

Curriculum Vitae

RESEARCH INTERESTS

- Numerical method for hyperbolic partial differential equations – conservative finite-difference and finite-volume methods, high-order time integration methods (implicit, implicit-explicit, and multirate methods).
- Domain discretization techniques – mapped multi-block grids, overset meshes, immersed boundary methods.
- Applications: fusion plasma applications (ICF and MFE), external compressible and incompressible flows, atmospheric flows, aerodynamic flows – rotorcraft and flapping wing aircraft, ideal magneto-hydrodynamics.
- High-performance computing – design and implementation of scalable algorithms on HPC platforms, specifically DOE Leadership-class supercomputers.

PROFESSIONAL EXPERIENCE

- **COMPUTATIONAL SCIENTIST – LAWRENCE LIVERMORE NATIONAL LABORATORY**, February 2018 – Present
Center for Applied Scientific Computing
High-order numerical methods for plasma dynamics in fusion applications; Implicit-explicit time integration methods for multiscale physics; Multifluid models for simulation of interpenetrating plasmas in ICF applications; Reduced-order modeling for fusion plasma dynamics.
- **POSTDOCTORAL RESEARCH STAFF MEMBER – LAWRENCE LIVERMORE NATIONAL LABORATORY**, October 2015 – February 2018
Center for Applied Scientific Computing
Implicit-explicit time integration methods for continuum kinetic systems; High-order finite-volume algorithms for tokamak edge plasma simulations; Multirate time integration methods for AMR-based atmospheric flow solvers.
- **POSTDOCTORAL APPOINTEE – ARGONNE NATIONAL LABORATORY**, February 2013 – October 2015
Mathematics and Computer Science Division
and **FELLOW – COMPUTATION INSTITUTE, THE UNIVERSITY OF CHICAGO**, March 2015 – October 2015
Implicit-explicit time integrators and their applications to atmospheric flows; Multirate time integration methods; Scalable implementation of nonlinear compact finite-difference schemes.
- **RESEARCH ASSISTANT – UNIVERSITY OF MARYLAND**, July 2008 – January 2013
Alfred Gessow Rotorcraft Center, Aerospace Engineering
High-resolution non-oscillatory schemes for turbulent flows; Application to DNS of turbulent flows and flows around rotary and flapping wing aircraft; Simulation of incompressible, vortex-dominated flows; Immersed boundary methods and their applications.
- **RESEARCH ASSISTANT – INDIAN INSTITUTE OF TECHNOLOGY BOMBAY**, June 2005 – June 2006
Department of Aerospace Engineering
Numerical methods for ideal magneto-hydrodynamics; Finite-volume time-domain algorithms for Maxwell's equations (electromagnetics); Radar cross-section analysis of low-observable aircraft.
- **SUMMER INTERN – INFOTECH ENTERPRISES**, May 2004 – Aug 2004
Pratt & Whitney Center of Excellence
Computational analysis of effusion-cooled plate with commercial software.

EDUCATION

- University of Maryland, Department of Mathematics Jan 2013
DOCTOR OF PHILOSOPHY in Applied Mathematics (Concentration: Scientific Computing)
- Indian Institute of Technology Bombay, Aerospace Engineering July 2006
MASTER OF TECHNOLOGY in Aerospace Engineering (Concentration: Computational Aerodynamics)
BACHELOR OF TECHNOLOGY in Aerospace Engineering
- **OTHER COURSES AND TRAINING PROGRAMS:**
 - Argonne Training Program for Extreme Scale Computing (St. Charles, IL, 2014)
 - Computational Machine Learning for Scientists and Engineers, ECE Continuum (University of Michigan), June 2021. (tinyurl.com/x34hzvb9)

PUBLICATIONS**JOURNAL ARTICLES**

- Angus, J. R., Farmer, W., Friedman, A., Ghosh, D., Grote, D., Larson, D., Link, A., An implicit particle code with exact energy and charge conservation for electromagnetic studies of dense plasmas, *Journal of Computational Physics*, 491, 2023, 112383, doi:10.1016/j.jcp.2023.112383.
- Kim, Y., Ghosh, D., Constantinescu, E. M., Balakrishnan, R., GPU-accelerated DNS of compressible turbulent flows, *Computers and Fluids*, 251, 2023, 105744, doi:10.1016/j.compfluid.2022.105744.
- Angus, J. R., Link, A., Friedman, A., Ghosh, D., Johnson, J. D., On numerical energy conservation for an implicit particle-in-cell method coupled with a binary Monte-Carlo algorithm for Coulomb collisions, *Journal of Computational Physics*, 456, 2022, 10.1016/j.jcp.2022.111030.
- Chapman T., Winjum B. J., Berger, R. L., Dimits, A., Banks, J. W., Brunner, S., Joseph, I., Ghosh, D., Nonlinear kinetic simulation study of the ion-ion streaming instability in single- and multi-ion species plasmas, *Physics of Plasmas*, 28, 022105, 2021, doi:10.1063/5.0015302.
- Ghosh, D., Chapman, T. D., Berger, R. L., Dimits, A., Banks, J. W., A Multispecies, Multifluid Model for Laser-Induced Counterstreaming Plasma Simulations, *Computers and Fluids*, 186, 2019, 38-57, doi:10.1016/j.compfluid.2019.04.012.
- Dimits, A. M., Banks, J. W., Berger, R. L., Brunner, S., Chapman, T. D., Copeland, D., Ghosh, D., Arrighi, W. J., Hittinger, J., Joseph, I., Linearized Coulomb Collision Operator for Simulation of Interpenetrating Plasma Streams, *IEEE Transactions on Plasma Science*, 47 (5), 2019, 2074-2080, doi:10.1109/TPS.2019.2897790.
- Ghosh, D., Dorf, M. A., Dorr, M. R., Hittinger, J., Kinetic Simulation of Collisional Magnetized Plasmas with Semi-Implicit Time Integration, *Journal of Scientific Computing*, 77 (2), 2018, 819-849, doi:10.1007/s10915-018-0726-6.
- Dorr, M., Colella, P., Dorf, M., Ghosh, D., Hittinger, J., Schwartz, P. O., High-order Discretization of a Gyrokinetic Vlasov Model in Edge Plasma Geometry, *Journal of Computational Physics*, 373, 2018, 605-630, doi:10.1016/j.jcp.2018.07.008.
- Dorf, M., Dorr, M., Hittinger, J., Lee, W., Ghosh, D., High-order finite-volume modeling of drift waves, *Journal of Computational Physics*, 373, 2018, 446-454, doi:10.1016/j.jcp.2018.07.009.
- Ghosh, D., Constantinescu, E. M., Semi-Implicit Time Integration of Atmospheric Flows with Characteristic-Based Flux Partitioning, *SIAM Journal on Scientific Computing*, 38 (3), 2016, A1848-A1875.
- Ghosh, D., Constantinescu, E. M., Well-Balanced, Conservative Finite-Difference Algorithm for Atmospheric Flows, *AIAA Journal*, 54 (4), 2016, 1370-1385.
- Wang, P., Barajas-Solano, D. A., Constantinescu, E. M., Abhyankar, S., Ghosh, D., Smith, B. F., Huang, Z., Tartakovsky, A. M., Probabilistic Density Function Method for Stochastic ODEs of Power Systems with Uncertain Power Input, *SIAM/ASA Journal on Uncertainty Quantification*, 3 (1), 2015, 873-896.
- Ghosh, D., Constantinescu, E. M., Brown, J., Efficient Implementation of Nonlinear Compact Schemes on Massively Parallel Platforms, *SIAM Journal on Scientific Computing*, 37 (3), 2015, C354-C383.
- Ghosh, D., Baeder, J.D., Weighted Non-Linear Compact Schemes for the Direct Numerical Simulation of Compressible, Turbulent Flows, *Journal of Scientific Computing*, 61 (1), 2014, 61-89.
- Ghosh, D., Medida, S., Baeder, J.D., Application of Compact-Reconstruction WENO Schemes to Compressible Aerodynamic Flows, *AIAA Journal*, 52 (9), 2014, 1858-1870.
- Ghosh, D., Baeder, J.D., Compact Reconstruction Schemes with Weighted ENO Limiting for Hyperbolic Conservation Laws, *SIAM Journal on Scientific Computing*, 34 (3), 2012, A1678-A1706.
- Ghosh, D., Baeder, J.D., A High-Order Accurate Incompressible Navier Stokes Algorithm for Vortex Ring Interactions with Solid Wall, *AIAA Journal*, 50 (11), 2012, 2408-2422.

BOOK CHAPTER

- Ghosh, D., Constantinescu, E. M., Nonlinear Compact Finite-Difference Schemes with Semi-Implicit Time Stepping, in *Spectral and High Order Methods for Partial Differential Equations ICOSAHOM 2014*, Springer Lecture Notes in Computational Science and Engineering, Volume 106, 2015, 237-245.

PEER-REVIEWED CONFERENCE PAPERS

- Christopher, J., Davis, A., Gao, X., Ghosh, D., Dorf, M., Dorr, M., Ricketson, L., On Preconditioning for the Two-Field Neutral Model, *AIAA SciTech 2022 Forum*, January 3 - 7, 2022, San Diego, CA, doi:10.2514/6.2022-1108.

- Munafo, A., Vogiatzis, K., Ghosh, D., Vedula, P., Panesi, M., Josyula, E., High-Order Techniques for Multi-Component Turbulent Non-Equilibrium Hypersonic Flows, AIAA SciTech 2020 Forum, January 6 - 10, 2020, Orlando, FL, doi:10.2514/6.2020-2193.
- Dorf, M. A., Dorr, M., Ghosh, D., Hittinger, J., Umansky, M. V., Angus, J., Pankin, A., Simulation of Cross-Separatrix Edge Plasma Transport with the Continuum Gyrokinetic Code COGENT, 27th IAEA Fusion Energy Conference, October 22 - 27, Gandhinagar, Gujarat, India.
- Guhur, P.-L., Constantinescu, E.M., Ghosh, D., Peterka, T., Cappello, F., Detection of Silent Data Corruption in Adaptive Numerical Integration Solvers, IEEE Cluster Conference, September 5-8, 2017, Honolulu, HI.
- Ghosh, D., Dorf, M., Hittinger, J., Dorr, M., Implicit-Explicit Time Integration for the Vlasov-Fokker-Planck Equations, AIAA Paper 2017-4016, 48th AIAA Plasmadynamics and Lasers Conference, June 5-9, 2017, Denver, CO
- Ghosh, D., Constantinescu, E.M., Well-Balanced Formulation of Gravitational Source Terms for Conservative Finite-Difference Atmospheric Flow Solvers, AIAA Paper 2015-2889, 7th AIAA Atmospheric & Space Environments Conf., June 22-26, Dallas, TX.
- Ghosh, D., Medida, S., Baeder, J.D., Compact-Reconstruction Weighted Essentially Non-Oscillatory Schemes for Unsteady Navier-Stokes Equations, AIAA Paper 2012-2832, 42nd AIAA Fluid Dynamics Conference and Exhibit, June 25-28, 2012, New Orleans, LA.
- Ghosh, D., Baeder, J.D., Numerical Simulation of Vortex Ring Interactions with Solid Wall, AIAA Paper 2011-675, 49th AIAA Aerospace Sciences Meeting, Jan 4-7, 2011, Orlando, FL.
- Ghosh, D., Baeder, J.D., A High Order Conservative Upwind Algorithm for the Incompressible Navier Stokes Equations, AIAA Paper 2010-5030, 40th AIAA Fluid Dynamics Conference and Exhibit, June 28 – July 1, 2010, Chicago, IL.

TECHNICAL REPORTS

- Ghosh, D., Constantinescu, E.M., Brown, J., Scalable Nonlinear Compact Schemes, Technical Memorandum ANL/MCS-TM-340, Argonne National Laboratory, April 2014

THESES

- Compact-Reconstruction Weighted Essentially Non-Oscillatory Schemes for Hyperbolic Conservation Laws, Ph. D. Thesis, University of Maryland, College Park, January 2013.
- Higher Order Non-Oscillatory Schemes in Ideal Magnetohydrodynamics, Master's Thesis, Indian Institute of Technology Bombay, July 2006.
- Finite Volume Time Domain Solutions of Maxwell's Equations, Bachelors Seminar, Indian Institute of Technology Bombay, March 2004.

INVITED AND MINI-SYMPOSIUM TALKS

- Bonneville, C., He, X., Chen, J.-S., Fries, W., Cheung, S. W., Ghosh, D., Belof, J., Springer, K., Choi, Y., Certified and Parameterized Latent Space Dynamics Identification for Time Dependent Image Data, AAAI Spring Symposium on Computational Approaches to Scientific Discovery, March 27 - 29, 2023, San Francisco, CA.
- Ghosh, D., Dorr, M., Dorf, M., Ricketson, L., Semi-Implicit Time Integration for Multiscale Tokamak-Edge Plasma Dynamics, SIAM Conference on Computational Science and Engineering, Minisymposium on Computational Methods for Kinetic Models, February 26 - March 3, 2023, Amsterdam, The Netherlands.
- Bonneville, C., Choi, Y., Ghosh, D., GPLaSDI: Identifying Autoencoders Latent Space Dynamics with Gaussian Processes for Non-Intrusive Reduced Order Models, SIAM Conference on Computational Science and Engineering, Minisymposium on Reduced Order Modeling of Differential Equations Through Deep Learning Algorithms, February 26 - March 3, 2023, Amsterdam, The Netherlands.
- Ghosh, D., High-Order Semi-Implicit Time Integration Methods for Multiscale Advective Physics, University of Zaragoza, October 2022 (Online talk).
- Ricketson, L., Ghosh, D., Dorr, M., Dorf M., Hittinger, J., Continuum Kinetic Simulations of Tokamak Edge Plasmas with COGENT, Platform for Advanced Scientific Computing (PASC) Conference, Minisymposium on Towards Exascale Computing in Kinetic Simulations of Magnetic Fusion Plasmas. Part III - Advanced Numerical Methods and Algorithms, July 5 - 9, 2021, Virtual Format.
- Ricketson, L., Ghosh, D., Dorr, M., Dorf M., Block Preconditioning of a Semi-Implicit Gyrokinetic Model of Fusion Plasmas, 9th International Conference on Computational Methods for Coupled Problems in Science and Engineering (COUPLED PROBLEMS 2021), Minisymposium on Block Preconditioning for Challenging Multiphysics Systems, June 14 - 16, 2021, Virtual Format.
- Ghosh, D., Chapman, T., Berger, R. L., Banks, J. W., Copeland, D., A Semi-Implicit Algorithm for the Simulation of High-Z Plasma Interpenetration, 15th United States National Congress on Computational Mechanics (USNCCM15), Minisymposium

on Innovative Higher Order Discretization Methods in Computational Science and Engineering, in honor of Prof. Mary Wheeler, July 28 - August 1, 2019, Austin, TX.

- Hittinger, J., Dorr, M. R., Dorf, M. A., Ghosh, D., Ricketson, L. F., Kinetic Edge Plasma Simulation using a Continuum Model, Platform for Advanced Scientific Computing (PASC), Minisymposium on HPC Challenges in Kinetic Simulations of Plasmas, Part I of III: Eulerian Approach, June 12 - 14, 2019, Zurich, Switzerland.
- Ghosh, D., Chapman, T. D., Berger, R. L., Dimits, A., Banks, J. W., A Multi-Species, Multi-Fluid Model for Simulating Plasma Interpenetration, SIAM Conference on Computational Science and Engineering, Minisymposium on State-of-the-art high-order Numerical Methods and Complex Fluid Simulations, February 25 - March 1, 2019, Spokane, WA.
- Banks, J. W., Berger, R. L., Brunner, S., Chapman, T. D., Dimits, A., Ghosh, D., Simulation of Interpenetrating Plasmas in 2D using the Grid Based Continuum Code LOKI, SIAM Conference on Computational Science and Engineering, Minisymposium on Computational Methods for Kinetic Models of Plasma, February 25 - March 1, 2019, Spokane, WA.
- Ghosh, D., Kavouklis, C., Chapman, T., Berger, R. L., Vogman, G. V., Numerical Simulation of Counterstreaming Plasma Interactions using a Multifluid Model, 13th World Congress on Computational Mechanics (WCCM XIII), Minisymposium on High-order Discretizations for Multi-physics Applications, July 22 - 27, 2018, New York, NY.
- Dimits, A. M., Berger, R. L., Chapman, T., Ghosh, D., Arrighi W. J., Hittinger, J. A. F., Joseph, I., Kavouklis, C., Brunner, S., Banks, J. W., Linearized Coulomb Collision Operator for Simulation of Interpenetrating Plasma Streams, 45th IEEE International Conference on Plasma Science, June 24 - 28, 2018, Denver, CO.
- Implicit-Explicit Time Integration for Multiscale Physics, Department of Applied Mathematics and Statistics, University of California Santa Cruz, December 2017, Santa Cruz, CA.
- Ghosh, D., Constantinescu, E. M., Characteristic-Based Slow-Wave-Fast-Wave Partitioning for Semi-Implicit Time Integration of Atmospheric Flows, IMAGE 2017 Theme of the Year: Workshop on Multiscale Geoscience Numerics, National Center for Atmospheric Research (NCAR), May 16 - 19, 2017, Boulder, CO.
- Ghosh, D., Dorr, M., Dorf, M., Hittinger, J., Implementation of Implicit-Explicit Time Integration for the Kinetic Modeling of Tokamak Plasma Edge, SIAM Conference on Computational Science and Engineering, Minisymposium on Computational Plasma Physics, February 27 - March 3, 2017, Atlanta, GA.
- Dorr, M., Colella, P., Dorf, M., Ghosh, D., Hittinger, J., Exact Preservation of Zero Velocity Divergence in a High-Order, Mapped-Grid, Finite-Volume Discretization of a Gyrokinetic System, SIAM Conference on Computational Science and Engineering, Minisymposium on Computational Plasma Physics, February 27 - March 3, 2017, Atlanta, GA.
- Ghosh, D., Constantinescu, E. M., Characteristic-Based Flux Splitting for Implicit-Explicit Time Integration of Low-Mach Number Flows, 13th U.S. National Congress on Computational Mechanics (USNCCM13), Mini-symposium on Advances in Implicit / Explicit (IMEX) Time integration of Multiphysics Systems, July 26 - 30, 2015, San Diego, CA.
- Ghosh, D., Constantinescu, E. M., A Finite-Difference Algorithm with Characteristic-Based Semi-Implicit Time-Integration for the Euler Equations with Gravitational Forcing, SIAM Conference on Mathematical & Computational Issues in the Geosciences, Mini-symposium on Modeling and Simulation of Multiscale and Coupled Processes in Atmospheric Physics, June 29 - July 2, 2015, Stanford, CA.
- Ghosh, D., Constantinescu, E. M., A Compact-Reconstruction WENO Scheme with Semi-Implicit Time Integration, SIAM Conference on Computational Science and Engineering, Mini-symposium on Recent Advances in High Order Spatial Discretization Methods for PDEs, March 14 - 18, 2014, Salt Lake City, UT.
- Ketcheson, D., Ghosh, D., Stability-Optimized Time Integrators for WENO Discretizations, SIAM Conference on Computational Science and Engineering, Mini-symposium on Advances in Time-stepping Methods, March 14 - 18, 2014, Salt Lake City, UT.
- Barajas-Solano, D. A., Tartakovsky, A., Ghosh, D., Constantinescu, E. M., Abhyankar, S., Probability Density Methods for the Analysis of Power Grids Under Uncertainty, SIAM Conference on Computational Science and Engineering, Mini-symposium on Distributed Cyber-Physical Systems: Modelling and Controlling the Power Grid, March 14 - 18, 2014, Salt Lake City, UT.
- Ghosh, D., Constantinescu, E. M., Brown, J., Scalable Non-Linear Compact Schemes, International Conference on Spectral and High Order Methods (ICOSAHOM), Mini-symposium on Aspects of Time Stepping, June 23 - 27, 2014, Salt Lake City, UT.
- Ghosh, D., Compact-Reconstruction WENO Schemes - Theory, Implementation and Applications, NIA CFD Seminar, National Institute of Aerospace, Hampton, VA, June 2014.

OTHER CONFERENCES/TALKS/POSTERS

- Ghosh, D., Dorr, M., Dorf, M., Ricketson, L., High-order implicit-explicit time integration for the kinetic simulation of magnetized plasmas, Foundations of Computational Mathematics (FoCM), Workshop on Multiresolution and Adaptivity in Numerical PDEs, June 12 - 21, 2023, Paris, France.

- Angus, J., Farmer, W., Friedman, A., Ghosh, D., Grote, D., Larson, D., Link, A., An implicit particle code with exact energy and charge conservation for electromagnetic studies of dense plasmas, International Conference on Plasma Science (ICOPS), May 21 - 25, 2023, Santa Fe, NM.
- Dorf, M., Dorr, M., Ghosh, D., Angus, J., Including electromagnetic effects into COGENT simulations of edge plasmas, U.S. Transport Task Force (TTF) Workshop, May 2 - 5, 2023, Madison, WI.
- Geyko, V., Joseph, I., Dorf, M., Dorr, M., Ghosh, D., Electrostatic drift-kinetic simulations of edge localized mode heat pulses in the tokamak scrape-off layer, 64th Annual Meeting of the American Physical Society's Division of Plasma Physics (DPP), October 17 - 21, 2022, Spokane, WA.
- Dorf, M., Dorr, M., Ghosh, D., Angus, J., Progress with the full-F continuum edge gyrokinetic code COGENT, 64th Annual Meeting of the American Physical Society's Division of Plasma Physics (DPP), October 17 - 21, 2022, Spokane, WA.
- Geyko, V., Joseph, I., Dorf, M., Dorr, M., Ghosh, D., Drift kinetic simulations of edge localized modes in tokamak scrape-off layer plasmas, 25th International Conference on Plasma Surface Interaction in Controlled Fusion Devices, June 13 - 17, 2022, Virtual Format.
- Angus, J. R., Link, A., Friedman, A., Ghosh, D., Johnson, J. D., On numerical energy conservation for an implicit particle-in-cell method coupled with a binary Monte-Carlo algorithm for Coulomb collisions, 49th IEEE International Conference on Plasma Science (ICOPS), May 22 - 26, 2022, Seattle, WA.
- Dorf, M., Dorr, M., Ghosh, D., Cohen, R., Gyrokinetic Modeling of Electrostatic Ion-Scale Turbulence in Divertor Tokamaks, 63rd Annual Meeting of the American Physical Society's Division of Plasma Physics (DPP), November 8 - 12, 2021, Pittsburgh, PA.
- Joseph, I., Geyko, V. I., Dorf, M. A., Dorr, M. R., Ghosh, D., Ricketson, L. F., Edge localized mode propagation through the tokamak scrape-off layer, Plasma Edge Theory (PET) Workshop, September 13 - 15, 2021, Virtual Format.
- Ghosh, D., Berger, R. L., Chapman, T., Dimits, A., Banks, J. W., Hydrodynamic Simulation of Counterstreaming Plasmas with a Multifluid Model, 72nd Annual Meeting of the American Physical Society's Division of Fluid Dynamics (DFD), November 23 - 26, 2019, Seattle, WA.
- Chapman, T., Berger, R. L., Dimits, A., Ghosh, D., Joseph, I., Winjum, B., Banks, J. W., Brunner, S., Nonlinear evolution of the ion-ion streaming instability in single- and multi-ion species plasmas, 61st Annual Meeting of the APS Division of Plasma Physics (DPP), October 21 - 25, 2019, Fort Lauderdale, FL.
- Berger, R., Ghosh, D., Banks, J. W., Arrighi, W. J., Belyaev, M. A., Brunner, S., Chapman, T., Copeland, D. M., Dimits, A., Hittinger, J., Jones, O., Rozmus, W., Multi-dimensional Simulations of Interpenetrating Plasmas, 49th Anomalous Absorption Conference, June 9 - 14, 2019, Telluride, CO.
- Berger, R., Ghosh, D., Chapman, T., Arrighi, W., Banks, J., Dimits, A. M., Hittinger, J., Joseph, I., Kavouklis, C., High-order Conservative, Eulerian, Multi-dimensional Hydrodynamic Simulations of Interpenetrating Plasmas, 60th Annual Meeting of the APS Division of Plasma Physics, November 5 - 9, Portland, OR.
- Angus, J. R., Dorf, M., Ghosh, D., Drift-Ideal MHD Simulations of Flow-Stabilized Z-Pinch Plasmas, 60th Annual Meeting of the APS Division of Plasma Physics, November 5 - 9, Portland, OR.
- Ghosh, D., Kavouklis, C., Chapman, T., Berger, R., A Finite-Volume, Semi-Implicit Multifluid Algorithm for the Simulation of Counterstreaming Plasma Dynamics, SIAM Annual Meeting, July 9 - 13, 2018, Portland, OR.
- Dorf, M. A., Angus, J. R., Ghosh, D., Gyrokinetic Simulations of Drift-Wave Instabilities in Flow-Stabilized Z-Pinch Plasmas, 45th IEEE International Conference on Plasma Science, June 24 - 28, 2018, Denver, CO.
- Angus, J. R., Dorf, M. A., Ghosh, D., Drift-Ideal MHD Simulations of the Entropy Mode in Flow-Stabilized Z-Pinch Plasmas, 45th IEEE International Conference on Plasma Science, June 24 - 28, 2018, Denver, CO.
- Dimits, A. M., Banks, J. W., Berger, R. L., Brunner, S., Chapman, T., Ghosh, D., Arrighi, W. J., Hittinger, J., Joseph, I., Kavouklis, C., Linearized Coulomb Collision Operator for Simulation of Interpenetrating Plasma Streams, Kinetic Effects in ICF Workshop, May 23, 2018, Santa Fe, NM.
- Kavouklis, C., Colella, P., Ghosh, D., A 6th order finite volume multigrid Poisson solver, 15th Copper Mountain Conference on Iterative Methods, March 25 - 30, 2017, Copper Mountain, CO.
- Dorf, M., Dorr, M., Ghosh, D., Hittinger, J., Lee, W., Cohen R., Drift-kinetic simulations of axisymmetric plasma transport at the edge of a divertor tokamak, 59th Annual Meeting of the APS Division of Plasma Physics, October 23 - 27, 2017, Milwaukee, WI.
- Ghosh, D., Kavouklis, C., Berger, R. L., Chapman, T., Hittinger, J., A Multifluid Numerical Algorithm for Interpenetrating Plasma Dynamics, 59th Annual Meeting of the APS Division of Plasma Physics, October 23 - 27, 2017, Milwaukee, WI.
- Ghosh, D., Chapman, T., Berger, R. L., Khodak, M., Hittinger, J., Simulation of interpenetrating plasmas in 1D with a multifluid approach, 47th Annual Anomalous Absorption Conference, June 11 - 16, 2017, Florence, OR.

- Lee, W., Dorf, M., Dorr, M., Cohen, R., Ghosh, D., Hittinger, J., Umansky, M., Krasheninnikov, S., Status of 5D continuum kinetic code COGENT and its verification with kinetic drift wave instability, International Sherwood Fusion Theory Conference, May 1 - 3, 2017, Annapolis, MD.
- Dorf, M., Dorr, M., Ghosh, D., Hittinger, J., Lee, W., Cohen, R., Continuum kinetic modeling of cross-separatrix plasma transport with COGENT, International Sherwood Fusion Theory Conference, May 1 - 3, 2017, Annapolis, MD.
- Lee, W., Dorf, M., Dorr, M., Cohen, R., Ghosh, D., Rognlien, T., Hittinger, J., Umansky, M., Krasheninnikov, S., Status of the 5D gyrokinetic code COGENT and its initial applications, 58th Annual Meeting of the APS Division of Plasma Physics, October 31 - November 4, 2016, San Jose, CA.
- Dorf, M., Dorr, M., Ghosh, D., Hittinger, J., Rognlien, T., Cohen, R., Lee, W., Schwartz, P., Edge-relevant plasma simulations with the continuum code COGENT, 58th Annual Meeting of the APS Division of Plasma Physics, October 31 - November 4, 2016, San Jose, CA.
- Dorf, M., Dorr, M., Cohen, R. H., Lee, W., Ghosh, D., Hittinger, J., Rognlien, T., Continuum Kinetic Modeling of the Tokamak Plasma Edge with the COGENT code, International Sherwood Fusion Theory Conference, April 4 - 6, 2016, Madison, WI.
- Cohen, R. H., Dorf, M., Dorr, M., Lee, W., Ghosh, D., Hittinger, J., Rognlien, T., Continuum Kinetic Modeling of the Tokamak Plasma Edge with the COGENT, US Transport Task Force Workshop, March 29 - April 1, 2016, Denver, CO.
- Ghosh, D., Constantinescu, E.M., Brown, J., A Scalable, Parallel Implementation of Weighted, Non-Linear Compact Schemes, SIAM Annual Meeting, July 7 – 11, 2014, Chicago, IL.
- Brown, J., Ghosh, D., Fast Solvers for Implicit Runge-Kutta, Thirteenth Copper Mountain Conference on Iterative Methods, April 6 – 11, 2014, Copper Mountain, CO.
- Brown, J., Ghosh, D., Fast solvers for implicit Runge-Kutta systems, Tenth Workshop of the INRIA-Illinois-ANL Joint Laboratory on Petascale Computing, November 25 - 27, 2013, Urbana, IL.
- Brown, J., Constantinescu, E.M., Ghosh, D., McInnes, L.C., BOUT++ and PETSc: Time integration and solver composition, BOUT++ Workshop, September 3 - 6, 2013, Livermore, CA.
- Constantinescu, E.M., Brown, J., Smith, B., McInnes, L.C., Ghosh, D., Balay, S., Robust Implicit-Explicit Time Stepping, DOE Applied Math PI Meeting, August 6, 2013, Albuquerque, NM.
- Ghosh, D., Medida, S., Baeder, J.D., Direct Numerical Simulation of Compressible Turbulent Flows with Weighted Non-Linear Compact Schemes, 65th Annual Meeting of the APS Division of Fluid Dynamics, November 18 – 20, 2012, San Diego, CA
- Ghosh, D., Medida, S., Baeder, J.D., High-Order Non-Oscillatory Compact Reconstruction Scheme for Overset Grids, 11th Symposium on Overset Composite Grids and Solution Technology, October 15 – 18, 2012, Dayton, OH
- Ghosh, D., Baeder, J.D., Application of Compact-Reconstruction WENO Schemes to the Navier-Stokes Equations, SIAM Annual Meeting, July 9 – 13, 2012, Minneapolis, MN
- Ghosh, D., Baeder, J.D., High Order Compact Reconstruction Scheme with Weighted Essentially Non-Oscillatory Limiting, AMS-MAA Joint Mathematics Meetings, Jan 4-7, 2012, Boston, MA
- Ghosh, D., Application of Weighted Essentially Non-Oscillatory Limiting to Compact Interpolation Schemes, AIAA Region I Young Prof., Student & Education Conference, Nov 4, 2011, Laurel, MD
- Ghosh, D., Chatterjee, A., Higher-Order Non-Oscillatory Schemes in 2D Ideal Magneto-hydrodynamics, 9th Annual CFD Symposium, August 2006, Bangalore, India
- Ghosh, D., Chatterjee, A., Higher-Order Non-Oscillatory Schemes in Ideal Magneto-hydrodynamics, 8th Annual CFD symposium, August 2005, Bangalore, India
- Ghosh, D., Vaghela, M.B., Chatterjee, A., Radar Cross Section Computations for Low Observable Configurations, 18th National Conference for Aerospace Engineers, Institution of Engineers (I), November 2004, IIT Kharagpur, India
- Ghosh, D., Vaghela, M.B., Chatterjee, A., Characteristic Based FVTD Computations for Low Observable Configuration, 7th Annual CFD symposium, August 2004, Bangalore, India

SCIENTIFIC SOFTWARE CONTRIBUTIONS

- EUCLID (Developer) – A high-order conservative finite-difference code for multifluid plasma simulations.
- COGENT (Contributor) – A high-order finite-volume solver for tokamak edge simulations.
- PETSc (Contributor) – Portable, extensible toolkit for scientific computing.
- NUMA (Contributor) – A massively parallel numerical weather prediction code.
- HyPar (Developer) – A conservative finite-difference solver for n-dimensional hyperbolic-parabolic PDEs

PROPOSAL AWARDS

- Addressing key physics problems in high-energy-density plasmas with a novel kinetic simulation capability (Co-Investigator) - LLNL Laboratory Directed Research and Development Program, ~\$650K/yr., 2023 – 2026.
- Simulation of High-Energy-Density Plasmas Using a Novel, Fully-Implicit Particle-in-Cell/Monte-Carlo Algorithm (Co-Investigator) - LLNL Laboratory Directed Research and Development Program, ~\$150K/yr., 2021 – 2022.
- Nonlinear Spatial Discretization on Sparse Grids (Co-Investigator) – LLNL Laboratory Directed Research and Development Program, ~\$150K/yr., 2019 – 2020.
- Interpenetrating Plasma Simulations (Principal Investigator) – LLNL Laboratory Directed Research and Development Program, ~\$650K/yr., 2017 – 2020.
- High-Resolution Methods for Phase Space Problems in Complex Geometries (Co-Investigator) – DOE Office of Science ASCR Program, ~\$900K/yr., 2017 – 2020, 2021 – 2024

PROFESSIONAL SERVICE

- Reviewer
 - SIAM Journal on Scientific Computing
 - Journal of Computational Physics
 - Journal of Scientific Computing
 - ACM Transactions on Mathematical Software
 - International Journal of Numerical Methods in Fluids
 - Computers & Mathematics with Applications
 - Computer Physics Communications
 - Communications in Computational Physics
 - Journal of Parallel and Distributed Computing
 - Journal of Advances in Modeling Earth Systems
 - Physics of Fluids
 - International Journal of Computational Fluid Dynamics
 - International Journal of High Performance Computing Applications
 - International Journal of Computer Mathematics
 - International Conference for High Performance Computing, Networking, Storage, and Analysis 2017 (SC17)
- Member of the AIAA Atmospheric and Space Environments Technical Committee (2016 - Present).
- Conference Session Chair/Co-Chair:
 - 7th AIAA Atmospheric and Space Environments Conference (Numerical Weather Prediction) (with Dr. Nashat Ahmad, NASA)
 - SIAM Annual Meeting 2014 (Numerical Methods in PDE VII)
- Visiting researcher
 - Scientific Computing Group in the Department of Applied Mathematics, Naval Postgraduate School, Monterey, CA (Host: Frank Giraldo), September 2015.
 - Numerical Mathematics Group in Computer, Electrical and Mathematical Sciences & Engineering, King Abdullah University of Science and Technology (Host: David Ketcheson), June 2015.
- Organizer of the LANS Informal Seminar Series at Argonne National Laboratory MCS Division (2013 – 2015).

HONORS AND AWARDS

- Travel Award to attend the International Conference on Spectral and High Order Methods 2014
- Graduate Research Assistantship (2008 – 2013) from the Alfred Gessow Rotorcraft Center, Department of Aerospace Engineering, University of Maryland, College Park
- Block Grant Fellowship (2006 – 2008) from the Dept. of Mathematics, Univ. of Maryland
- Research Assistantship (2005 – 2006) from Aerospace Engineering, Indian Inst. of Tech. Bombay

TECHNICAL SKILLS

- Programming & Related Tools: C/C++, FORTRAN, MATLAB, Julia, Python, MPI, OpenMP, HPCToolkit, TotalView, Memscape
- Scientific Computing Libraries/Software: PETSc, CHOMBO, Tecplot, VisIt
- Authoring and Publishing Software: Latex, Microsoft Office