Invited Lecture, Conference on Solution Methods for Large-Scale Nonlinear Problems (a.k.a. The Root Finders Ball), Pleasanton, CA, July 2000.
62. Analysis Seminar, Department of Mathematics, University of Southern California, Los Angeles, CA, May 2000.
61. Lecture in the MSRI Program on A posteriori Error Estimation and Adaptive Approaches in the Finite Element Method, Berkeley, CA, April 2000.
60. Lecture, 16th Pacific Coast Gravity Meeting (PCGM16), California Institute of Technology, Pasadena, CA, March 2000.
59. Contributed Presentation, 12th International Conference on Domain Decomposition Methods, Chiba University, Chiba, Japan, October 1999.
58. Colloquium, Department of Physics, The Pennsylvania State University, State College, PA, September 1999.
57. Colloquium, Department of Mathematics, The Pennsylvania State University, State College, PA, September 1999.
56. Lecture, Schnelle Löser für partielle Differentialgleichungen, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany, May 1999.
55. Applied Mathematics Colloquium, California Institute of Technology, Pasadena, CA, May 1999.
54. Lecture, Finite Element Circus, Pennsylvania State University, State College, PA, May 1999.
53. Seminar, Department of Mathematics, Stanford University, Stanford, CA, December 1998.
52. Seminar, Center for Applied Scientific Computing, Lawrence Livermore National Laboratory, Livermore, CA, December 1998, December 1998.

51. Seminar, Summer School on Finite Element Methods, Department of Mathematics, ETH/Zurich, Zurich, Switzerland, July 1998.
50. Seminar, Summer School on Finite Element Methods, Department of Mathematics, ETH/Zurich, Zurich, Switzerland, July 1998.
49. Seminar, Copper Mountain Conference on Iterative Methods, Copper Mountain, CO, April 1998.
48. Lecture, The Finite Element Circus, University of Colorado, Denver, CO, March 1998.
47. Colloquium, Department of Mathematics, The Pennsylvania State University, State College, PA, February 1998.
46. Thorne Relativity Group Seminar, Department of Physics, California Institute of Technology, Pasadena, CA, December 1997.
45. Seminar, Department of Mathematics, University of California, San Diego, CA, November 1997.
44. Seminar, Summer School on Multilevel Methods, Department of Mathematics, Tsian-Tan University, Changsha, People's Republic of China, August 1997.
43. Seminar, Department of Applied Mathematics and Theoretical Physics, Cambridge University, Cambridge, England, April 1997.
42. Seminar, Max-Planck-Institute for Gravitationsphysik, Albert-Einstein-Institut, Potsdam-Berlin, Germany, March 1997.
41. Seminar, Departement Computerwetenschappen, Katholieke Universiteit Leuven, Belgium, March 1997.
40. Seminar, Department of Mathematics, University of California at Irvine, Irvine, CA, February 1997.
39. Seminar, Department of Mathematics, Arizona State University, Tempe, AZ, February 1997.
38. Seminar, 18th Texas Symposium on Relativistic Astrophysics, Chicago, IL, December 1996.
37. Seminar, Elasticity Workshop, Department of Mathematics, University of Kansas, Kansas City, KA, July 1996.
36. Invited Minisymposium Lecture on Mathematical Molecular Modeling, SIAM Annual Meeting, Kansas City, KA, July 1996.
35. Seminar, Department of Mathematics, Arizona State University, Tempe, AZ, March 1996.
34. Seminar, Department of Mathematics, University of Colorado, Denver, CO, February 1996.
33. Seminar, Department of Mathematics, Colorado State University, Fort Collins, CO, February 1996.
32. Colloquium, Department of Mathematics, Colorado State University, Fort Collins, CO, February 1996.
31. Seminar, Department of Mathematics, University of California, Irvine, CA, February 1996.
30. Seminar, Department of Mathematics and Kansas Institute for Theoretical and Computational Science, University of Kansas, Lawrence, KA, April 1995.
29. Applied Mathematics Seminar, California Institute of Technology, Pasadena, CA, March 1995.
28. Department of Mathematics Seminar, UCLA, Los Angeles, CA, February 1995.
27. Department of Mathematics Seminar, Courant Institute of Mathematical Sciences, New York University, New York, NY, December 1994.
26. Department of Biochemistry and Molecular Biophysics Seminar, Columbia University, New York, NY, November 1994.
25. Invited Lecture, Workshop on Algorithms for Macromolecular Modeling, Lawrence, KA, October 1994.
24. Keller Group Lecture, Applied Math, California Institute of Technology, Pasadena, CA, September 1994.
23. CRPC Meeting, Rice University, Houston TX, August 1994.
22. Keller Group Lecture, Applied Math, California Institute of Technology, Pasadena, CA, August 1994.
21. Contributed Presentation, SIAM Annual Conference, San Diego, CA, July 1994.

20. Keller Group Lecture, Applied Math, California Institute of Technology, Pasadena, CA, July 1994.
19. Department of Chemistry Seminar, California Institute of Technology, Pasadena, CA, April 1994.
18. Department of Mathematics Colloquium, University of Houston, Houston, TX, March 1994.
17. Department of Mathematics Colloquium, University of California at San Diego, San Diego, CA, February 1994.
16. CRPC Annual Meeting, California Institute of Technology, Pasadena, CA, January 1994.
15. Keller Group Lecture, Applied Math, California Institute of Technology, Pasadena, CA, December 1993.
14. Contributed Presentation, Seventh International Conference on Domain Decomposition Methods, The Pennsylvania State University, State College, PA, November 1993.
13. Department of Computer Science Colloquium, University of Illinois, Urbana, IL, October 1993.
12. Four Invited Lectures, Department of Biochemistry and Molecular Biophysics, Columbia University, New York, NY, September 1993.
11. CRPC Invited Forum, Applied Mathematics, California Institute of Technology, Pasadena, CA, May 1993.
10. Department of Biochemistry and Molecular Biophysics Seminar, Columbia University, New York, NY, July 1992.
9. Department of Mathematics Colloquium, University of Kansas, Lawrence, KA, May 1992.
8. Numerical analysis seminar, University of Illinois, Urbana, IL, January–May 1992.
7. A summer series of lectures presented at Lawrence Livermore National Laboratory, Livermore, CA, July 1991.
6. Contributed Presentation, Second International Conference on Industrial and Applied Mathematics, Washington, D.C., July 1991.
5. Contributed Presentation, Copper Mountain Multigrid Conference, Copper Mountain, CO, April 1991.
4. Contributed Presentation, Cray Research and Development Grant Program, Urbana, IL, April 1990.
3. Contributed Presentation, SIAM Annual Conference, Chicago, IL, July 1990.
2. Poster Presentation, UIUC Annual Review of Computing, Urbana, IL, September 1990.
1. Contributed Presentation, Parallel Circus, Toronto, Canada, October, 1990.

WORKSHOPS AND LONG-TERM RESEARCH VISITS

35. *IMA Workshop on Solvation*, University of Minnesota, Minneapolis, MN, December 2008.
34. *IMA Year-long Program on Mathematics and Chemistry*, University of Minnesota, Minneapolis, MN, July 2008 – June 2009.
33. *Schnelle Löser für partielle Differentialgleichungen*, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany, May 2008.
32. *Recent Developments in Numerical Methods and Algorithms for Geometric Evolution Equations (co-organizer)*, Mathematical Sciences Research Institute (MSRI), Berkeley, CA, March 2007.
31. *Mathematical Research Challenges in Optimization of Complex Systems*, DOE Funding Workshop, Bethesda, MD, December 2006.
30. *Workshop on Adaptive and Multilevel Methods for PDE (co-organizer)*, Peking University, Beijing, China, August 2006.
29. *Global Problems in Mathematical Relativity*, Isaac Newton Institute for Mathematical Sciences, University of Cambridge, Cambridge, U.K., August 2005 – December 2005.
28. *IPAM/UCLA Workshop on Bridging Time and Length Scales in Materials Science and Biophysics*, UCLA, Los Angeles, CA, September 2005.
27. *Workshop on Geometry and Symmetry in Numerical Computation*, Colorado State University, Fort Collins, CO, August 2005.

26. *Schnelle Löser für partielle Differentialgleichungen*, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany, May 2005.
25. *IPAM/UCLA Workshop on Relativistic Astrophysics (co-organizer)*, UCLA, Los Angeles, CA, May 2005.
24. *BIRS Numerical Relativity Workshop*, Banff International Research Station, Banff AB, Canada, April 2005.
23. *CTBP Summer Workshop*, UC San Diego, La Jolla, CA, August 2004.
22. *Third DOE Workshop on Multiscale Modeling*, Broomfield, CO, July 2004.
21. *IMA Workshop on Compatible Discretizations*, University of Minnesota, Minneapolis, MN, May 2004.
20. *IPAM/UCLA Workshop on Geometric Flows*, UCLA, Los Angeles, CA, February 2004.
19. *Miami Waves Workshop (session organizer)*, University of Miami, Miami, FL, January 2004.
18. *Dept. of Physics*, California Institute of Technology, Pasadena, CA, January 2004 – July 2004.
17. *AIM/Stanford Workshop on Relativity*, Stanford University, Stanford, CA, November 2003.
16. *Caltech Program on Numerical Relativity: Initial Data Problem (co-organizer)*, California Institute of Technology, Pasadena, CA, January 2003 – May 2003.
15. *Caltech Program on Numerical Relativity: Formulations of the Evolution Equations (co-organizer)*, California Institute of Technology, Pasadena, CA, September 2002 – December 2002.
14. *Beijing parallel computing workshop (session coordinator)*, Peking University, Beijing, China, June 2002.
13. *IMA Workshop on Numerical Relativity*, University of Minnesota, Minneapolis, MN, June 2002.
12. *Schnelle Löser für partielle Differentialgleichungen*, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany, May 2001.
11. *Claes Johnsson Research Group*, Chalmers University, Goteborg, Sweden, September 2000.
10. *A posteriori Error Estimation and Adaptive Approaches in the Finite Element Method*, Mathematical Sciences Research Institute (MSRI), Berkeley, CA, April 2000.
9. *Schnelle Löser für partielle Differentialgleichungen*, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany, May 1999.
8. *Seminar fuer Angewandte Mathematik*, ETH Zuerich, Zuerich, Switzerland, July 1998.
7. *Dept. of Mathematics*, Tsian-Tan University, Changsha, People's Republic of China, August 1997.
6. *Dept. of Applied Mathematics and Theoretical Physics*, Cambridge University, Cambridge, England, April 1997.
5. *Departement Computerwetenschappen*, Katholieke Universiteit Leuven, Leuven, Belgium, March 1997.
4. *Dept. of Mathematics*, University of Kansas, Lawrence, KA, April 1995.
3. *Dept. of Biochem. and Biophys.*, Columbia Univ., New York, NY, November 1994.
2. *Dept. of Mathematics*, UCSD, San Diego, CA, September 1994.
1. *Dept. of Biochem. and Biophys.*, Columbia Univ., New York, NY., September 1993.