RESUME - Leo G Rebholz

PERSONAL DATA

Professor
Department of Mathematical Sciences
Clemson University
Clemson, SC 29634
864-656-1840

EDUCATION

Ph.D., University of Pittsburgh, 2006, Mathematics
- Thesis: *Helicity and physical fidelity in models and algorithms*
- Advisor: Prof. W. Layton

M.A., University of Pittsburgh, 2003, Mathematics
M.S., Duquesne University, 2002, Computational Mathematics
- Thesis: *Bankruptcy as a cusp catastrophe*
- Advisor: Prof. A. Gaur

B.S., Duquesne University, 2000, Mathematics

PROFESSIONAL EXPERIENCE

Clemson University (School of Mathematical and Statistical Sciences)
- 2023-, College of Science Dean's Distinguished Professor
- 2015-, Professor
- 2012-2015, Associate Professor
- 2008-2012, Assistant Professor
- Administrative Positions
  - 2019-2025, Division Lead for Mathematics (chair for math division in the School)
  - March 2023 - July 2023, Acting Director for SMSS
  - 2018-2019, Instruction Coordinator
  - 2016-2018, Director of Undergraduate Studies

Emory University
- 2014-2015, Adjunct Associate Professor of Mathematics

Bechtel Bettis Atomic Power Laboratory
- 2007-2008, Senior Mathematician
- 2004-2007, Mathematician

University of Pittsburgh
- 2002-2006, Teaching Fellow and Research Assistant

Community College of Allegheny County
- 2002-2003, Mathematics Instructor

Management Science Associates Inc.
- 2001-2002, Market Research Analyst (Statistician)

Duquesne University
- 2000-2002 Teaching Assistant

The Home Depot
- 1996-2001 Plumbing sales and service

MEMBERSHIPS

Member, American Mathematical Society, AMS, (2000-)
Member, Society for Industrial and Applied Mathematics, SIAM, (2007-)
Vice President, SIAM Southeast, 2022-2023
Clemson Student Chapter Faculty Advisor, 2012-2016

PUBLICATIONS

Books

1. S. Pollock and L. Rebholz, *Anderson Acceleration for Numerical PDEs*, SIAM (Philadelphia), 2025.

2. T. Heister and L. Rebholz, *Introduction to Scientific Computing for Scientists and Engineers*, Second Edition, DeGruyter (Berlin), 2023.

3. T. Heister, L. Rebholz and F. Xue, *Numerical Analysis: An Introduction*, DeGruyter (Berlin), 2019.

4. T. Heister and L. Rebholz, *Introduction to Scientific Computing for Scientists and Engineers*, DeGruyter (Berlin), 2015.

5. W. Layton and L. Rebholz, *Approximate Deconvolution Models of Turbulence: Analysis, Phenomenology and Numerical Analysis*, Springer (Heidelberg), 2012.

Refereed Journal Publications (* denotes student)

129. D. Vargun, I. Monteiro and L. Rebholz, Anderson acceleration of a Picard solver for the Oldroyd-B model of viscoelastic fluids, submitted.

128. M. Olshanskii and L. Rebholz, Approximating a branch of solutions to the Navier–Stokes equations by reduced-order modeling, *Journal of Computational Physics*, 524, 113728, 1-14, (2025).

127. S. Pollock, L. Rebholz, X. Tu and M. Xiao, Analysis of the Picard-Newton iteration for the Navier-Stokes equations: global stability and quadratic convergence, *Journal of Scientific Computing*, 104:25, 1-23, (2025).

126. A. Diegel, X. Li and L. Rebholz, Analysis of continuous data assimilation with large (or even infinite) nudging parameters, *Journal of Computational and Applied Mathematics*, 456 (116221), 1-16, (2025).

125. M. Dallas, S. Pollock and L. Rebholz, Analysis of an Adaptive Safeguarded Newton-Anderson Algorithm with Applications to Fluid Problems, *Advances in Computational Science and Engineering*, 2(3), 246-270, (2024).

124. B. Garcia-Archilla, X. Li, J. Novo and L. Rebholz, Enhancing nonlinear solvers for the Navier-Stokes equations with continuous (noisy) data assimilation, *Computer Methods in Applied Mechanics and Engineering*, 424, 116903, 1-15, (2024).

123. M. Akbas, A. Diegel and L. Rebholz, Continuous data assimilation of a discretized barotropic vorticity model of geophysical flow, *Computers and Mathematics with Applications*, 160, 30-45, (2024).

122. M. Olshanskii and L. Rebholz, Local conservation laws of continuous Galerkin method for the incompressible Navier–Stokes equations in EMAC form, *Computer Methods in Applied Mechanics and Engineering*, 418B, 116583, 1-14, (2024).

121. J. Liu, L. Rebholz and M. Xiao, Acceleration of algebraic splitting iterations for nonlinear saddle point problems, *Mathematical Methods in the Applied Sciences*, 47, 451-474, (2024).

120. E. Hawkins*, L. Rebholz and D. Vargun*, Removing splitting/modeling error in projection/penalty methods for Navier-Stokes simulations with continuous data assimilation, *Communications in Mathematical Research*, 40 (1), 1-29, (2024).

119. X. Li, E. Hawkins*, L. Rebholz and D. Vargun*, Accelerating and enabling convergence of nonlinear solvers for Navier-Stokes equations by continuous data assimilation, *Computer Methods in Applied Mechanics and Engineering*, 416, 116313, 1-17, (2023).

118. L. Rebholz and F. Tone, Long-time H^1-stability of BDF2 time stepping for 2D Navier-Stokes equations, *Applied Mathematics Letters*, 141, 108624, 1-8, (2023).

117. S. Pollock and L. Rebholz, Filtering for Anderson acceleration, *SIAM Journal on Scientific Computing*, 45(4), A1571-A1590, (2023).

116. L. Rebholz and M. Xiao, The effect of Anderson acceleration on the convergence order of superlinear and sublinear nonlinear solvers, *Journal of Scientific Computing*, 96(34), 1-23, (2023).

115. S. Pollock, L. Rebholz and D. Vargun*, An efficient nonlinear solver and convergence analysis for a viscoplastic flow model, *Numerical Methods for Partial Differential Equations*, 39:3874-3896, (2023).

114. S. Ingimarson*, M. Neda, L. Rebholz, J. Reyes* and A. Vu*, Improved long time accuracy for projection methods for Navier-Stokes equations using EMAC formulation, *International Journal of Numerical Analysis and Modeling*, 20(2), 176-198, (2023).

113. P. Guven Geredeli, L. Rebholz, D. Vargun* and A. Zytoon, Improved convergence of the Arrow-Hurwicz iteration for the Navier-Stokes equation via grad-div stabilization and Anderson acceleration, *Journal of Computational and Applied Mathematics*, 422, 114920, 1-16, (2023).

112. S. Ingimarson*, L. Rebholz and T. Iliescu, Full and reduced order model consistency of the nonlinearity discretization in incompressible flows, *Computer Methods in Applied Mechanics and Engineering*, 401B (115620), 1-16, (2022).

111. M. Mohebujjaman, H. Wang, L. Rebholz and M.A.A. Mahbub, An efficient algorithm for simulating ensembles of parameterized MHD flow problems, *Computers and Mathematics with Applications*, 112, 167-180, (2022).

110. A. Diegel and L. Rebholz, Continuous data assimilation and long-time accuracy in a C^0 interior penalty method for the Cahn-Hilliard equation, *Applied Mathematics and Computation*, 424 (127042), 1-22, (2022).

109. Y. Zhang*, A. Palha, M. Gerritsma and L. Rebholz, A mass-, kinetic energy- and helicity-conserving mimetic dual-field discretization for three-dimensional incompressible Navier-Stokes equations, part I: Periodic domains, *Journal of Computational Physics*, 451, 110868, 1-23, (2022).

108. L. Rebholz, D. Vargun* and M. Xiao, Enabling fast convergence of the iterated penalty Picard iteration with $O(1)$ penalty parameter for incompressible Navier-Stokes via Anderson acceleration, *Computer Methods in Applied Mechanics and Engineering*, 387 (114178), 1-17, (2021).

107. L. Rebholz and C. Zerfas*, Simple and efficient continuous data assimilation of evolution equations via algebraic nudging, *Numerical Methods for Partial Differential Equations*, 37 (3), 2588-2612, (2021).

106. D. Forbes*, L. Rebholz and F. Xue, Anderson acceleration of nonlinear solvers for the stationary Gross-Pitaevskii equation, *Advances in Applied Mathematics and Mechanics*, 13, 1096-1125, (2021).

105. M. Gardner*, A. Larios, L. Rebholz, D. Vargun* and C. Zerfas*, Continuous data assimilation applied to a velocity-vorticity formulation of the 2D Navier-Stokes equations, *American Institute of Mathematical Sciences Electronic Research Archive*, 29(3): 2223-2247, (2021).

104. S. Pollock and L. Rebholz, Anderson acceleration for contractive and noncontractive operators, *IMA Journal of Numerical Analysis*, 41 (4), 2841-2872, (2021).

103. S. Pollock, L. Rebholz and M. Xiao, Acceleration of nonlinear solvers for natural convection problems, *Journal of Numerical Mathematics*, 29(4), 1-19, (2021).

102. C. Mou*, B. Koc*, O. San, L. Rebholz, T. Iliescu, Data-driven variational multiscale reduced order models, *Computer Methods in Applied Mechanics and Engineering*, 373 (113470), 1-36, (2021).

101. M. Akbas and L. Rebholz, Modular grad-div stabilization for incompressible non-isothermal fluid flows, *Applied Mathematics and Computation*, 393 (125748), 1-18, (2021).

100. M. Olshanskii and L. Rebholz, Longer time accuracy for incompressible Navier-Stokes equations with the EMAC formulation, *Computer Methods in Applied Mechanics and Engineering*, 372(113369), 1-17, (2020).

99. L. Rebholz, A. Viguerie* and M. Xiao*, Analysis of Algebraic Chorin Temam splitting for incompressible Navier-Stokes equations, *Journal of Computational and Applied Mathematics*, 365. 112366, 1-18, (2020).

98. C. Evans*, S. Pollock, L. Rebholz and M. Xiao, A proof that Anderson acceleration increases the convergence rate in linearly converging fixed point methods (but not in quadratically converging ones), *SIAM Journal on Numerical Analysis*, 58(1), 788-810, (2020).

97. F. Eroglu, S. Kaya, and L. Rebholz, Decoupled Modular Regularized VMS-POD for Darcy-Brinkman Equations, *IAENG International Journal of Applied Mathematics*, 49 (2),134-144, (2019).

96. C. Zerfas*, L. Rebholz, M. Schneier and T. Iliescu, Continuous data assimilation reduced order models of fluid flow, *Computer Methods in Applied Mechanics and Engineering*, 357, 112596, 1-21, (2019).

95. A. Linke and L. Rebholz, Pressure-induced locking in mixed methods for the time-dependent (Navier-)Stokes equations, *Journal of Computational Physics*, 388, 350-356, (2019).

94. S. Pollock, L. Rebholz and M. Xiao, Anderson-accelerated convergence of Picard iterations for incompressible Navier-Stokes equations, *SIAM Journal on Numerical Analysis*, 57(2), 615-637, (2019).

93. T. Iliescu, M. Mohebujjaman and L. Rebholz, Physically-constrained data-driven correction for reduced order modeling of fluid flows, *International Journal of Numerical Methods in Fluids*, 89, 103-122, (2019).

92. A. Larios, L. Rebholz, and C. Zerfas*, Global in time stability and accuracy of IMEX-FEM data assimilation schemes for Navier-Stokes equations, *Computer Methods in Applied Mechanics and Engineering*, 345, 1077-1093, (2019).

91. A. Larios, Y. Pei, and L. Rebholz, Global well-posedness of the velocity-vorticity-Voigt formulation of the 3D Navier-Stokes equations, *Journal of Differential Equations*, 266(5), 2435-2465, (2019).

90. L. Rebholz, D. Wang, Z. Wang, K. Zhao, and C. Zerfas*, Initial Boundary Value Problems for a System of Parabolic Conservation Laws Arising From a Keller-Segel Type Chemotaxis Model in Multiple Space Dimensions, *DCDS-A*, 39(7), 3789-3838, (2019).

89. S. Charnyi*, T. Heister, M. Olshanskii and L. Rebholz, Efficient discretizations for the EMAC formulation of the incompressible Navier-Stokes equations, *Applied Numerical Mathematics*, 141, 220-233, (2019).

88. L. Rebholz, A. Viguerie* and M. Xiao*, Efficient nonlinear iteration schemes based on algebraic splitting for the incompressible Navier-Stokes equations, *Math. Comp.*, 88, 1533-1557, (2019).

87. M. Akbas, A. Linke, L. Rebholz and P. Schroeder*, The analogue of grad-div stabilization in DG methods for incompressible flows: limiting behavior and extension to tensor-product meshes, *Computer Methods in Applied Mechanics and Engineering*, 341, 917-938, (2018).

86. X. Xie, M. Mohebujjaman, L. Rebholz and T. Iliescu, Data-driven filtered reduced order modeling of fluid flows, *SIAM Journal on Scientific Computing*, 40(3), B834-B857, (2018).

85. F. Eroglu*, S. Kaya, and L. Rebholz, POD-ROM for the Darcy-Brinkman equations with double-diffusive convection, *Journal of Numerical Mathematics*, 27(3), 123-139, (2019).

84. L. Rebholz, S.M. Wise, and M. Xiao*, Penalty-Projection Schemes for the Cahn-Hilliard Navier-Stokes Diffuse Interface Model of Two Phase Flow, and their Connection to Divergence-Free Coupled Schemes, *International Journal on Numerical Analysis and Modeling*, 4, 649-676, (2018).

83. M. Olshanskii, L. Rebholz, and A. Salgado, On well-posedness of a velocity-vorticity formulation of the Navier-Stokes equations with no-slip boundary conditions, *DCDS-A*, 38(7), 3459-3477, (2018).

82. M. Akbas, L. Rebholz and C. Zerfas*, Optimal vorticity accuracy in an efficient velocity-vorticity method for the 2D Navier-Stokes equations, *Calcolo*, 55(1):3, 1-29, (2018).

81. M. Mohebujjaman*, L. Rebholz, X. Xie*, and T. Iliescu, Energy balance and mass conservation in reduced order models of fluid flows, *Journal of Computational Physics*, 346, 262-277, (2017).

80. F. Eroglu*, S. Kaya, and L. Rebholz, A modular regularized variational multiscale proper orthogonal decomposition for incompressible flows, *Computer Methods in Applied Mechanics and Engineering*, 325, 350-368, (2017).

79. M. Akbas, M. Mohebujjaman*, L. Rebholz, and M. Xiao*, High order algebraic splitting for magnetohydrodynamics simulation, *Journal of Computational and Applied Mathematics*, 321, 128-142, (2017).

78. S. Charnyi*, T. Heister, M. Olshanskii, and L. Rebholz, On conservation laws of Navier-Stokes Galerkin discretizations, *Journal of Computational Physics*, 337, 289-308, (2017).

77. L. Rebholz, C. Zerfas* and K. Zhao, Global in time analysis and sensitivity analysis for the reduced NS-α model of incompressible flow, *Journal of Mathematical Fluid Mechanics*, 19(3), 445-467, (2017).

76. L. Rebholz and M. Xiao*, Improved accuracy in algebraic splitting methods for Navier-Stokes equations, *SIAM Journal on Scientific Computing*, 39(4), A1489-A1513, (2017).

75. A. Linke, M. Neilan, L. Rebholz, and N. Wilson*, Improving efficiency of coupled schemes for Navier-Stokes equations by a connection to grad-div stabilized projection methods, *Journal of Numerical Mathematics*, 25(4), 229-248, (2017).

74. T. Heister, M. Mohebujjaman* and L. Rebholz, Decoupled, unconditionally stable, higher order discretizations for MHD flow simulation, *Journal of Scientific Computing*, 71(1), 21-43, (2017).

73. V. John, A. Linke, C. Merdon, M. Neilan and L. Rebholz, On the divergence constraint in mixed finite element methods for incompressible flows, *SIAM Review*, 59(3), 492-544, (2017).

72. T. Heister, M.A. Olshanskii and L. Rebholz, Unconditional long-time stability of a velocity-vorticity method for the 2D Navier-Stokes equations, *Numerische Mathematik*, 135, 143-167, (2017).

71. M. Mohebujjaman* and L. Rebholz, An efficient algorithm for computation of MHD flow ensembles, *Computational Methods in Applied Mathematics*, 17(1), 121-137, (2017).

70. L. Rebholz, T.-Y. Kim and Young-Li Byon, On an accurate α model for coarse mesh turbulent channel flow simulation, *Applied Mathematical Modelling*, 43, 139-154, (2017).

69. M. Akbas*, S. Kaya, and L. Rebholz, On the stability at all times of linearly extrapolated BDF2 timestepping for multiphysics incompressible flow problems, *Numerical Methods for Partial Differential Equations*, 33(4), 995-1017, (2017).

68. A. Bowers and L. Rebholz, The reduced NS-α model for incompressible flow: a review of recent progress, *Fluids*, 2 (38), 1-20, (2017).

67. T. Heister, L. Rebholz and M. Xiao*, Flux-preserving enforcement of inhomogeneous Dirichlet boundary conditions for strongly divergence-free mixed finite element methods for flow problems, *Journal of Mathematical Analysis and Applications*, 438(1), 507-513, (2016).

66. Y. Cao, S. Chen, and L. Rebholz, Well-posedness and a numerical study of a regularization model with adaptive nonlinear filtering for incompressible fluid flow, *Computers and Mathematics with Applications*, 71(11), 2192-2205, (2016).

65. M. Morales Hernandez*, L. Rebholz, C. Tone and F. Tone, On the stability of the Crank–Nicolson–Adams–Bashforth Scheme for the 2d Leray-alpha model, *Numerical Methods for Partial Differential Equations*, 32(4), 1155-1183, (2016).

64. L. Berselli, T.-Y. Kim, and L. Rebholz, Analysis of a reduced-order approximate deconvolution model and its interpretation as a Navier-Stokes-Voigt regularization, *Discrete and Continuous Dynamical Systems, Series B*, 21(4), 1027-1050, (2016).

63. M. Akbas*, S. Kaya, M. Mohebujjaman* and L. Rebholz, Numerical analysis and testing of a fully discrete, decoupled penalty-projection algorithm for MHD in Elsasser variable, *International Journal of Numerical Analysis and Modeling*, 13(1), 90-113, (2016).

62. N. Jiang*, M. Mohebujjaman*, L. Rebholz and C. Trenchea, Analysis of a family of optimally accurate regularization methods for Navier-Stokes equations, *Computer Methods in Applied Mechanics and Engineering*, 310, 388-405, (2016).

61. M. Neda, F. Pahlevani, L. Rebholz and J. Waters, Sensitivity analysis of the grad- div stabilization parameter in finite element simulations of incompressible flow, *Journal of Numerical Mathematics*, 24(3), 189-206 (2016).

60. M. Olshanskii, T. Heister, L. Rebholz and K. Galvin*, Natural vorticity boundary conditions on solid walls, *Computer Methods in Applied Mechanics and Engineering*, 297, 18-37, (2015).

59. L. Rebholz and M. Xiao*, On reducing the splitting error in Yosida methods for the Navier-Stokes equations with grad-div stabilization, *Computer Methods in Applied Mechanics and Engineering*, 294, 259-277, (2015).

58. M. Akbas*, L. Rebholz, and F. Tone, A note on the importance of mass conservation in long-time stability of Navier-Stokes simulations using finite elements, *Applied Mathematics Letters*, 45, 98-102, (2015).

57. M. Morales Hernandez* and L. Rebholz, A note on helicity conservation in Leray models of incompressible flow, *Journal of Mathematical Analysis and Applications*, 422(1), 776-781, (2015).

56. M. Akbas*, S. Kaya, and L. Rebholz, An explicitly decoupled variational multiscale method for incompressible, non-isothermal flows, submitted, *Computational Methods in Applied Mathematics*, 15(1), 1-20, (2015).

55. I. Monteiro*, C. Manica, and L. Rebholz, Numerical study of a regularized barotropic vorticity model of geophysical flow, *Numerical Methods for Partial Differential Equations*, 31(5), 1492-1514, (2015).

54. S. Le Borne and L. Rebholz, Preconditioning sparse grad-div/augmented Lagrangian stabilized saddle point systems, *Computing and Visualization in Science*, 16(6), 259-269, (2015).

53. A. Dunca, T.-Y. Kim, L. Rebholz and E. Fried, Energy analysis and improved regularity estimates for multiscale deconvolution models of incompressible flow, *Mathematical Methods in the Applied Sciences*, 38(17), 4199-4209, (2015).

52. V. Cuff*, A. Dunca, C. Manica and L. Rebholz, The reduced order NS-α model for incompressible flow: theory, numerical analysis and benchmark testing, *ESAIM: Mathematical Modelling and Numerical Analysis (M2AN)*, 49(3), 641-662, (2015).

51. S. Kaya, C. Manica and L. Rebholz, On Crank-Nicolson Adams-Bashforth timestepping for approximate deconvolution models in two dimensions, *Applied Mathematics and Computation*, 246, 23-38, (2014).

50. A. Bowers*, S. Le Borne, and L. Rebholz, Error analysis and iterative solvers for Navier-Stokes projection methods with standard and sparse grad-div stabilization, *Computer Methods in Applied Mechanics and Engineering*, 275, 1-19, (2014).

49. L. Rebholz and S. Watro*, A note on Taylor-eddy and Kavosnay solutions of NS-α-deconvolution and Leray-α-deconvolution models, *Journal of Nonlinear Dynamics*, Volume 2014, ID 959038, 1-5, (2014).

48. K. Galvin*, L. Rebholz, and C. Trenchea, Efficient, unconditionally stable, and optimally accurate FE algorithms for approximate deconvolution models, *SIAM Journal on Numerical Analysis*, 52(2), 678-707, (2014).

47. E. Jenkins, V. John, A. Linke and L. Rebholz, On the parameter choice in grad-div stabilization for incompressible flow problems, *Advances in Computational Mathematics*, 40(2), 491-516, (2014).

46. A. Dunca, M. Neda, and L. Rebholz, A mathematical and numerical study of a filtering-based multiscale fluid model with nonlinear eddy viscosity, *Computers and Mathematics with Applications*, 66(6), 917-933, (2013).

45. L. Rebholz, Well-posedness of a reduced order approximate deconvolution turbulence model, *Journal of Mathematical Analysis and Applications*, 405(2), 738-741, (2013).

44. A. Linke and L. Rebholz, On a reduced sparsity stabilization of grad-div type for incompressible flow problems, *Computer Methods in Applied Mechanics and Engineering*, 261, 142-153, (2013).

43. W. Layton and L. Rebholz, On relaxation times in the Navier-Stokes-Voigt model, *International Journal of Computational Fluid Dynamics*, 27(3), 184-187, (2013).

42. A. Bowers* and L. Rebholz, Numerical study of a regularization model for incompressible flow with deconvolution-based adaptive nonlinear filtering, *Computer Methods in Applied Mechanics and Engineering*, 258, 1-12, (2013).

41. B. Cousins*, S. Le Borne, A. Linke, L. Rebholz, and Z. Wang*, Efficient linear solvers for incompressible flow simulations using Scott-Vogelius finite elements, *Numerical Methods for Partial Differential Equations*, 29(4), 1217-1237, (2013).

40. M. Akbas*, S. Kaya, L. Rebholz, and N. Wilson*, A subgrid stabilization finite element method for incompressible magnetohydrodynamics, *International Journal of Computer Mathematics*, 90(7), 1506-1523, (2013).

39. A. Bowers*, T.-Y. Kim, M. Neda, L. Rebholz, and E. Fried, The Leray-$\alpha\beta$-deconvolution model: energy analysis and numerical algorithms, *Applied Mathematical Modelling*, 37(3), 1225-1241, (2013).

38. M. Benzi, M. Olshanskii, L. Rebholz, and Z. Wang*, An iterative solver for the Navier-Stokes equations in Velocity-Vorticity-Helicity form, *Computer Methods in Applied Mechanics and Engineering*, 247, 216-225, (2012).

37. A. Bowers*, L. Rebholz, A. Takhirov, and C. Trenchea, Improved accuracy in regularization models of incompressible flow via adaptive nonlinear filtering, *International Journal for Numerical Methods in Fluids*, 70(7), 805-828, (2012).

36. P. Kuberry*, A. Larios, L. Rebholz, and N. Wilson*, Numerical approximation of the Voigt regularization of incompressible NSE and MHD flows, *Computers and Mathematics with Applications*, 64(8), 2647-2662, (2012).

35. A. Bowers* and L. Rebholz, Increasing accuracy and efficiency of FE computations of the Leray-deconvolution model, *Numerical Methods for Partial Differential Equations*, 28(2), 720-736, (2012).

34. W. Layton, L. Rebholz, and C. Trenchea, Modular nonlinear filter stabilization of methods for higher Reynolds numbers flow, *Journal of Mathematical Fluid Mechanics*, 14(2), 325-354 (2012).

33. K. Galvin*, H.K. Lee, and L. Rebholz, Approximation of viscoelastic flows with defective boundary conditions, *Journal of Non-Newtonian Fluid Mechanics*, 169-170, 104-113, (2012).

32. T.-Y. Kim, L. Rebholz, and E. Fried, A deconvolution enhancement of the Navier–Stokes-$\alpha\beta$ model, *Journal of Computational Physics*, 231(11), 4015-4027, (2012).

31. K. Galvin*, A. Linke, L. Rebholz, and N. Wilson*, Stabilizing poor mass conservation in incompressible flow problems with large irrotational forcing and application to thermal convection, *Computer Methods in Applied Mechanics and Engineering*, 237, 166-176, (2012).

30. A. Dunca, K. Kohler*, M. Neda and L. Rebholz, A mathematical and physical study of multiscale deconvolution models of turbulence, *Mathematical Methods in the Applied Sciences*, 35, 1205-1219, (2012).

29. C. Manica, M. Neda, M. Olshanskii and L. Rebholz, Enabling accuracy of Navier-Stokes-alpha through deconvolution and enhanced stability, *M^2AN: Mathematical Modelling and Numerical Analysis*, 45(2), 277-307, (2011).

28. M. Case*, V. Ervin, A. Linke, L. Rebholz, and N. Wilson, Stable computing with an enhanced physics based scheme for the 3D Navier-Stokes equations, *International Journal of Numerical Analysis and Modeling*, 8(1), 118-136, (2011).

27. C. Manica, M. Neda, M. Olshanskii, L. Rebholz and N. Wilson*, On an efficient finite element method for NS-$\overline{\omega}$ with strong mass conservation, *Computational Methods in Applied Mathematics*, 11(1), 3-22, (2011).

26. H.K. Lee, M. Olshanskii and L. Rebholz, On error analysis for the 3D Navier-Stokes equations in Velocity-Vorticity-Helicity form, *SIAM Journal on Numerical Analysis*, 49(2), 711-732, (2011).

25. A. Linke, L. Rebholz, and N. Wilson*, On the convergence rate of grad-div stabilized Taylor-Hood to Scott-Vogelius solutions for incompressible flow problems, *Journal of Mathematical Analysis and Applications*, 381, 612-626, (2011).

24. T.-Y. Kim, M. Neda, L. Rebholz, and E. Fried, A numerical study of the Navier–Stokes-$\alpha\beta$ model, *Computer Methods in Applied Mechanics and Engineering*, 200, 2891-2902, (2011).

23. M. Case*, V. Ervin, A. Linke and L. Rebholz, A connection between Scott-Vogelius elements and grad-div stabilization, *SIAM Journal on Numerical Analysis*, 49(4), 1461-1481, (2011).

22. B. Cousins*, L. Rebholz and N. Wilson*, Enforcing energy, helicity and strong mass conservation in FE computations for incompressible Navier-Stokes simulations, *Applied Mathematics and Computation*, 218, 1208-1221, (2011).

21. J. Connors, E. Jenkins, and L. Rebholz, On small-scale divergence penalization for incompressible flow problems via time relaxation, *International Journal of Computer Mathematics*, 88(15), 3202-3216, (2011).

20. M.A. Olshanskii and L. Rebholz, Application of barycenter refined meshes in linear elasticity and incompressible fluid dynamics, *ETNA: Electronic Transactions in Numerical Analysis*, 38, 258-274, (2011).

19. K. Galvin*, H.K. Lee and L. Rebholz, A Numerical Study for a Velocity-Vorticity-Helicity formulation of the 3D Time-Dependent NSE, *International Journal of Numerical Analysis and Modeling, Series B*, 2(4), 355-368, (2011).

18. M. Case*, A. Labovsky, L. Rebholz, and N. Wilson*, A high physical accuracy method for incompressible magnetohydrodynamics, *International Journal on Numerical Analysis and Modeling, Series B*, 1(2), 219-238, (2010).

17. W. Miles and L. Rebholz, An enhanced physics based scheme for the NS-alpha turbulence model, *Numerical Methods for Partial Differential Equations*, 26, 1530-1555, (2010).

16. A. Bowers*, B. Cousins*, A. Linke and L. Rebholz, New connections between finite element formulations of the Navier-Stokes equations, *Journal of Computational Physics*, 229(24), 2090-2095, (2010).

15. M. Olshanskii and L. Rebholz, A note on helicity balance of the Galerkin method for the 3D Navier-Stokes equations, *Computer Methods in Applied Mechanics and Engineering*, 199, 1032-1035, (2010).

14. M. Olshanskii and L. Rebholz, Velocity-Vorticity-Helicity formulation and a solver for the Navier-Stokes equations, *Journal of Computational Physics*, 229, 4291-4303, (2010).

13. W. Layton, C.D. Pruett, and L. Rebholz, Temporally regularized direct numerical simulation, *Applied Mathematics and Computation*, 216, 3728-3738, (2010).

12. L. Rebholz and M. Sussman, On the high accuracy NS-alpha-deconvolution model of turbulent fluid flow, *M^3AS: Mathematical Models and Methods in Applied Sciences*, 20 (4), 611-633, (2010).

11. W. Layton, C. Manica, M. Neda and L. Rebholz, Numerical analysis and computational comparisons of the NS-alpha and NS-omega regularizations, *Computer Methods in Applied Mechanics and Engineering*, 199, 916-931, (2010).

10. W. Layton, L. Rebholz, and M. Sussman, Energy and helicity dissipation rates of the NS-alpha and NS-alpha-deconvolution models, *IMA Journal of Applied Mathematics*, 75 (1), 56-74, (2010).

9. L. Rebholz, Enhanced physics-based numerical schemes for two classes of turbulence models, *Advances in Numerical Analysis*, 2009 (ID:370289), 1-13, (2009).

8. A. Labovsky, W. Layton, C. Manica, M. Neda and L. Rebholz, The stabilized, extrapolated trapezoidal finite element method for the Navier-Stokes equations, *Computer Methods in Applied Mechanics and Engineering*, 198 (9-12), 958-974, (2009).

7. W. Layton, C. Manica, M. Neda, M. Olshanskii and L. Rebholz, On the accuracy of the rotation form in simulations of the Navier-Stokes equations, *Journal of Computational Physics*, 228 (9), 3433-3447, (2009).

6. W. Layton, C. Manica, M. Neda and L. Rebholz, Numerical Analysis and Computational Testing of a high-order Leray-deconvolution turbulence model, *Numerical Methods for Partial Differential Equations*, 24 (2), 555-582, (2008).

5. L. Rebholz, A family of new high order NS-alpha models arising from helicity correction in Leray turbulence models, *Journal of Mathematical Analysis and Applications*, 342 (1), 246-254, (2008).

4. W. Layton, C. Manica, M. Neda and L. Rebholz, The joint helicity-energy cascade for homogeneous, isotropic turbulence generated by approximate deconvolution models, *Advances and Applications in Fluid Mechanics*, 4 (1), 1-46, (2008).

3. L. Rebholz, An Energy and Helicity conserving finite element scheme for the Navier-Stokes Equations, *SIAM Journal on Numerical Analysis*, 45 (4), 1622-1638, (2007).

2. L. Rebholz, Conservation laws of turbulence models, *Journal of Mathematical Analysis and Applications*, 326 (1), 33-44, (2007).

1. L. Rebholz, A multiscale V-P discretization for flow problems, *Applied Mathematics and Computation*, 177 (1), 24-35, (2006).

Refereed Conference Proceedings

1. J. Franklin*, E. Hawkins*, M. Morales Hernandez and L. Rebholz, Efficiency and robustness of the (Anderson-)Picard-Newton iteration for solving nonlinear PDEs, Proceedings of the 16th World Congress in Computational Mechanics, (2024).

2. F. Eroglu*, S. Kaya and L. Rebholz, A numerical investigation of the VMS-POD model for Darcy-Brinkman equations, Proceedings of the World Congress on Engineering, volume I, 1-5, (2018).

3. L. Bertagna, A. Quaini, L.G. Rebholz, A. Veneziani, On the sensitivity to the filtering radius in Leray models of incompressible flow, in Contributions to Partial Differential Equations and Applications - Computational Methods in the Applied Sciences 47, 111-130, editors: B.N Chetverushkin, W. Fitzgibbon, Y.A. Kuznetsov, P. Neittaanmaki, J. Periaux, J. and O. Pironneau, Springer International, (2018).

4. M. Akbas*, S. Kaya and L. Rebholz, Numerical Studies on a Second Order Explicitly Decoupled Variational Multiscale Method, Numerical Mathematics and Advanced Concepts - ENUMATH 2015, edited by: B. Karasozen, M. Manguoglu, M. Tezer-Sezgin, S. Goktepe and U. Omur, Springer Lecture Notes in Computational Science and Engineering, volume 112, (2016).

5. E. D'Agnillo* and L. Rebholz, On the enforcement of discrete mass conservation in incompressible flow simulations with continuous velocity approximation, In: Recent Advances in Scientific Computing and Applications: Proceedings of the 8th International Conference on Scientific Computing and Applications, edited by: Jichun Li, Eric Macharro, and Hongtao Yang, AMS Contemporary Mathematics, volume 586, (2013).

6. A. Labovschii, W. Layton, C. Manica, M. Neda, L. Rebholz, I. Stanculescu, C. Trenchea, Architecture of approximate deconvolution models of turbulence, *Quality and Reliability of Large-Eddy Simulations*, Part I, ERCOFTAC Series, Volume 12, editors J. Meyers, B. Guerts, P. Sagaut, (2008).

PRESENTATIONS

Conference Talks

2004 AMS Eastern Fall 2004, S.S. on Multiscale Algorithms in CFD, Pittsburgh PA

2005 Mathematics as an Enabling Science Conference, Virginia Tech

2006 Finite Element Circus, March 2006, University of Maryland Baltimore County

2007 AMS Midwestern Fall 2007, S.S. on Math. Mod. and Num. Meth., DePaul, Chicago, IL

2009 Joint VT/UTK/Pitt/Clemson Applied Math Conference, Virginia Tech

2009 AMS Southeast Spring 2009, S.S. on Adv. in Turbulent Flow Mod. and Comp., N.C. State

2009 Finite Element Circus, University of Tennessee at Knoxville

2010 SIAM Annual Meeting 2010, S.S. on Alg. Anal., Design and Comp. for Turbulent Flows

2010 SIAM Annual Meeting 2010, S.S. on Nonconforming Finite Element Methods

2011 AMS Western Spring 2011, S.S. on Advances in Modeling, Numerical Analysis and Computations of Fluid Flow Problems, UNLV

2011 Workshop/conference on Approximation Theory and Harmonic Analysis, Kennesaw State

2012 8^{th} International Conference on Scientific Computing and Applications, UNLV

2012 Workshop on 'Connections Between Regularized and Large-Eddy Simulation Methods for Turbulence', Banff International Research Station, Alberta CA

2012 SIAM Annual 2012, SS on Rec.adv. in mod and num meth fluid flow probs, Minneapolis MN

2013 SIAM Conference on Applications of Dynamical Systems 2013, S.S. on Recent Advancements in Large Eddy Simulations of Turbulent Flows, Snowbird UT

2013 SIAM Annual 2013, SS on Numerical methods for incompressible flows, San Diego CA

2013 Finite Element Circus, October 2013, University of Delaware

2014 JMM 2014, SIAM MS on Turbulence and Mixing in Fluids: Anal. Appl., Baltimore MD

2014 SIAM Southeast 2014, SS on Rec.adv. in mod of complex systems: anal. and comp., Fl. Tech

2014 AMS Southeast Fall 2014, SS on Rec.adv. in num.meth. for fluid flow prob., UNC Greensboro

2015 AMS Midwest Spr 2015, SS on Rec.adv. in FE and DG Methods for PDEs, Michigan State

2015 AMS Southeast Spr 2015, SS on Rec.adv in num.meth for nonlinear PDEs, Alabama Huntsville

2015 AMS West Spr 2015, SS on Dev. of Num.Meth. and Comp. for Fluid Flow Prob., UNLV

2015 13^{th} US National Congress on Computational Mechanics, SS on Old and New Challenges for Navier-Stokes Equations, San Diego CA

2015 Finite Element Circus (Fall 2015), UMass Dartmouth

2016 SIAM Southeast 2016, SS on Rec.adv. in fluid flow and applications, U. Georgia

2016 Conference on 'Numerical Analysis and Predictability of Fluid Motion', Pitt

2017 JMM 2017, SS on Recent advances in numerical analysis of PDEs, Atlanta GA

2017 SIAM Computational Science and Engineering 2017, SS on Reduced order models for fluids, Atlanta GA

2017 Tenth IMACS Int. Conf. on Nonlinear Evolution Equations and Wave Phenomena, S.S. on Analysis of numerical methods for dispersive and fluid equations, Athens GA

2017 Workshop on Applied Analysis, Kennesaw State

2017 SIAM Annual 2017, SS on Synergy of Design, Analysis, and Computations in Fluid Flow Dynamics, Pittsburgh PA

2017 Mathematical Congress of the Americas 2017, SS on Equations of Fluid Mechanics: Numerics, Montreal CA

2017 SIAM PDE 2017, Multiphysics and Turbulence: Analysis and Simulation, Baltimore MD

2018 SIAM Southeast 2018, SS on ROM, multiscale and conservative numerical methods for fluids, Chapel Hill NC

2018 Finite Element Circus (Spring 2018), University of Tennessee Knoxville

2018 MAA Southeast Spring 2018, Special Session on Mathematical Experiences and Projects in Business, Industry and Government, Clemson SC

2018 Finite Element Circus (Fall 2018), University of Delaware

2019 JMM 2019, SS on Recent Developments for Numerical Methods for Fluids, Baltimore MD

2019 AMS West Spring 2019, SS. on Recent Advances in Numerical Methods for PDEs, University of Hawaii, Honolulu HI

2019 SIAM Southeast 2019, S.S. on Numerical methods and reduced-order modeling in fluid dynamics and control, Knoxville TN, September 2019

2019 ENUMATH 2019, S.S. on Structure-preserving discretization methods I: Discretization methods based on exterior calculus, Egmond aan Zee, Netherlands, October 2019

2019 ENUMATH 2019, S.S. on Recent Advances in Numerical Simulation of Incompressible Flows, Egmond aan Zee, Netherlands, October 2019

2019 AMS Southeast Spring 2019, S.S. on nonlinear Solvers and Acceleration Methods, University of Florida, Gainesville FL, November 2019

2019 SIAM PDE 2019, S.S. on Applicable Analysis and Control Theory for Fluid and Fluid-Structure PDE, La Quinta CA, December 2019

2020 JMM 2020, Denver CO, SS on Recent Developments in Numerical Methods for PDEs, January 2020

2020 AMS Southeast Fall 2020, virtual, S.S. on Applicable Analysis of PDE Systems which Govern Fluid Flows and Flow-Structure Interactions, October 2020

2020 SIAMTXLA 2020 conference, virtual, S.S. on Numerical methods for Stokes and Navier-Stokes equations, October 2020

2021 SIAM Southeast, Auburn AL (Auburn University), S.S. on reduced order modeling in the age of data, September 2021

2021 KUMUNU-ISI conference, Invited speaker, Lincoln NE, October 2021

2022 SIAM PDE 2022, Virtual, S.S. on Data driven closures for kinetic and fluid models, March 2022

2022 AMS Southeast, Fall 2022, Chattanooga TN (UT Chattanooga), S.S. on Deterministic and Stochastic PDEs: Theoretical and Numerical Analyses, October 2022

2023 AMS Southeast, Spring 2023, Atlanta GA (Georgia Tech), S.S. on Recent Development in Advanced Numerical Methods for Partial Differential Equations, March 2023

2023 SIAM Dynamical Systems 2023, S.S. on Rigorous and Computational Studies of Data Assimilation and Parameter Estimation, Portland OR, May 2023

2023 ICERM Topical Workshop on Acceleration and Extrapolation Methods, Providence RI, July 2023

2023 ICIAM 2023, S.S. on Innovative numerical methods for complex PDEs, Tokyo Japan, August 2023

2023 Sixth International Conference on Mathematics and Related Sciences (ICMRS 2023), Plenary Speaker, November 2023

2024 ICERM Workshop on Numerical Analysis of Multiphysics Problems, Providence RI, February 2024

2024 World Congress on Computational Mechanics 2024, S.S. on Recent advances in discretization techniques for coupled problems in incompressible fluid dynamics, Vancouver BC, July 2024

2025 JMM 2025, SIAM S.S. on Reduced Order Models for Convection-Dominated Flows: Modeling, Analysis, and Simulation, Seattle WA, January 2025

2025 Finite Element Rodeo, LSU, Baton Rouge LA, February 2025

2025 SIAM Computational Science and Engineering, S.S. on Computational Methods for Non-Newtonian Flows, Fort Worth TX, March 2025

2025 SIAM Southeast 2025, S.S. on Recent Progress in Numerical PDEs and Applications, Knoxville TN, March 2025

2025 Recent Advances in Numerical PDEs conference, Pittsburgh PA, May 2025

Seminar/Colloquium Talks

2004 University of Pittsburgh, Computational Math Seminar

2005 University of Pittsburgh, Computational Math Seminar

2006 University of Pittsburgh, Computational Math Seminar

2007 University of Pittsburgh, Computational Math Seminar

2008 Clemson University, Fluid Mechanics Seminar Series

2009 Clemson University, Fluid Mechanics Seminar Series

2009 Emory University, Scientific Computing Seminar

2009 UNLV, Department of Mathematical Sciences Colloquium

2010 Clemson University, Computational Math Seminar, (Spring)

2010 University of Pittsburgh, Computational Math Seminar, (Spring)

2010 Clemson University, Computational Math Seminar, (Fall)

2010 University of Pittsburgh, Computational Math Seminar, (Fall)

2010 Florida State University, Department of Scientific Computing Colloquium

2010 Virginia Tech, ICAM Seminar

2010 Tennessee Tech, Department of Mathematics Colloquium

2011 Clemson University, Computational Math Seminar, (Spring)

2011 Kennesaw State University, Analysis and Applied Mathematics Seminar

2011 Clemson University, Computational Math Seminar, (Fall)

2011 University of Alberta, Applied Mathematics Institute Seminar

2011 University of Houston, Department of Mathematics Colloquium

2012 University of Pittsburgh, Computational Math Seminar

2012 Clemson University, Computational Math Seminar (Fall)

2012 Michigan Tech University, Department of Mathematics Colloquium

2012 Weierstrass Institute (Berlin, Germany), Seminar Numerische Mathematik

2012 University of Houston, Scientific Computing Seminar

2013 University of Pittsburgh, Computational Math Seminar

2013 Clemson University, Computational Math Seminar (Fall)

2013 UNLV, Computational and Applied Math Seminar

2013 Universidade Federal do Rio Grande do Sul (Porto Alegre, Brazil), Institute of Mathematics Colloquium (2 talks)

2014 Clemson University, Computational Math Seminar (Spring)

2014 College of Charleston, Department of Mathematics Colloquium

2014 University of South Carolina, Applied and Computational Mathematics Seminar

2014 University of Texas at Dallas, Department of Mathematical Sciences Colloquium

2014 Temple University, Department of Mathematics Colloquium

2014 Auburn University, Applied Mathematics Seminar

2014 Technische Universitat Hamburg-Harburg (Hamburg, Germany), Kolloquium fur Angewandte Mathematik

2014 Weierstrass Institute (Berlin, Germany), Seminar Numerische Mathematik

2014 UNLV, Computational and Applied Math Seminar

2014 Emory, Scientific Computing Seminar

2014 Tulane, Department of Mathematics Colloquium

2014 Tulane, Applied and Computational Math Seminar

2014 Virginia Tech, Department of Mathematics Colloquium

2015 Clemson University, Computational Math Seminar

2015 University of Pittsburgh, Computational Math Seminar

2015 University of Pittsburgh, Talk for SIAM Student Chapter

2015 Michigan Tech, Department of Mathematics Colloquium

2015 University of Alberta, Applied Mathematics Institute Seminar

2016 Florida State University, Department of Scientific Computing Colloquium

2016 Florida State University, Talk for Scientific Computing graduate students

2016 University of Tennessee, Department of Mathematics Colloquium

2016 Tulane, Department of Mathematics Colloquium

2017 Indiana University, Institute for Scientific Computing Seminar

2017 University of Nebraska, PDE seminar

2017 Goettingen University (Germany), Seminar Numerische Mathematik

2017 Weierstrass Institute (Berlin, Germany), Seminar Numerische Mathematik

2017 University of Pittsburgh, Department of Mathematics Colloquium

2019 University of Alberta, Applied Mathematics Institute Colloquium

2019 Virginia Tech, Fluids Seminar

2019 University of Houston, Computational Mathematics Seminar

2019 University of Missouri Science and Technology Mathematics Colloquium

2020 Texas Tech Mathematics Colloquium

2020 Oak Ridge National Lab, Computational and Applied Mathematics Seminar

2021 University of West Florida, Department of Mathematics and Statistics Colloquium

2021 Indiana University, Applied Math / PDE seminar

2021 University of Nebraska, PDE seminar

2021 Iowa State, Department of Mathematics Colloquium

2021 Weierstrass Institute (Berlin), Numerical Mathematics and Scientific Computing seminar

2021 Iowa State, Computational and Applied Math Seminar

2021 Oak Ridge National Lab, Mathematics in Computation Seminar

2022 Mississippi State, Mathematics Colloquium

2022 Montana State, Applied Math Seminar

2022 University of Georgia, Applied Math Seminar

2023 University of Pittsburgh, Mathematics Colloquium

2023 SIAM Central States Computational and Applied Mathematics Forum

2023 University of Pittsburgh, Computational Mathematics Seminar

2024 University of Alabama Birmingham (UAB), Mathematics Colloquium

AWARDS and HONORS

College of Science Dean's Distinguished Professorship, 2023

College of Science Excellence in Discovery Award, 2021

Clemson Board of Trustees Recognition for Excellence in Research, 2018

Clemson Board of Trustees Recognition for Excellence in Research, 2014

Mathematical Sciences Faculty Teaching Award, 2012

Stories in the media about my work:
Clemson University Featured Story, June 22, 2015: 'Clemson University professor works to cut costs for companies and students', written by Paul Alongi
Greenville News (front page!) July 1, 2015: 'Clemson, Furman professors done with pricey textbooks', written by Nathaniel Cary
Channel 4 news, 6:00pm, July 1, 2015: Story about the book Timo Heister and I wrote for numerical methods course

SPONSORED RESEARCH

- **Research grants**

"Infrastructure and Application Aware Reduction Methods for Scientific Data", Department of Energy, Grant #DE-SC0025292, Principal Investigator, $450,000 ($450,000), (2024-2027). [This is collaborative research: PI at ORNL is R. Archibald, PI at Dartmouth is A. Gelb, PI at NYU is E. Vanden- Eijnden]

"Collaborative Research: Lab data enabled phase field modeling and data assimilation for coupled two-phase fluid flow and porous media flow", National Science Foundation, DMS-2152623, Principal Investigator, $110,000 ($110,000), (2022-2025). [PI at U Missouri S&T is Xiaoming He]

"AGEP-GRS Supplement to DMS-2011490", National Science Foundation, DMS-2113340, Principal Investigator, $51,248 ($51,248), (2021-2022)

"Collaborative Research: Advancing Theoretical Understanding of Accelerated Nonlinear Solvers, with Applications to Fluids", National Science Foundation, DMS-2011490, Principal Investigator, $145,307 ($145,307), (2020-2024). [PI at U Florida is Sara Pollock]

"Collaborative Research: Variational Structure Preserving Methods for Incompressible Flows: Discretization, Analysis, and Parallel Solvers", National Science Foundation, DMS-1522191, Principal Investigator, $324,780 ($117,390), (2015-2019). [co-PI Timo Heister, PI at UofH is Maxim Olshanskii]

"Long-term stable conservative multiscale methods for vortex flows", US Army Research Office, 65294-MA, Principal Investigator, $160,809 ($160,809), (2014-2017). [Collaborative research; co-PI is Maxim Olshanskii]

"Improving numerical methods for incompressible, viscous flow simulation," National Science Foundation, DMS-1112593, Principal Investigator, $150,000 ($150,000), (2011-2015).

"Parallel fluid dynamics algorithms development," National Computational Science Institute and Shodor, Principal Investigator, $8,000 ($8,000), (2010-2011).

"Enabling long time accuracy in turbulent flow simulations," National Science Foundation, DMS-0914478, Principal Investigator, $256,583 ($256,583), (2009-2012).

- **Conference grants**

"Conference: The eleventh annual graduate student mini-conference in computational mathematics", National Science Foundation, DMS-2349950, co-PI, $22,243 ($7,414), (2024-2026). [PI is Qingshan Chen and co-PI is Hyesuk Lee]

"Eighth Annual Graduate Student Mini-conference in Computational Mathematics", National Science Foundation, DMS-1547107, Principal Investigator, $9,808 ($3,269), (2016). [co-PIs are Qingshan Chen and Hyesuk Lee]

"Fifth Annual Graduate Student Mini-conference in Computational Mathematics," National Science Foundation, DMS-1245607, Principal Investigator, $8,000 ($4,000), (2013). [co-PI is Hyesuk Lee]

MENTORING

Postdocs supervised

1. Xuejian Li, SMSS Postdoc, 2023-2025 [Tenure track assistant professor, Embry Riddle Aeronautical University, August 2025-]
2. Jorge Reyes, SIAM Postdoc, 2025-2026

Ph.D. Graduates (and jobs after graduation and awards)

1. Michael A. Case (Ph.D.) (co-advisor: E. Jenkins), *Improved accuracy for fluid flow problems via enhanced physics*, (2010, posthumous)
   - SIAM Southeast Student Paper Prize, 2010
2. Nicholas E. Wilson (Ph.D.), *Physics-based algorithms and divergence free finite elements for coupled flow problems*, (2012) [Postdoc Michigan Tech]
   - Outstanding Graduate Researcher Award, Department of Mathematical Sciences, Clemson University, 2012
3. Keith J. Galvin (Ph.D.) (co-advisor: Hyesuk Lee), *Improved numerical methods for Newtonian and non-Newtonian fluids*, (2013) [Postdoc University of Michigan]

- Outstanding Graduate Researcher Award, Department of Mathematical Sciences, Clemson University, 2013

4. Abigail L. Bowers (Ph.D.), *On numerical algorithms for fluid flow regularization models*, (2014) [Assistant Professor Florida Polytechnic]

5. Mine Akbas (Ph.D.), (co-advisor: S. Kaya Merdan), *Numerical methods for multiphysics flow problems*, (2016) [Postdoc Duzce University]

6. Muhammad Mohebujjaman (Ph.D.), (co-advisor: Timo Heister) *Efficient numerical methods for magnetohydrodynamic flow*, (2017) [Postdoc Virginia Tech 2017-2018, Postdoc MIT 2019-2020]

7. Mengying Xiao (Ph.D.), (co-advisor Timo Heister) *Efficient and accurate splitting methods for flow problems*, (2018) [Postdoc University of Florida]

    - Outstanding Graduate Researcher Award, Department of Mathematical Sciences, Clemson University, 2018 (runner up in 2017)
    - Outstanding Graduate in Discovery, College of Science, Clemson University, 2018

8. Sergey Charnyi (Ph.D.) (co-advisor: Timo Heister), *The EMAC scheme for Navier-Stokes simulation, and application to flow past bluff bodies*, (2018). [Postdoc, Naval Postgraduate School]

9. Camille Zerfas (Ph.D.), *Numerical methods and analysis for continuous data assimilation in fluid models*, (2019). [Data Scientist, NextEra Energy]

10. Sean Ingimarson (Ph.D.), *Advancement in fluid simulation through enhanced conservation schemes*, (2023). [Staff Scientist, Applied Research Associates]

11. Duygu Vargun (Ph.D.), *Acceleration methods for nonlinear solvers and application to fluid flowsimulations*, (2023). [Postdoc Oak Ridge National Lab 2023-2025, Postdoc Rice University 2025-]

12. Elizabeth Hawkins (Ph.D.), *Robust and efficient solvers for physics-based PDEs* (2025) [Postdoc, Rice University]

Masters Graduates (and jobs after graduation)

1. Keith J. Galvin (M.S.), *Subgrid scale viscosity methods for the Navier-Stokes equations* (2010) [continued into Phd program]

2. Ryan G. Hill, (M.S.), *Benchmark testing of the α models of turbulence* (2010) [Applied Mathematician at Naval Surface Warfare Center, 2010-present]

3. Abigail L. Bowers (M.S.), *Increased accuracy and efficiency in finite element computations of the Leray-deconvolution model of turbulence* (2010) [continued into Phd program]

4. Michael C. Dowling (M.S.) *Enhanced physics schemes for the 2D NS-α model of incompressible flow* (2012) [continued into Phd program]

5. Erica D'Agnillo (M.S.), *The importance of discrete mass conservation in incompressible flow simulations* (2012) [Analyst Epic Systems 2012-present]

6. Kara E. Kohler (M.S.), *A mathematical and physical study of multiscale deconvolution models of turbulence* (2012) [Mathematics Instructor, Salem Academy]

7. Stacey A. Watro (M.S.), *Analytical solutions to turbulent flow models* (2013) [Analyst Thoughtworks, 2013-]

8. Victoria M. Cuff (M.S.), *Unconditionally stable and efficient algorithms for NS-α models* (2013) [Analyst Hanscom Airforce Base 2013-present]

9. Muhammad Mohebujjaman (M.S.), *Linear solvers for saddle points systems arising from Navier-Stokes simulations* (2014) [continued into Phd program]

10. Monica Morales Hernandez (M.S.), *Some new results for Leray models and their discretizations* (2015) [Lecturer Emmanuel College 2017-2018, Lecturer Adelphi University 2018-present]

11. Becca Knoll (M.S.), *On the choice of grad-div parameter in finite element discretizations of the steady Navier-Stokes equations* (2016) [Mathematics Instructor Rockbridge Academy 2016-present]

12. Camille Zerfas (M.S.), *Sensitivity study for the rNS-α model of turbulence* (2016) [continued into Phd program]

13. Dominique Forbes (M.S.), *Accelerated solvers for nonlinear Schrödinger and nonlinear Helmholtz equations* (2020) [Axos Bank]

14. Tori Luongo Fisher (M.S.), *Efficient solvers and Anderson acceleration for the Bingham equations* (2025) [continued into Phd program]

Current Graduate Advising

Tori Luongo Fisher (Ph.D.), *Efficient assimilation methods for data reduction*

Jessica Franklin (M.S.), *TBD*

UNDERGRADUATE STUDENT ADVISING

Past Undergraduate Honors/Research Advising

Benjamin R. Cousins (B.S.), *Scott-Vogelius elements and the p-method for fluid flow simulations*, (2012)

Victoria M. Cuff (B.S.), *Simulation of the Navier-Stokes equation with adaptive mesh refinement*, (2012)

Nathan Heavner (B.S.), *On local choice of grad-div stabilization parameters in finite element methods for incompressible flows*, (2014)

Barbara Woo (B.S.), *Numerical methods for differential equations*, (2015)

Sarah Malick (B.S.), *A connection between grad-div stabilized FE solutions and pointwise divergence-free FE solutions on general meshes*, (2016)

Jacob Honeycutt (B.S. 2019), Hannah Johnson (B.S. 2019), Sarah Kelly (B.S. 2018), *Using Data Assimilation to Better Predict Contaminant Transport in Fluids*

Claire Evans (B.S. 2018), *Anderson acceleration accelerates*

Allison Miller (B.S. 2019), *Anderson acceleration of fixed point methods*

Tori Luongo (B.S., 2023), *Long-time stability for an IMEX discretization of the 1D Fujita equation*

Jessica Franklin (B.S., 2024), *The Picard-Newton iteration for solving nonlinear systems*

Sarah Cornell (B.S., 2025), *Continuous data assimilation in PDEs for fluids*

TEACHING

Courses Taught at Clemson (Beginning Fall 2008)

Math1020, Business Calculus I, SU19
Math2060, Multivariable Calculus, FA08,SP09,FA12
Math2080, Ordinary Differential Equations, SP20, FA20, FA22, FA24
Math2500, Sophomore Seminar for MathSci Majors, FA19,20,21,22,23,24
Math3110, Linear Algebra, SU14
Math3650, Numerical Methods for Engineering (many, many times)
Math4530, Advanced Calculus, SU11, SU15
Math4650, Numerical Methods for Differential Equations FA18, FA21
Math4600, Intro to Numerical Analysis, SP13, SP16, SP18
Math8260, Partial Differential Equations, SP12
Math8600, Scientific Computing, SP09, SP11(2), SP15, SP19
Math8610, Numerical Linear Algebra, FA13
Math8660, Finite Element Method, SP14
Math9830, Computational Fluid Mechanics, FA09, FA11, FA19
Math9830, Splitting methods for Navier-Stokes equations, FA15
Math9830, Turbulence Modeling, FA12

Courses Taught pre-Clemson (2001-2008)

Math101 (Duquesne Univ.) College Algebra, FA01
Math125 (Duquesne Univ.) Fundamentals of Statistics, SP02
Math110 (Comm. College Allegheny County) Business Calculus SU02
Math225 (Comm. College Allegheny County) Calculus 3 SU03
Math116 (Univ. of Pittsburgh) Business Calculus SU03

SERVICE

National Science Foundation

Panelist: Applied Mathematics, March 2024
Panelist: Computational Mathematics, February 2023
Panelist: Mathematical Sciences, March 2022
Panelist: Computational Mathematics, March 2021
Panelist: Mathematical Sciences, May 2020
Panelist: Computational Mathematics, March 2013
Panelist: Computational Mathematics, March 2012
Panelist: Computational Mathematics, March 2010
Ad hoc reviewer: December 2010, August 2016, February 2022

Natural Sciences and Engineering Research Council of Canada

Ad hoc reviewer, January 2014

Ad hoc reviewer, June 2014
Ad hoc reviewer (Mitacs), November 2015, April 2016, February 2018

Czech Science Foundation
Ad hoc reviewer, 2013

KAUST
Ad hoc reviewer, 2022

Associate Editor
Journal of Numerical Mathematics, 2021-
Ranked #6 out of 71 (upper Q1) Numerical Analysis Journal by SJR
Ranked #10 out of 158 (upper Q1) Computational Mathematics Journal by SJR
Ranked #121 out of 1670 (upper Q1) Mathematics Journal by SJR
Communications in Mathematical Research, 2020-
Advances in Applied Mathematics and Mechanics, 2018-2022
Int. J. of Numerical Analysis and Modeling, 2015-
Int. J. of Numerical Analysis and Modeling, Ser. B, 2010-2015
Int. J. of Analysis, 2012-2014

Conferences organized
2024 Graduate student mini-conference on computational mathematics
Clemson, SC, April 2024 (funded by NSF, PI: Q. Chen, co-PIs: H.K. Lee and Rebholz)

2016 Graduate student mini-conference on computational mathematics
Clemson, SC, February 2016 (funded by NSF, PIs: Rebholz, Q. Chen and H.K. Lee)

2013 Graduate student mini-conference on applied and computational mathematics
Clemson, SC, February 2013 (funded by NSF, PIs: Rebholz and H.K. Lee)

2011 Graduate student mini-conference on applied and computational mathematics
Clemson, SC, February 2011

Special sessions organized/organizing
SIAM Annual Meeting 2025, special session organizer:
Special Session on Data Assimilation and Beyond: Parameter Estimation, Noise, and Model Error
Montreal Canada, July 2025

AMS Southeast Fall 2024 special session organizer:
Special Session on Recent progress in numerical methods for PDEs
Savannah, GA, October 2024

AMS Southeast Fall 2023 special session organizer:
Special Session on Recent progress in numerical methods for PDEs
Mobile, AL, October 2023

JMM 2023 special session organizer:
Recent developments in Numerical Methods for PDEs
Boston, MA, January 2023

SIAM Annual Meeting 2022, special session organizer:
Special Session on Recent progress in numerical methods for PDEs

Pittsburgh, PA, July 2022

AMS Western Spring 2022 special session organizer:
Special Session on Recent Advances in Finite Element Methods for Coupled Systems
Virtual, May 2022

AMS Southeast Fall 2019 special session organizer:
Special Session on Nonlinear Solvers and Acceleration Methods
Gainesville, FL, November 2019

JMM 2019 special session organizer:
SIAM Minisymposium on Recent Developments in Numerical Methods for Fluids
Baltimore, MD, January 2019

SIAM Southeast 2018 special session organizer:
Special Session on ROM, multiscale and conservative numerical methods for fluids
UNC-Chapel Hill, NC, March 2018

JMM 2018 special session organizer:
Recent Trends in Analysis of Numerical Methods for Partial Differential Equations
San Diego, CA, January 2018

AMS Southeast Spring 2017 special session organizer:
Special Session on Recent Trends in Finite Element Methods
Charleston, SC, March 2017

AMS Western Fall 2016 special session organizer:
Above and beyond fluid flow studies and a celebration of Bill Layton's 60th
Denver, CO, October 2016

SIAM Southeast 2016 special session organizer:
Recent advances in numerical methods for fluid flow with applications
Athens, GA, March 2016

ICIAM 2015 special session organizer:
Divergence-free elements, grad-div, and related for incompressible flow problems
Beijing China, August 2015

AMS Southeast Sectional Meeting Fall 2014 special session organizer:
Recent Advances in Numerical Methods for Fluid Flow Problems
Greensboro, NC, November 2014

SIAM Annual Meeting 2013 special session organizer:
Numerical methods for incompressible fluid flows
San Diego, CA, July 2013

SIAM Annual Meeting 2012 special session organizer:
Recent advances in analysis and numerical methods for fluid flow simulation
Minneapolis, MN, July 2012

SIAM Southeast Meeting 2012 special session organizer:
Numerical methods for incompressible flow problems
Huntsville, AL, March 2012

SIAM Southeast Meeting 2011 special session organizer:

Recent advances in numerical methods for PDE
Charlotte, NC, March 2011

SIAM Annual Meeting 2010 special session organizer:
Algorithm analysis, design and computation for turbulent flows
Pittsburgh, PA, July 2010

AMS Southeast Spring 2009 special session organizer:
Advancements in Turbulent Flow Modeling and Computation
North Carolina State University, April 2009

External Evaluation of Tenure and Promotion Cases
I can't make this public.

External evaluator of Doctoral Program
Texas Tech, Department of Mathematics and Statistics, 2025

Poster Evaluator for Grace Hopper conference
Evaluated posters, 2021

Journal Refereeing
I reviewed more than 20 papers each year since 2010, and I have reviewed for pretty much every reputable applied and/or computational mathematics and/or computational physics journal.

Departmental
Clemson Calculus Challenge exam writing and grading committees, 2009, 2010, 2011, 2012, 2013
Research Committee (2009-2011, 2013)
Graduate Committee (2011-2012, 2015)
Math Science Council (2012-2013, 2015-2025)
Teaching Award Committee (2012-2015)
Clemson Computational Math Research Seminar organizer, SP10-FA12
Faculty advisor to Clemson SIAM Student Chapter, 2012-2016
Chair evaluation committee, 2015
Chair search committee (chair), 2016
Chair search committee (chair), 2017-18

College
Associate Dean for Research Search Committee, 2013
Awards Committee, 2016, 2017, 2022, 2025
Curriculum Committee, 2017, 2018

Updated May, 2025