John N. Shadid

Distinguished Member of the Technical Staff

Computational Mathematics Department; Sandia National Laboratories, Albuquerque, NM 87185

National Laboratory Professor

Department of Mathematics and Statistics, University of New Mexico

Education:

Ph. D., Mechanical Engineering, University of Minnesota (1989)
M.S., Mathematics, University of Wisconsin – Milwaukee (1982)
Masters Eng., Mechanical Engineering, University of Wisconsin - Milwaukee (1981)
B.S., Mechanical Engineering, University of Wisconsin – Milwaukee (1980)

Primary Positions and Appointments:

2015 – Present ***National Laboratory Professor***, Dept. of Mathematics and Statistics, Univ. of New Mexico
1998 – Present ***Distinguished Member of Technical Staff***, Sandia National Laboratories
2017 – 2023 ***ASCR-PI*** *DOE* ASCR/OFES SciDAC Center-Tokamak Disruption Sim. (X. Tang LANL– overall PI)
1996 – 1998 ***Principal Member of Technical Staff***, Sandia National Laboratories
1989 – 1996 ***Senior Member of Technical Staff***, Sandia National Laboratories

Honors and Awards (incomplete list of Sandia (SNL) awards)**:**

2019 U.S. Assoc. of Computational Mechanics' Thomas J.R. Hughes Medal for Computational Fluid Dynamics ''For outstanding and sustained contributions to large-scale parallel multiphysics computational fluid-dynamics solution methods, high-performance computing algorithms/software, and numerical methods for coupled nonlinear partial differential equations."

2018 Fellow Society of Industrial and Applied Math. (SIAM) "solution methods for multiphysics systems, scalable parallel numerical algorithms, and numerical methods for strongly coupled nonlinear PDEs"

2016 Sandia Award for Excellence	"*Exceptional Leadership in Computational Plasma Modeling*"
2011 Sandia Award for Excellence	for adv. "*CFD capabilities supporting nuclear reactor modeling in CASL*"
2004 Sandia Award for Excellence	"*for efforts in support of DOE developing a multiscale science program*"
1999 Sandia Award for Excellence	"*for representing SNL on national scale within combustion community*"
1998 Sandia Award for Excellence	"*for technical excellence for development of* ***Aztec***"
1997 R&D 100 Award	"***Aztec***: A Parallel Sparse Matrix Solver Library"
1997 Gordon Bell Prize Finalist	For large-scale parallel implicit FE reacting flows (***MPSalsa, Aztec***)
1994 Gordon Bell Prize Finalist	For large-scale parallel implicit FE reacting flows (***MPSalsa, Aztec***)

Publications and Presentation Summary:

Refereed Journal Papers:	Published (97); Accepted (0), Submitted (2), in Preparation (2)
Other Publications:	Technical Reports & Conference Papers (85+), Book Chapters (1), LNCS&E (3)
	Co-editor DOE / Adv. Sci. Comp. Research (ASCR) Multiscale Workshop Report (1);
Major Invited Talks:	Conf. Plenary (6), Keynote (4), Semi-Plenary (1); SIAM Conf. Panel Presentation (2),
	Gordon Bell Prize Finalist Competition Lectures (2), Summer School Principal Lectures (3);
Invited Presentations:	132 Total (30 – International; 102 – U.S)
h-index	44 with 5900+ citations (Google Scholar)

Selected Professional Service:
Editorial Boards:
Computer Methods in Applied Mechanics and Eng. (**CMAME,** Editorial Board 2022 - present)
SIAM J. Scientific Computing (Guest Assoc. Ed.: Copper Mountain Conf. Iterative Meth. 2012 -present)
SIAM J. Scientific Computing (Assoc. Editor January 2018 - 2021)
Journal of Computational Physics (2008–2015)
SIAM/ASA Journal of Uncertainty Quantification (2012–2014)
SIAM Review (1998-2004)

U.S. Assoc. of Computational Mechanics: T. J. R. Hughes Medal Award Committee (2021,23)
Scientific Comm. 22nd IACM Computational Fluids Conference – CFC 2023, Cannes, France, 2023
SIAM Fellows Canvassing Committee (2019, 2020)
Co-chair Copper Mountain Conference on Iterative Methods, Copper Mtn., CO (*2020, 2022, 2024)*
Organizing Comm. Copper Mountain Conf. on Iterative Methods, Copper Mtn. CO, (2012, 2014, 2016, 2018);
Scientific Comm. for VI and VII Int. Conf. on Coupled Problems in Sci. & Eng., (Italy, 2015, Greece, June 2017)
SIAM Outstanding Paper Prize Committee member (2014)
Organizing Comm. FE in Flow International Conf. (2007 – Santa Fe, NM, 2011 – Munich Germany)
Invited Panelist for *SIAM CS&E*: "*Research Directions and Enabling Tech. for the Future of CS&E"*, 2007
Co-chair for Third SIAM Computational Science and Engineering Conference, Orlando Fl., Feb 10-15, 2005
Co-organizer SIAM CS&E High Performance Scientific Computing Panel (Conf. major evening activity), 2005
Invited Panelist for *SIAM Annual* Meeting: "*SIAM Annual Meeting Industry Panel",* 2005
Organizing Committee Second SIAM Conf. on Comp. Science and Engineering, San Diego CA, 2003
Co-chair 2nd DOE/ASCR Workshop on Multiscale Mathematics, Denver CO, July 20–22, 2004
Co-chair DOE/ASCI – Workshop on Meth. for Comp. Physics and Modern Software, Monterey, CA, 2004
Steering Committee Member for DOE/Scientific Simulation Initiative (SSI) CSMI planning, 1998-1999
DOE ASCR: Workshop Breakout Session Co-lead (3), Report Contributor (10), Invited Participant (16)
Co-organizer Conference Minisymposia. (35+);

Selected Conference Plenary, Keynote Talks, and Principal Lectures:

- Keynote Eighth European Seminar on Computing, Pilsen Czech Republic, June 6 – 17, 2022,
- Plenary SIAM Analysis of PDEs, Palm Springs, CA, Dec 10 – 14, 2019
- 3 Summer School Principal Lectures - 2016 Rocky Mountain Mathematics Consortium (RMMC), Theme: Functional Analytic and Statistical Methods in Error Prediction with App., Univ. of Wyoming, June 2016
- Keynote, Advances in Computational Mechanics and FE in Flow Problems, San Diego, CA, Feb. 24 – 27, 2013
- Plenary - Boundary and Internal Layers International Conf. (Bail2012), Pohang, South Korea, Feb 6-10, 2012
- Plenary - Inst. for Computing in Science Multiphysics Workshop Park City, Utah, July 30 – Aug. 6, 2011
- Semi-Plenary at 16th Inter. Conf. on FE in Flow Problems, Munich Germany, March 23-25, 2011
- Keynote, 3rd Int. Conf. on FE Methods in Eng. and Sci. (FEMTEC 2011), Lake Tahoe, NV May 9-13, 2011
- Plenary - SIAM Computational Science and Engineering, Miami FL, March 2 – 6, 2009
- Plenary - SIAM Annual Meeting, New Orleans. Louisiana, 2005
- Plenary - Parallel Computational Fluid Dynamics (CFD) 99, Williamsburg, VA, May 24-26, 1999.

Large-scale Software Development Projects:

Aztec: Parallel iterative Krylov solver library; (R&D 100 award winner)
MPSalsa: Parallel implicit FE transport/reaction simulation R&D code. (2 Gordon Bell Prize Finalist)
Charon: Parallel implicit FE semiconductor Drift-Diffusion R&D simulation code.

Charon_MHD: Parallel implicit FE plasma transport reaction and resistive MHD R&D code.
Drekar::CFD: Parallel implicit FE turbulent multiphysics fluid flow simulation code. (used in CASL)
Drekar::MHD/::Multifluid_Plasma: Parallel IMEX FE MHD/Multifluid EM plasma R&D simulation code

Publicly Available Major Numerical Methods / Mathematical Software Developed:
Aztec: Parallel preconditioned iterative Krylov solver library. (**1997 R&D 100 Award**), ~10K downloads. User Guides [*Ver. 1.0* (1995), *1.1* (1995), *2.0* (1998), *2.1* (1999)]; *Cites: ~415 in Goggle Scholar;* Basis of ***AztecOO in Trilinos***; (w/Hutchinson, Tuminaro, et. al.)

Academic / Educational Engagement, Mentoring, and Training of Students:
Postdocs supervised/mentored (25), Masters & Ph.D. students mentored (27), Ph. D. Exam Committees (10),

Journal Publications:

1. Peter Ohm, Jesus Bonilla, Edward Phillips, John N. Shadid, Michael M. Crockatt, Raymond S. Tuminaro, Jonathan J. Hu, And Xian-Zhu Tang, Scalable Multiphysics Block Preconditioning For Low Mach Number Compressible Resistive MHD with Application to MCF, Submitted to SIAM SISC, 2023
2. Jau-Uei Chen, Shinhoo Kang, Tan Bui-Thanh, And John N. Shadid, Unified Hp-HDG Frameworks For Friedrichs' PDE Systems, Submitted to Computers & Math. with Applications (CAMWA), 2023
3. J. Bonilla, J.N.Shadid, X.-Z. Tang, M.M. Crockatt, P. Ohm, E. G. Phillips, R.P. Pawlowski, S. Conde, O. Beznosov, On a Fully-implicit VMS-stabilized FE Formulation for Low Mach Number Compressible Resistive MHD with Application to MCF, Comput. Methods Appl. Mech. Engrg. 2023, https://www.sciencedirect.com/science/article/pii/S0045782523004838
4. M. M. Crockatt and J. N. Shadid, A Non-neutral Generalized Ohm's Law Model for Magnetohydrodynamics in the Two-Fluid Regime, Physics of Plasmas 30, 053902 (2023) https://doi.org/10.1063/5.0138673
5. Matthias Maier, John Shadid, Ignacio Tomas, Structure-Preserving Finite-Element Schemes for the Euler-Poisson Equations, Communications in Computational Physics, 33 (2023), pp. 647-691 https://doi.org/10.4208/cicp.OA-2022-0205
6. Sriramkrishnan Muralikrishnan, Stephen Shannon, Tan Bui-Thanh, John N. Shadid, A Multilevel Block Preconditioner for the HDG Trace System Applied to Incompressible Resistive MHD, Comput. Methods Appl. Mech. Engrg. 404 115775, 2023, https://doi.org/10.1016/j.cma.2022.115775
7. Michael M. Crockatt, Sibusiso Mabuza, John N. Shadid, Sidafa Conde, Thomas M. Smith, Roger P. Pawlowski, An Implicit Monolithic AFC Stabilization Method for the CG Finite Element Discretization of the Fully-ionized Ideal Multifluid Electromagnetic Plasma System, Journal of Computational Physics, 464:111228, 2022, https://doi.org/10.1016/j.jcp.2022.111228
8. Sidafa Conde, Imre Fekete, John N. Shadid, Embedded pairs for optimal explicit strong stability preserving Runge--Kutta methods, J. Computational and Applied Math, 2022, https://doi.org/10.1016/j.cam.2022.114325
9. Peter Ohm, Tobias Wiesner, Eric Cyr, Jonathan J. Hu, John N. Shadid, And Raymond S. Tuminaro, A Monolithic Algebraic Multigrid Framework For Multiphysics Applications with Examples from Resistive MHD, Electronic Trans. Numerical Analysis (ETNA) 55, 365-390, 2022, https://etna.math.kent.edu/vol.55.2022/pp365-390.dir/pp365-390.pdf
10. Qi Tang, Luis Chacon, Tzanio V. Kolev, John N. Shadid, Xian-Zhu Tang, An adaptive scalable fully implicit algorithm based on stabilized finite element for reduced visco-resistive MHD, J. Comp. Physics, 454, 110967, 2022, https://doi.org/10.1016/j.jcp.2022.110967

11. An a posteriori error analysis for the equations of stationary incompressible magnetohydrodynamics, J. H. Chaudhry, A. E. Rappaport, J. N. Shadid, SIAM SISC, 43(2), B354-B380, 2021 https://doi.org/10.1137/20M1342975
12. David Sondak, Thomas M. Smith, Roger P. Pawlowski, Sidafa Conde, John N. Shadid, High Rayleigh number variational multiscale large eddy simulations of Rayleigh-Bénard Convection, Computational Mechanics Research Comm., 112, 103614, 2021 https://doi.org/10.1016/j.mechrescom.2020.103614
13. ON DIFFERENTIABLE LOCAL BOUNDS PRESERVING STABILIZATION FOR EULER EQUATIONS, SANTIAGO BADIA, JESÚS BONILLA, SIBUSISO MABUZA, AND JOHN SHADID, Computer Methods in Applied Mechanics and Engineering (CMAME), Volume 370, 113267, July 2020, https://doi.org/10.1016/j.cma.2020.113267
14. Sibusiso Mabuza, John N. Shadid, Eric C. Cyr, Roger P. Pawlowski, Dmitri Kuzmin, A linearity preserving nodal variation limiting algorithm for continuous Galerkin discretization of ideal MHD equations, J. Comp. Physics, 410 109390, 2020 https://doi.org/10.1016/j.jcp.2020.109390
15. Matrix-free sub-cell residual distribution for Bernstein finite elements: Monolithic limiting, Hennes Hajduk, Dmitri Kuzmin, Tzanio Kolev, Vladimir Tomov, Ignacio Tomas, John N. Shadid, Computers and Fluids, 200, 104451, 2020 (https://doi.org/10.1016/j.compfluid.2020.104451)
16. Sriramkrishnan Muralikrishnan, Tan Bui-Thanh, John N. Shadid, A Multilevel Approach for Trace System in HDG Discretizations, J. Comp. Phy., 407, 109240, 2020 https://doi.org/10.1016/j.jcp.2020.109240
17. Jeonghun J. Lee, Stephen Shannon, Tan Bui-Thanh, John N. Shadid, Analysis of an HDG Method for Linearized Incompressible Resistive MHD Equations, SIAM J. Numer. Anal., 57(4), 1697–1722, 2019 (https://doi.org/10.1137/18M1166729)
18. S. T. Miller, E. C. Cyr, J. N. Shadid, R. M. J. Kramer, E. G. Phillips, S. Conde, R. P. Pawlowski, IMEX and exact sequence discretization of the multi-fluid plasma model. JCP, 397, 108806, 2019 https://doi.org/10.1016/j.jcp.2019.05.052
19. ROBUST UNCERTAINTY QUANTIFICATION USING RESPONSE SURFACE APPROXIMATIONS OF DISCONTINUOUS FUNCTIONS, T. Wildey, A. A. Gorodetsky, A. C. Belme, & J. N. Shadid, Int. J. UQ, 9, 5, 415-437, 2019, https://doi.org/10.1615/Int.J.UncertaintyQuantification.2019026974
20. Lin PT, Shadid JN, Tsuji PH. On the performance of Krylov smoothing for fully coupled AMG preconditioners for VMS resistive MHD. Int J Numer. Methods Eng., 120, 1297-1309, 2019, https://doi.org/10.1002/nme.6178
21. J. H. Chaudhry, J. N. Shadid, and T. M. Wildey, A Posteriori Analysis of an IMEX Entropy-Viscosity Formulation for Hyperbolic Conservation Laws with Dissipation, Applied Numerical Mathematics, 135, 129-142, 2019 https://doi.org/10.1016/j.apnum.2018.08.010
22. Edward G. Phillips, John N. Shadid, Eric C. Cyr, Scalable Preconditioners for Structure Preserving Discretizations of Maxwell Equations in First Order Form, SISC, 40,2, B723-B742, 2018, https://doi.org/10.1137/17M1135827
23. S. Mabuza, J. N. Shadid, D. Kuzmin, Local bounds preserving stabilization for continuous Galerkin discretization of hyperbolic systems, 361, 15, JCP Pages 82-110, 2018, https://doi.org/10.1016/j.jcp.2018.01.048
24. S. Conde, S. Gottlieb, Z. J. Grant, J. N. Shadid, Implicit and Implicit-Explicit Strong Stability Preserving Runge--Kutta Methods with High Linear Order, Journal of Scientific Computing 73 (2-3), 667-690, 2018, https://doi.org/10.1007/s10915-017-0560-2
25. P. T. Lin, J. N. Shadid, J. J. Hu, R. P. Pawlowski, E. C. Cyr, Performance of Fully-coupled Algebraic Multigrid Preconditioners for Large-scale VMS Resistive MHD, J. Comp. and Applied Math, 344 (2018) 782–793, https://doi.org/10.1016/j.cam.2017.09.028
26. A. Glaws, P. G. Constantine, J. N. Shadid, T. M. Wildey, Dimension reduction in MHD power generation models: dimensional analysis and active subspaces, Statistical Analysis and Data Mining: The ASA Data Science Journal, 10, 5, 312-325. https://doi.org/10.1002/sam.11355, 2017

27. Dmitri Kuzmin, Steffen Basting, John N. Shadid, Linearity preserving monotone local projection stabilization schemes for continuous finite elements, Computer Methods in Applied Mechanics and Engineering 322, 23-41, 2017, https://doi.org/10.1016/j.cma.2017.04.030
28. Christopher Basting, Dmitri Kuzmin and John N. Shadid, Optimal control for reinitialization in finite element level set methods, IJNMF 84 (5), 292-305, 2017, https://doi.org/10.1002/fld.4348
29. Dmitri Kuzmin and John N. Shadid, Gradient-based nodal limiters for artificial diffusion operators in finite element schemes for transport equations, Int. J. Num. Meth. Fluids, 84 (11), 633-695, 2017, https://doi.org/10.1002/fld.4365
30. C. Lohmann, D. Kuzmin, J. N. Shadid, S. Mabuza, Flux-corrected Transport Algorithms for Continuous Galerkin Methods based on High Order Bernstein Finite Elements, JCP, 344, 151-186, 2017, https://doi.org/10.1016/j.jcp.2017.04.059
31. J. H. Chaudhry, J. B. Collins, J. N. Shadid, A Posteriori Error Estimation for Multi-stage Runge-Kutta IMEX Schemes, App. Num. Math.117, 36-49, 2017, https://doi.org/10.1016/j.apnum.2017.01.021
32. J. N. Shadid, T. M. Smith, E. C. Cyr, T. M. Wildey, R. P. Pawlowski, Stabilized FE Simulation of Prototype Thermal-Hydraulics Problems with Integrated Adjoint-based Capabilities, JCP, 321 321–341, 2016, https://doi.org/10.1016/j.jcp.2016.04.062
33. E. G. Phillips, J. N. Shadid, E. C. Cyr, H. C. Elman, R. P. Pawlowski, Block Preconditioners for Stable Mixed Nodal and Edge FE Representations of Incompressible Resistive MHD, SIAM SISC, Vol. 38, No. 6, pp. B1009–B1031, 2016, https://doi.org/10.1137/16M1074084
34. E. C. Cyr, J. N. Shadid, and R. S. Tuminaro, "Teko an abstract block preconditioning capability with concrete example applications to Navier-Stokes and resistive MHD, SIAM SISC Vol. 38, No. 5, pp. S307–S331, 2016, https://doi.org/10.1137/15M1017946
35. J. N. Shadid, R. P. Pawlowski, E. C. Cyr, R. S. Tuminaro, L. Chacon, P. D. Weber, Scalable Implicit Incompressible Resistive MHD with Stabilized FE and Fully-coupled Newton-Krylov-AMG, Comput. Methods Appl. Mech. Engrg. 304, 1–25, 2016, https://doi.org/10.1016/j.cma.2016.01.019
36. D. Sondak, J. N. Shadid, A. A. Oberai, R. P. Pawlowski, E.C. Cyr, and T.M. Smith, A new class of finite element variational multiscale turbulence models for incompressible magnetohydrodynamics, Journal of Computational Physics, Volume 295, 15 August 2015, Pages 596-616, https://doi.org/10.1016/j.jcp.2015.04.035
37. E. Cyr, J. N. Shadid, and T. Wildey, Efficient Backward-in-time Adjoint Integration Employing Data Compression, Comput. Methods Appl. Mech. Engrg. 288 (2015) 24–44, https://doi.org/10.1016/j.cma.2014.12.001
38. Chaudhry, Estep, Ginting, Shadid, Tavener, A posteriori error analysis of IMEX multi-step time integration methods for advection–diffusion–reaction equations, Comp. Meth. Applied Mechanics and Eng., 285, 730-751, 2015, https://doi.org/10.1016/j.cma.2014.11.015
39. E. G. Phillips, H. C. Elman, E. C. Cyr, J. N. Shadid, R.P. Pawlowski, A Block Preconditioner for an Exact Penalty Formulation for Stationary MHD, SIAM J. Sci. Comput. 36-6 (2014), pp. B930-B951, https://doi.org/10.1137/140955082
40. E. Cyr, J. N. Shadid, and T. Wildey, "Approaches for Adjoint-based A Posterirori Analysis of Stabilized Finite Element Methods", SIAM J. Sci.. Comput. Vol 36, No. 2, A766-791, 2014, https://doi.org/10.1137/120895822
41. E. C. Cyr, J. N. Shadid, R. S. Tuminaro, R. P. Pawlowski, and L. Chacon, "A new approximate block factorization preconditioner for 2D incompressible (reduced) resistive mhd," SIAM Journal on Scientific Comp., 35:B701-B730, 2013, https://doi.org/10.1137/12088879X
42. Keyes, D.E., McInnes, L.C., Woodward, C., Gropp, W., Myra, E., Pernice, M, et. al., R. P. Pawlowski, J. N. Shadid, et. al, Multiphysics simulations: Challenges and opportunities, Int. J. High Performance Computing App. 27 (1) , pp. 4-83, 2013, https://doi.org/10.1177/1094342012468181

43. E. C. Cyr, J. N. Shadid, and R. S. Tuminaro, Stabilization and Scalable Block Preconditioning for the Navier-Stokes Equations, JCP 231, 345-363, 2012. https://doi.org/10.1016/j.jcp.2011.09.001
44. Kuzmin, D., Moller, M., Shadid, J. N., and Shashkov, M., "Failsafe flux limiting and constrained data projections for equations of gas dynamics", J. Comput. Phys. 229 (2010) no. 23, 8766-8779, https://doi.org/10.1016/j.jcp.2010.08.009
45. Scovazzi, G., Shadid, J.N., Love, E., Rider, W.J. "A Conservative Nodal Variational Multiscale Method for Lagrangian Shock Hydrodynamics", CMAME, volume 199, issue 49-52, year 2010, pp. 3059 – 3100, https://doi.org/10.1016/j.cma.2010.03.027
46. Paul T. Lin, John N. Shadid, Ray S. Tuminaro, Marzio Sala, Gary L. Hennigan, Roger P. Pawlowski, "A Parallel Fully-Coupled Algebraic Multilevel Preconditioner Applied to Multiphysics PDE Applications: Drift-diffusion, Flow/transport/reaction, Resistive MHD", IJNMF, Volume 64, issue 10-12, pp 1148-1179, (2010), https://doi.org/10.1002/fld.2402
47. Paul T. Lin, and John N. Shadid, "Towards Large-Scale Multi-Socket, Multicore Parallel Simulations: Performance of an MPI-only Semiconductor Device Simulator", JCP, 229 (2010), pp. 6804-6818, https://doi.org/10.1016/j.jcp.2010.05.023
48. Paul T. Lin, John N. Shadid, Ray S. Tuminaro, Marzio Sala, "Performance of a Petrov-Galerkin Algebraic Multilevel Preconditioner for Finite Element Modeling of the Semiconductor Device Drift-Diffusion Equations", Int. J. Num. Meth. Eng., 84, 448 – 469, 2010, https://doi.org/10.1002/nme.2902
49. J. N. Shadid, R. P. Pawlowski, J. W. Banks, L. Chacon, P. T. Lin, R. S. Tuminaro, "Towards a Scalable Fully-Implicit Fully-coupled Resistive MHD Formulation with Stabilized FE Methods", JCP, 229, 20, 7649 – 7671, 2010, https://doi.org/10.1016/j.jcp.2010.06.018
50. J. W. Banks and J. N. Shadid, "An Euler System Source Term that Develops Prototype Z-pinch Implosions Intended for the Evaluation of Shock-Hydro Meth.", Int. J. Num. Meth. Fluid, 61, 7, pp 725-751, 2009, https://doi.org/10.1002/fld.1976
51. Paul T. Lin, John N. Shadid, Marzio Sala, Ray S. Tuminaro, Gary L. Hennigan, and Rob J. Hoekstra, Performance of a Parallel Algebraic Multilevel Preconditioner for Stabilized Finite Element Semiconductor Device Modeling, J. Comp. Physics, 228, 17, pp 6079-6616, 2009, https://doi.org/10.1016/j.jcp.2009.05.024
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53. D. L. Ropp and J. N. Shadid, "Stability of Operator Splitting Methods for Systems with Indefinite Operators: Advection-Diffusion-Reaction Systems", J. Comp. Physics, 228 (2009) 3508–3516, https://doi.org/10.1016/j.jcp.2009.02.001
54. R. P. Pawlowski and J. N. Shadid and J. P. Simonis and H. F. Walker, Inexact Newton Dogleg Methods, SIAM Journal on Numerical Analysis, Vol.46, No.4, 2008, https://doi.org/10.1137/050632166
55. Estep, D., Ginting, V., Ropp, D., Shadid, J.N., and Tavener, S., An A Posteriori-A Priori Analysis of Multiscale Operator Splitting, SIAM J. Numerical Analysis, v. 46, pp. 1116 - 1146, 2008, https://doi.org/10.1137/07068237X
56. H. Elman, V. Howle, J. N. Shadid, R. Shuttleworth, R. Tuminaro, "A Taxonomy and Comparison of Parallel Block Multilevel Preconditioners for the Incompressible Navier-Stokes Equations", JCP, v. 227, 3, pp 1790 - 1808, 2008, https://doi.org/10.1016/j.jcp.2007.09.026
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58. M. D. Gunzburger, J. S. Peterson, J. N. Shadid, Reduced-order modeling of time-dependent PDEs with multiple parameters in the boundary data, Computer Methods in Applied Mechanics and Engineering; vol.196, no.4-6, p.1030-47, 2007, https://doi.org/10.1016/j.cma.2006.08.004

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61. Paul T. Lin , Marzio Sala, John N. Shadid, Ray S. Tuminaro, “Performance of Fully-Coupled Algebraic Multilevel Domain Decomposition Preconditioners for Incompressible Flow and Transport”, International Journal for Numerical Methods in Engineering; 9 July 2006; vol.67, no.2, p.208-25, https://doi.org/10.1002/nme.1624
62. S. A. Means, A. J. Smith, J. Shepard, J. N., Shadid, J. Fowler, R. Wojcikiewicz, T. Mazel, G. D. Smith, and B. S. Wilson, “Reaction Diffusion Modeling of Calcium Dynamics with Realistic ER Geometry”, Biophysical Journal; 15 July 2006; vol.91, no.2, p.537-57, https://doi.org/10.1529/biophysj.105.075036
63. L. T. Izu, S. A. Means, J. N. Shadid, Y. Chen-Izu, and C. W. Balke, “Interplay of Ryanodine Receptors Distribution and Calcium Dynamics”, Biophysical Journal; 1 July 2006; vol.91, no.1, p.95-112, https://doi.org/10.1529/biophysj.105.077214
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