DEBOJYOTI GHOSH

Curriculum Vitae

Center for Applied Scientific Computing
Lawrence Livermore National Laboratory
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http://debog.github.io/

RESEARCH INTERESTS

o *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).

o *Domain discretization techniques* – mapped multi-block grids, overset meshes, immersed boundary methods.

o *Applications*: fusion plasma applications (ICF and MFE), external compressible and incompressible flows, atmospheric flows, aerodynamic flows – rotorcraft and flapping wing aircraft, ideal magneto-hydrodynamics.

o *High-performance computing* – design and implementation of scalable algorithms on HPC platforms, specifically DOE Leadership-class supercomputers.

PROFESSIONAL EXPERIENCE

o 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; Multi-fluid models for simulation of interpenetrating plasmas in ICF applications.

o 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.

o 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.

o 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.

o *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.

o *SUMMER INTERN* – **INFOTECH ENTERPRISES**, May 2004 – Aug 2004
Pratt & Whitney Center of Excellence
Computational analysis of effusion-cooled plate with commercial software.

EDUCATION

o *University of Maryland*, Department of Mathematics   Jan 2013
DOCTOR OF PHILOSOPHY in Applied Mathematics (Concentration: Scientific Computing)

o *Indian Institute of Technology Bombay*, Aerospace Engineering   July 2006
MASTER OF TECHNOLOGY in Aerospace Engineering (Concentration: Computational Aerodynamics)
BACHELOR OF TECHNOLOGY in Aerospace Engineering

o **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, 2020. (tinyurl.com/x34hzvb9)

PUBLICATIONS

JOURNAL ARTICLES

o 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.

o 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.

o 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.

o 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.

o 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.

o 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.

o 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.

o Ghosh, D., Constantinescu, E. M., *Well-Balanced, Conservative Finite-Difference Algorithm for Atmospheric Flows*, AIAA Journal, 54 (4), 2016, 1370-1385.

o 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.

o 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.

o 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.

o Ghosh, D. Medida, S., Baeder, J.D., *Application of Compact-Reconstruction WENO Schemes to Compressible Aerodynamic Flows*, AIAA Journal, 52 (9), 2014, 1858-1870.

o 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.

o 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

o 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

o 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.

o 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.

o 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

o 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.

INVITED AND MINI-SYMPOSIUM TALKS

- 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 (WCCMXIII), 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.

o 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.

o 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.

o 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.

o 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.

o 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.

o 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

o 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.

o 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.

o 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.

o 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.

o 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.

o 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.

o 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.

o 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.

o 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.

o 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.

o 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.

o 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.

o 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

PROPOSAL AWARDS

- *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

PROFESSIONAL SERVICE

o   Reviewer
  o   *SIAM Journal on Scientific Computing*
  o   *Journal of Computational Physics*
  o   *Journal of Scientific Computing*
  o   *ACM Transactions on Mathematical Software*
  o   *International Journal of Numerical Methods in Fluids*
  o   *Computers & Mathematics with Applications*
  o   *Computer Physics Communications*
  o   *Communications in Computational Physics*
  o   *Journal of Parallel and Distributed Computing*
  o   *Journal of Advances in Modeling Earth Systems*
  o   *Physics of Fluids*
  o   *International Journal of Computational Fluid Dynamics*
  o   *International Journal of High Performance Computing Applications*
  o   *International Journal of Computer Mathematics*
  o   *International Conference for High Performance Computing, Networking, Storage, and Analysis 2017 (SC17)*

o   Member of the *AIAA Atmospheric and Space Environments Technical Committee* (2016 - Present).
o   Conference Session Chair/Co-Chair:
  o   7th AIAA Atmospheric and Space Environments Conference (Numerical Weather Prediction) (with Dr. Nashat Ahmad, NASA)
  o   SIAM Annual Meeting 2014 (Numerical Methods in PDE VII)
o   Visiting researcher
  o   Scientific Computing Group in the Department of Applied Mathematics, Naval Postgraduate School, Monterey, CA (Host: Frank Giraldo), September 2015.
  o   Numerical Mathematics Group in Computer, Electrical and Mathematical Sciences & Engineering, King Abdullah University of Science and Technology (Host: David Ketcheson), June 2015.
o   Organizer of the LANS Informal Seminar Series at Argonne National Laboratory MCS Division (2013 – 2015).

SCIENTIFIC SOFTWARE CONTRIBUTIONS

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

HONORS AND AWARDS

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

TECHNICAL SKILLS

o   Programming Languages: C/C++, FORTRAN, MATLAB, Julia, Python
o   High Performance Computing: MPI, OpenMP, HPCToolkit, TotalView, Memscape
o   Scientific Computing Libraries: PETSc, CHOMBO
o   Scientific Visualization Software: Tecplot, LLNL Visit
o   Authoring and Publishing Software: Latex, Microsoft Office

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