

James (Jimmy) Juno

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Education

- 2020 PhD in Physics, University of Maryland, College Park.
Thesis: “A Deep Dive into the Distribution Function:
Understanding Phase Space Dynamics using Continuum Vlasov–Maxwell simulations.”
Advisers: William Dorland and Jason TenBarge.
- 2014 BS in Computational Physics, Rice University.

Work Experience

- Aug. 2026–
present **Visiting Researcher**, West Virginia University.
- Aug. 2026–
present **Chief Scientist**, Lanyon AI.
- Jan. 2022–
Aug. 2026 **Staff Research Physicist**, Princeton Plasma Physics Laboratory.
- Aug. 2025–
Jan. 2026 **Lecturer School of Arts & Sciences - Physics & Astronomy**, Rutgers University.
- Sept. 2020–
Jan. 2022 **NSF AGS Postdoctoral Fellow**, University of Iowa.

Awards, fellowships & grants

- 2025 NASA Heliophysics Supporting Research (\$300,000), **Co-PI with PI institution Harvard Smithsonian**, titled *Statistical and Numerical Investigation of Heating Inside Switchbacks*.
- 2024 Laboratory Directed Research and Development Grant (\$750,000), titled *A novel parallel-kinetic-perpendicular-moment model for magnetized fusion plasmas*.
- 2023 Laboratory Directed Research and Development Grant–Fast-track (\$100,000), titled *A novel parallel-kinetic-perpendicular-moment model for magnetized fusion plasmas*.
- 2020 National Science Foundation Atmospheric and Geospace Sciences Postdoctoral Research Fellow (\$190,000), titled *A continuum kinetic study of heliospheric collisionless shocks*.
- 2018 Outstanding Tutorial Talk–Parker Solar Probe, 19th Solar Heliospheric and INterplanetary Environment (SHINE) Student Day.
- 2017 NASA Earth and Space Science Fellowship–Heliophysics (\$135,000), titled *Novel kinetic methods for the study of turbulence in the near Sun environment*.
- 2017 Outstanding Poster Award, Sherwood Fusion Theory Conference.

2015 Outstanding Tutorial Talk—Turbulence, 16th Solar Heliospheric and INterplanetary Environment (SHINE) Student Day.

Preprints under review

- 2026 I. Pusztai, L. Hanebring, **J. Juno**. “Collisionless Dynamo Seeds from Phase Mixing-Induced Electron Slippage.” arXiv preprint arXiv:2606.27833.
- 2026 M. H. Rosen, M. Francisquez, **J. Juno**, B. Terry-Mendoza, A. Hakim, G. W. Hammett. “Gyrokinetic Equilibria of High Temperature Superconducting Magnetic Mirrors.” arXiv preprint arXiv:2604.11684.
- 2026 J. Pawlak, **J. Juno**, J. M. TenBarge. “Line-Tied Flux Rope Relaxation and Reconnection: A 3D Kinetic Case Study.” arXiv preprint arXiv:2603.05855.
- 2026 **J. Juno**, G. Johnson, A. Philippov, A. Hakim, A. Chernoglazov, S. Zeng. “Modeling of Relativistic Plasmas with a Conservative Discontinuous Galerkin Method.” arXiv preprint arXiv:2602.17487.
- 2026 J. Gorard, A. Hakim, **J. Juno**. “BEACONS: Bounded-Error, Algebraically-Composable Neural Solvers for Partial Differential Equations.” arXiv preprint arXiv:2602.14853.
- 2025 A. Shukla, J. Roeltgen, M. Kotschenreuther, D. R. Hatch, M. Francisquez, **J. Juno**, T. N. Bernard, A. Hakim, G. W. Hammett, S. M. Mahajan. “Gyrokinetic Simulations of a Low Recycling Scrape-off Layer without a Lithium Target.” arXiv preprint arXiv:2511.09437.
- 2025 J. Gorard, **J. Juno**, A. Hakim. “Beyond GRMHD: A Robust Numerical Scheme for Extended, Non-Ideal General Relativistic Multifluid Simulations.” arXiv preprint arXiv:2510.26019.
- 2025 J. Gorard, **J. Juno**, A. Hakim. “Hydrodynamic and Electromagnetic Discrepancies between Neutron Star and Black Hole Spacetimes.” arXiv preprint arXiv:2505.05299.
- 2025 M. L. Nastac, R. J. Ewart, **J. Juno**, M. Barnes, A. A. Schekochihin. “Universal fluctuation spectrum of Vlasov-Poisson turbulence.” arXiv preprint arXiv:2503.17278.
- 2024 J. Gorard, A. Hakim, **J. Juno**, J.M. TenBarge. “A Tetrad-First Approach to Robust Numerical Algorithms in General Relativity.” arXiv preprint arXiv:2410.02549.

Publications

- 2026 G. Johnson, A. Hakim, **J. Juno**. “A Conservative Discontinuous Galerkin Algorithm for Particle Kinetics on Smooth Manifolds.” *Journal of Computational Physics*, **564**, 115133.
- 2026 M. Francisquez, P. Cagas, A. Shukla, **J. Juno**, G. W. Hammett. “Conservative Velocity Mappings for Discontinuous Galerkin Kinetics.” *Journal of Computational Physics*, **558**, 114852.
- 2026 M. H. Barbhuiya, P. A. Cassak, S. Conley, J. E. Stawarz, E. Lichko, J. M. TenBarge, **J. Juno**, J. R. Shuster, G. G. Howes, S. Adhikari. “Velocity-space Origins of the Pressure–Strain Interaction in Multipopulation Distributions and Its Application to Magnetic Reconnection.” *Astrophysical Journal*, **1005**, 166.
- 2026 K. Bradshaw, A. H. Hakim, **J. Juno**, J. Pawlak, J. M. TenBarge, A. Bhattacharjee. “Capturing Secondary Kinetic Instabilities in Three-Dimensional Dayside Reconnection Using an Improved Gradient-Based Closure.” *Journal of Geophysical Research: Space Physics*, **131**, e2026JA035250.
- 2026 L. Hanebring, **J. Juno**, A. Hakim, J. M. TenBarge, I. Pusztai. “From Weibel Seeds to Dynamo Beyond Pair-Plasmas.” *Journal of Plasma Physics*, **92**, E79.
- 2026 A. Shukla, A. Hakim, **J. Juno**, G. W. Hammett, M. Francisquez. “Constructing Field-Aligned Coordinate Systems for Gyrokinetic Simulations of Tokamaks in X-point Geometries.” *Journal of Plasma Physics*, **92**, E74.
- 2026 S. Zeng, A. Philippov, **J. Juno**, A. M. Beloborodov, E. Popova. “Origin of Pulsed Radio Emission from Magnetars.” *Astrophysical Journal Letters*, **996**, L20.
- 2025 D. Liu, **J. Juno**, G. W. Hammett, A. Hakim, A. Shukla, M. Francisquez. “Axisymmetric Gyrokinetic Simulation of ASDEX-Upgrade Scrape-off Layer Using a Conservative Implicit BGK Collision Op-

erator.” *Physics of Plasmas*, **32**, 113906.

- 2025 A. Mallet, S. Eriksson, M. Swisdak, **J. Juno**. “The Effect of Shear Flow on the Resistive Tearing Instability.” *Journal of Plasma Physics*, **91**, E146.
- 2025 T. Ervin, A. Mallet, S. Eriksson, M. Swisdak, **J. Juno**, O. M. Romeo, T. Phan, T. A. Bowen, R. Livi, P. L. Whittlesey, D. E. Larson, S. D. Bale. “The impact of Alfvénic shear flow on magnetic reconnection and turbulence.” *Astrophysical Journal Letters*, **992**, L11.
- 2025 G. Johnson, A. Hakim, **J. Juno**. “A Moment-Conserving Discontinuous Galerkin Representation of the Relativistic Maxwellian Distribution.” *Journal of Plasma Physics*, **91**, 905910518.
- 2025 **J. Juno**, A. Hakim, J. M. TenBarge. “A Parallel-Kinetic-Perpendicular-Moment Model for Magnetised Plasmas.” *Journal of Plasma Physics*, **91**, 905910506.
- 2025 J. Roeltgen, **J. Juno**, M. Kotschenreuther, T. Bernard, A. Shukla, M. Francisquez, A. Hakim, G. W. Hammett, D. Power, D. Hatch. “A Kinetic Line-Driven Radiation Operator and Its Application to Gyrokinetics.” *Nuclear Fusion*, **65**, 106020.
- 2025 S. Dorfman, S. Bose, E. Lichko, M. Ablor, **J. Juno**, J. TenBarge, Y. Zhang, S. C. Thakur, C. Cartagena-Sanchez, P. Tatum, et al. “The CHIMERAS Project: Design Framework for the Collisionless High-Beta Magnetized Experiment Researching Astrophysical Systems.” *Journal of Plasma Physics*, **91**, 905910469.
- 2025 A. Shukla, J. Roeltgen, M. Kotschenreuther, **J. Juno**, T. N. Bernard, A. Hakim, G. W. Hammett, D. R. Hatch, S. M. Mahajan, M. Francisquez. “Direct Comparison of Gyrokinetic and Fluid Scrape-Off Layer Simulations.” *AIP Advances*, **15**, 075121.
- 2025 G. G. Howes, A. Felix, C. R. Brown, C. C. Haggerty, **J. Juno**, J. M. TenBarge, L. B. Wilson III, D. Caprioli. “Velocity-Space Signatures of Shock-Drift Acceleration at Quasi-Perpendicular Collisionless Shocks.” *Physics of Plasmas*, **32**, 062101.
- 2025 A. Mallet, S. Eriksson, M. Swisdak, **J. Juno**. “Suppression of the Collisionless Tearing Mode by Flow Shear: Implications for Reconnection Onset in the Alfvénic Solar Wind.” *Journal of Plasma Physics*, **91**, 905900204.
- 2025 N. C. Hurst, M. Ablor, M. R. Brown, **J. Juno**, E. G. Kostadinova, N. A. Murphy, J. Olson, D. M. Orlov, D. B. Schaeffer, D. A. Schaffner, et al. “MagNetUS: A Magnetized Plasma Research Ecosystem.” *Journal of Plasma Physics*, **91**, 905900101.
- 2024 S. A. Conley, **J. Juno**, J. M. TenBarge, M. H. Barbhuiya, P. A. Cassak, G. G. Howes, E. Lichko. “The kinetic analogue of the pressure-strain interaction.” *Physics of Plasmas*, **31**, 122117.
- 2024 J. Walters, K. G. Klein, E. Lichko, **J. Juno**, J. M. TenBarge. “Electron Influence on the Parallel Proton Firehose Instability in 10-Moment, Multi-Fluid Simulations.” *Astrophysical Journal*, **975**, 290.
- 2024 J. Edyvean, T. N. Parashar, T. Simpson, **J. Juno**, G. L. Delzanno, F. Guo, O. Koshkarov, W. H. Matthaeus, M. Shay, and Y. Yang. “Scale Separation Effects on Simulations of Plasma Turbulence.” *Astrophysical Journal*, **972**, 173.
- 2024 J. Rodman, **J. Juno**, and B. Srinivasan. “The Effect of Spatially Varying Collision Frequency on the Development of the Rayleigh–Taylor Instability.” *Astrophysical Journal*, **965**, 173.
- 2024 S. Bose, J. M. TenBarge, T. Carter, M. Hahn, H. Ji, **J. Juno**, D. W. Savin, S. Tripathi, S. Vincena. “Experimental Study of Alfvén Wave Reflection from an Alfvén-speed Gradient Relevant to the Solar Coronal Holes.” *Astrophysical Journal*, **971**, 72.
- 2024 J. M. TenBarge, **J. Juno**, G. G. Howes. “Electron energization in reconnection: Eulerian vs Lagrangian perspectives.” *Physics of Plasmas*, **31**, 022901.
- 2023 T. N. Bernard, F. D. Halpern, M. Francisquez, **J. Juno**, N. R. Mandell, G. W. Hammett, A. Hakim, E. Humble, R. Mukherjee. “Effect of neutral interactions on parallel transport and blob dynamics in gyrokinetic scrape-off layer simulations.” *Physics of Plasmas*, **30**, 112501.
- 2023 E. Abeysinghe, C. W. Smith, L. Wang, **J. Juno**, M. McCall, M. Pierce, M. S. Shephard. “Defining a Cyberinfrastructure for Plasma Science and Space Weather Simulations.” *PEARC23: Proceedings of Practice and Experience in Advanced Research Computing*, Association of Computing Machinery.
- 2023 C. R. Brown, **J. Juno**, G. G. Howes, C. C. Haggerty, S. Constantinou. “Isolation and phase-space energization analysis of the instabilities in collisionless shocks.” *Journal of Plasma Physics*, **89**, (3),

905890308.

- 2023 P. Cagas, **J. Juno**, A. Hakim, A. LaJoie, F. Chu, S. Langendorf, B. Srinivasan. “An investigation of shock formation versus shock mitigation of colliding plasma jets.” *Physics of Plasmas*, **30**, 5, 053903.
- 2023 C. Lochhaas, J. Tumlinson, M. S. Peebles, B. W. O’Shea, J. K. Werk, R. C. Simons, **J. Juno**, C. E. Kopenhafer, R. Augustin, A. C. Wright, A. Acharyya, B. D. Smith. “Figuring Out Gas & Galaxies In Enzo (FOGGIE) VI: The Circumgalactic Medium of L^* Galaxies is Supported in an Emergent, Non-Hydrostatic Equilibrium.” *Astrophysical Journal*, **948**, 43.
- 2023 C. R. Skolar, K. Bradshaw, **J. Juno**, B. Srinivasan. “Continuum kinetic investigation of the impact of bias potentials in the current saturation regime on sheath formation.” *Physics of Plasmas*, **30**, 1, 012504.
- 2023 **J. Juno**, C. R. Brown, G. G. Howes, C. C. Haggerty, J. M. TenBarge, L. B. Wilson III, D. Caprioli, K. G. Klein. “Phase Space Energization of Ions in Oblique Shocks.” *Astrophysical Journal*, **944**, 15.
- 2022 L. Wang, A. Hakim, B. Srinivasan, **J. Juno**. “Electron cyclotron drift instability and anomalous transport: two-fluid moment theory and modeling.” *Plasma Sources Science and Technology*, **31**, 105001.
- 2022 T. N. Bernard, F. D. Halpern, M. Francisquez, N. R. Mandell, **J. Juno**, G. W. Hammett, A. Hakim, G. J. Wilkie, and J. Guterl. “Kinetic modeling of neutral transport for a continuum gyrokinetic code.” *Physics of Plasmas*, **29**, 052501.
- 2022 M. Francisquez, **J. Juno**, A. Hakim, G. W. Hammett, D. R. Ernst. “Improved multispecies Dougherty collisions.” *Journal of Plasma Physics*, **88**, (3), 905880303.
- 2021 B. Ripperda, J. F. Mahlmann, A. Chernoglazov, J. M. TenBarge, E. R. Most, **J. Juno**, Y. Yuan, A. A. Philippov, A. Bhattacharjee. “Weak Alfvénic turbulence in relativistic plasmas Part 2: Current sheets and dissipation.” *Journal of Plasma Physics*, **87**, (5), 905870512.
- 2021 J. M. TenBarge, B. Ripperda, A. Chernoglazov, A. Bhattacharjee, J. F. Mahlmann, E. R. Most, **J. Juno**, Y. Yuan, A. A. Philippov. “Weak Alfvénic turbulence in relativistic plasmas Part 1: Dynamical equations and basic dynamics of interacting resonant triads.” *Journal of Plasma Physics*, **87**, (6), 905870614.
- 2021 S. M. Jenab, G. Brodin, **J. Juno**, I. Kourakis. “Ultrafast Electron Holes in Plasma Phase Space Dynamics.” *Scientific Reports* **11**, 16358.
- 2021 **J. Juno**, G. G. Howes, J. M. TenBarge, L. B. Wilson III, A. Spitkovsky, D. Caprioli, K. G. Klein, A. Hakim. “A field–particle correlation analysis of a perpendicular magnetized collisionless shock.” *Journal of Plasma Physics*, **87**, (3), 905870316.
- 2021 O. Pezzi, H. Liang, **J. L. Juno**, P. A. Cassak, C. L. Vásconez, L. Sorriso-Valvo, D. Perrone, S. Servidio, V. Roytershteyn, J. M. TenBarge, W. H. Matthaeus. “Dissipation measures in weakly collisional plasmas.” *Monthly Notices of the Royal Astronomical Society*, **505**, (4), Pages 4857–4873.
- 2020 A. Hakim and **J. Juno**. “Alias-Free, Matrix-Free, and Quadrature-Free Discontinuous Galerkin Algorithms for (Plasma) Kinetic Equations.” *SC20: Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis*, IEEE Press.
- 2020 **J. Juno**, M. Swisdak, J. M. TenBarge, V. Skoutnev, A. Hakim. “Noise-induced magnetic field saturation in kinetic simulations.” *Journal of Plasma Physics*, **86**, (4).
- 2020 A. Hakim, M. Francisquez, **J. Juno**, G. Hammett. “Conservative discontinuous Galerkin schemes for nonlinear Dougherty–Fokker–Planck collision operators.” *Journal of Plasma Physics*, **86**, (4).
- 2020 I. Pusztai, **J. Juno**, A. Brandenburg, J. M. TenBarge, A. Hakim, M. Francisquez, A. Sundström. “Dynamo in Weakly Collisional Nonmagnetized Plasmas Impeded by Landau Damping of Magnetic Fields.” *Physical Review Letters*, **124**, 255102.
- 2019 J. M. TenBarge, J. Ng, **J. Juno**, L. Wang, A. Hakim, A. Bhattacharjee. “An extended MHD study of the 16 October 2015 MMS diffusion region crossing.” *Journal of Geophysical Research: Space Physics*, **124**, 8474–8487.
- 2019 J. Ng, A. Hakim, **J. Juno**, A. Bhattacharjee. “Drift Instabilities in Thin Current Sheets Using a Two-Fluid Model With Pressure Tensor Effects.” *Journal of Geophysical Research: Space Physics*,

124, 3331–3346.

- 2019 V. Skoutnev, A. Hakim, **J. Juno**, J. M. TenBarge. “Temperature-dependent Saturation of Weibel-type Instabilities in Counter-streaming Plasmas.” *Astrophysical Journal Letters*, **872**, L28.
- 2019 A. Sundström, **J. Juno**, J. M. TenBarge, I. Pusztai. “Effect of a weak ion collisionality on the dynamics of kinetic electrostatic shocks.” *Journal of Plasma Physics*, **85**(1). 905850108.
- 2018 **J. Juno**, A. Hakim, J. M. TenBarge, E. Shi, W. Dorland (2018). Discontinuous Galerkin algorithms for fully kinetic plasmas. *Journal of Computational Physics*, **353**, 110–147.
- 2018 I. Pusztai, J. M. TenBarge, A. N. Csapó, **J. Juno**, A. Hakim, L. Yi, T. Fülöp (2018). Low Mach-number collisionless electrostatic shocks and associated ion acceleration. *Plasma Physics and Controlled Fusion*, **60**, 3, 035004.
- 2017 P. Cagas, A. Hakim, **J. Juno**, B. Srinivasan (2017). Continuum kinetic and multi-fluid simulations of classical sheaths. *Physics of Plasmas*, **24**, 2, 022118.

Invited Presentations

- 2025 “Discontinuous Galerkin Methods for Kinetic Equations with Flexible Coordinates: Conservation Relations, L^2 stability, and More.” *The 15th International Conference on Spectral and High Order Methods*. Montreal, Canada.
- 2025 “Discontinuous Galerkin Methods for Kinetic Equations with Flexible Coordinates: Conservation Relations, L^2 stability, and More.” *Society for Industrial and Applied Mathematics (SIAM) Computational Science and Engineering 2025*. Fort Worth, TX.
- 2024 “On Asymptotic Kinetic and Moment Models and their Numerics in Strong Magnetic Fields.” *Computational Challenges and Optimization in Kinetic Plasma Physics*. Chicago, IL, USA.
- 2024 “Novel parallel-kinetic-perpendicular-moment model for magnetized plasmas.” *7th Vlasovia conference*. Florence, Italy.
- 2022 “Leveraging Phase Space to Understand Energization in Collisionless Shocks.” *Rice University Space Physics Seminar*. Houston, TX, USA.
- 2022 “A Deep Dive into the Particle Distribution Function using Discontinuous Galerkin Methods.” *33rd International Union of Pure and Applied Physics Conference on Computational Physics*. Virtual.
- 2022 “Leveraging Phase Space to Understand Energization in Collisionless Shocks.” *Solar, Heliospheric, and Interplanetary Environment (SHINE) Conference*. Honolulu, HI, USA.
- 2021 “Prioritizing, Leveraging, and Disseminating Fundamental Algorithms Research.” *General Atomic Plasma Theory Seminar*. San Diego, CA, USA.
- 2021 “A Deep Dive into the Distribution Function: Leveraging Phase Space to Understand Weakly Collisional (Plasma) Systems.” *University of Arizona Theoretical Astrophysics Program Colloquium*. Tucson, AZ, USA.
- 2020 “A Deep Dive into the Distribution Function: Understanding Phase Space Dynamics using Continuum Vlasov–Maxwell simulations.” *62nd Meeting of the American Physical Society’s Division of Plasma Physics Conference*. **Remote due to COVID-19**
- 2019 “A Modal, Alias-Free, Discontinuous Galerkin Algorithm for Plasma Kinetic Equations.” *Society for Industrial and Applied Mathematics (SIAM) Analysis of PDEs*. La Quinta, CA, USA.
- 2019 “A Deep Dive into the Distribution Function: Understanding Phase Space Dynamics using Continuum Vlasov–Maxwell simulations.” *Princeton Plasma Physics Theory Seminar*. Princeton, NJ, USA.
- 2019 “A Deep Dive into the Distribution Function: Understanding Phase Space Dynamics using Continuum Vlasov–Maxwell simulations.” *Chalmers’s University Plasma Seminar*. Gothenburg, Sweden.
- 2019 “A Deep Dive into the Distribution Function: Understanding Phase Space Dynamics using Continuum Vlasov–Maxwell simulations.” *Massachusetts Institute of Technology Plasma Theory Seminar*. Cambridge, MA, USA.
- 2019 “A Deep Dive into the Distribution Function: Understanding Phase Space Dynamics using Continuum Vlasov–Maxwell simulations.” *Dartmouth Space Physics Seminar*. Hanover, NH, USA.

- 2018 “A Quadrature and Matrix-Free Discontinuous Galerkin Algorithm for (Plasma) Kinetic Equations.” *ASTRONUM: Numerical Methods for Astrophysics Conference*. Panama City, FL, USA.
- 2017 “An Eulerian Discontinuous Galerkin Scheme for the Fully Kinetic Vlasov–Maxwell System.” *New York University MagnetoFluids Seminar*. New York City, NY, USA.
- 2015 “Toward a continuum Vlasov–Maxwell model: algorithm developments and basic benchmarks.” *American Geophysical Union Fall Meeting*. San Francisco, CA, USA.
- 2014 “Benchmarking a discontinuous Galerkin Vlasov–Poisson Solver in Gkeyll.” *University of Maryland–College Park Plasma Physics Seminar*. College Park, MD, USA.
- 2013 “Benchmarking a discontinuous Galerkin Vlasov–Poisson Solver in Gkeyll.” *Rice University Space Physics Seminar*. Houston, TX, USA.

Contributed Presentations

- 2024 “A novel discretization method of a hybrid parallel-kinetic-perpendicular-moment model.” **Poster** presented at *66th Meeting of the American Physical Society’s Division of Plasma Physics*. Atlanta, GA, USA.
- 2023 “A new hybrid: kinetic ions with parallel-kinetic-perpendicular-moment (pkpm) electrons.” **Poster** presented at *65th Meeting of the American Physical Society’s Division of Plasma Physics*. Denver, CO, USA.
- 2022 “Novel parallel-kinetic perpendicular-fluid model for highly magnetized (relativistic) plasmas.” **Poster** presented at *64th Meeting of the American Physical Society’s Division of Plasma Physics*. Spokane, WA, USA.
- 2021 “Phase Space Energization in Quasi-Perpendicular and Oblique Collisionless Shocks.” **Talk** presented at *63rd Meeting of the American Physical Society’s Division of Plasma Physics*. Pittsburgh, PA, USA.
- 2020 “Cross-Shock Electric Fields and Electron Energization in Collisionless Shocks.” **Talk** presented at *American Geophysical Union Fall Meeting*. **Remote due to COVID-19**.
- 2020 “A Deep Dive into the Distribution Function: Understanding Phase Space Dynamics of Plasma Instabilities in the Early Universe.” **Dissertation Talk** presented at *235th American Astronomical Society Winter Meeting*. Honolulu, HI, USA.
- 2019 “A Deep Dive into the Distribution Function: Understanding Phase Space Dynamics using Continuum Vlasov–Maxwell simulations.” **Dissertation Talk** presented at *61st Meeting of the American Physical Society’s Division of Plasma Physics Conference*. Ft. Lauderdale, FL, USA.
- 2019 “Comparing Kinetic Methods for Phase Space Dynamics of Weibel-Type Instabilities.” **Talk** presented at *Kavli Institute for Theoretical Physics Multiscale Astrophysics Workshop*. Santa Barbara, CA, USA.
- 2019 “The Effect of Particle Noise on Small-Scale Kinetic Instabilities.” **Poster** presented at *19th Solar, Heliospheric, and Interplanetary Environment (SHINE) Conference*. Boulder, CO, USA.
- 2019 “A Quadrature and Matrix-Free Discontinuous Galerkin Algorithm for (Plasma) Kinetic Equations.” **Talk** presented at *6th Vlasovia Conference*. Strasbourg, France.
- 2019 “Turbulent Dissipation in Simple Vlasov Systems.” **Poster** presented at *Sherwood Fusion Theory Conference*. Princeton, NJ, USA.
- 2019 “Discretizing the Vlasov–Maxwell system on a grid.. and applications!” **Talk** presented at the *Max Planck–Princeton Center Workshop*. Tokyo, Japan.
- 2018 “Diagnosing dissipation in non-relativistic collisionless shocks.” **Talk** presented at *American Geophysical Union Fall Meeting*. Washington D.C., USA.
- 2018 “Eulerian Algorithms for the Discretization of (Plasma) Kinetic Equations.” **Poster**¹ presented at *Association for Computing Machinery (ACM) Supercomputing Conference*. Dallas, TX, USA.

¹Poster presented as part of the Association for Computing Machinery’s Student Research Contest

- 2018 “Turbulent Dissipation in Simple Vlasov Systems.” **Talk** presented at *60th Meeting of the American Physical Society’s Division of Plasma Physics*. Portland, OR, USA.
- 2018 “A Quadrature and Matrix-Free Discontinuous Galerkin Algorithm for (Plasma) Kinetic Equations.” **Poster** presented at *19th Solar, Heliospheric, and Interplanetary Environment (SHINE) Conference*. Orlando, FL, USA.
- 2017 “Phase mixing in transverse electromagnetic shocks.” **Poster** presented at *American Geophysical Union Fall Meeting*. New Orleans, LA, USA.
- 2017 “Quantifying dissipation in Eulerian Vlasov simulations of collisionless shocks.” **Poster** presented at *59th Meeting of the American Physical Society’s Division of Plasma Physics*. Milwaukee, WI, USA.
- 2017 “Quantifying dissipation in Eulerian Vlasov simulations of collisionless shocks.” **Poster** presented at *18th Solar, Heliospheric, and Interplanetary Environment (SHINE) Conference*. Saint-Sauveur, Quebec, Canada.
- 2017 “Continuum Vlasov Simulations of Riemann Problems and Magnetized Shocks.” **Poster** presented at *Sherwood Fusion Theory Conference*. Annapolis, MD, USA.
- 2017 “Eulerian Algorithms for the Discretization of Plasma Kinetic Equations.” **Poster** presented at *Society for Industrial and Applied Mathematics (SIAM) Computational Science and Engineering Conference*. Atlanta, GA, USA.
- 2016 “Exploring electron-ion instability couplings in two-fluid extended MHD in high beta plasmas and looking ahead to analogous kinetic simulations.” **Poster** presented at *58th Meeting of the American Physical Society’s Division of Plasma Physics*. San Diego, CA, USA.
- 2016 “Toward a continuum Vlasov–Maxwell model: novel time-stepping and including inter-particle collisions.” **Poster** presented at *17th Solar, Heliospheric, and Interplanetary Environment (SHINE) Conference*. Santa Fe, NM, USA.
- 2016 “Scaling and performance of an Eulerian discretization of the plasma kinetic equation.” **Talk** presented at *International High Performance Computing Summer School*. Ljubljana, Slovenia.
- 2015 “Turbulence Dissipation Challenge: AstroGK Results.” **Talk** presented at *16th Solar, Heliospheric, and Interplanetary Environment (SHINE) Conference*. Stowe, VT, USA.
- 2015 “A new Vlasov–Maxwell solver for studying distribution function dynamics in solar physics.” **Poster** presented at *16th Solar, Heliospheric, and Interplanetary Environment (SHINE) Conference*. Stowe, VT, USA.
- 2014 “A new method of driving turbulence in particle-in-cell simulations.” **Poster** presented at *56th Meeting of the American Physical Society’s Division of Plasma Physics*. New Orleans, LA, USA.
- 2013 “Benchmarking a discontinuous Galerkin Vlasov-Poisson Solver in Gkeyll.” **Poster** presented at *55th Meeting of the American Physical Society’s Division of Plasma Physics*. Denver, CO, USA.

Teaching Experience

- 2025 Lecturer School of Arts & Sciences - Physics & Astronomy at Rutgers University for PHYS 345: Computational Astrophysics.
Duties: All components of course, including course design, creation of assignments, midterm, and example final projects, grading, office hours, and classroom management and lectures. Course description: Introduction to computational astrophysics, including key algorithms, their implementation in code, and their application to current research in astrophysics. Extended projects feature analysis of real data and simulations.
- 2015, 2016 TA at University of Maryland College Park for HONR 268N/L: Cracking the Secrets of the Universe Using Computers.
Duties: Grading and providing assistance inside and outside of class with coding projects. Since the class was experimental, I also helped in the design of the course work and notes. In the second semester, I supervised a small team of undergraduate students on a plasma physics project bench-

2015 marking the Vlasov–Maxwell solver in Gkeyll applied to electron-scale kinetic instabilities.
 Grader at University of Maryland College Park for PHYS 761: Plasma Physics I.
 2014 TA at University of Maryland College Park for PHYS 270: Electrodynamics, Light, Relativity and Modern Physics.
Duties: Weekly discussion sessions and grading of exams.

Leadership & Outreach Experience

2024–present American Physical Society Division of Plasma Physics Public Information Committee (APS PIC).
Duties: Curation, creation, and editing of summary topics to be featured as DPP General Press Releases. **2025 Vice Chair.**
 2022–2024 Program Committee for MagNetUS Annual Meeting.
Duties: Organization of the annual meeting of the magnetized plasma experimental facilities funded by the Department of Energy and National Sciences Foundation. Duties included creation of the program of talks, advertisement and running of the meeting, and solicitation and organization of community and user feedback on the overall collaborative network so continued improvements can be made to processes such as experimental proposals to the facilities which are part of the MagNetUS network.
 2016–2017 Solar, Heliospheric, and INterplanetary Environment (SHINE) Student Representative.
Duties: A 2 year term organizing the annual Student Day associated with the SHINE conference, which occurs the day before the SHINE conference begins. Student Day is principally for graduate and undergraduate students—scientists with PhDs are forbidden from attending—as a way to learn about the field of solar astrophysics and provide opportunities for students to practice presentation skills. During my tenure we re-organized the talks that occur during the day to emphasize a combination of tutorial topics as well as the student’s research. In addition, we organized a poster contest for the students for the first time, which has continued after my tenure ended.

Professional affiliations

- American Physical Society
- American Geophysical Union
- Society of Industrial and Applied Mathematics

Additional Skills

Conversational fluency in American Sign Language