Criston Hyett

Fields Of Interest

Physics-Informed Machine Learning, Reduced-Order Modeling, Uncertainty Quantification, Renewables Integration/Power System Robustness, Reduced Models of Turbulence

Education

2019-2024 (expected) **Ph.D.**, *University of Arizona*, Tucson, AZ.
Applied Mathematics

2019-2021 **M.S.**, *University of Arizona*, Tucson, AZ.
Applied Mathematics

2012-2016 **B.S.**, *University of Arizona*, Tucson, AZ.
Mathematics & Physics

Research

2020-present **Machine Learning Statistical Evolution of the Coarse-Grained Velocity Gradient Tensor**

We use cutting edge machine learning techniques to create physics-informed reduced order models of the inherently chaotic evolution of the velocity gradient tensor in isotropic turbulence.

2021-present **Optimal Natural Gas Flows in a Network with Uncertainty**

We work to determine optimal flows on a natural gas network under the coupled natural gas and energy grids upon inclusion of intermittent renewable energies.

Experience

2020-present **Graduate Research Assistant**, *University of Arizona*, Tucson, AZ.

Summers 2020-22 **Graduate Student Researcher**, *Los Alamos National Labs*, Los Alamos, NM.

2019-2020 **Graduate Teaching Assistant**, *University of Arizona*, Tucson, AZ.

2016-2019 **Software Engineer II**, *Raytheon Missile Systems*, Tucson, AZ.

Talks

Nov, 2022 Applicability of Machine Learning Methodologies to Model the Statistical Evolution of the Coarse-Grained Velocity Gradient Tensor
APS Division of Fluid Dynamics Meeting

Nov, 2022 Interpreting Machine Learning: Insights gleaned modeling the velocity gradient tensor in turbulence
SIAM Student Brownbag

Aug, 2022 Machine Learning Lagrangian Tetrads: Reduced-Order Modeling of Turbulence
University of Arizona – Los Alamos Days

Nov, 2021 Machine Learning Statistical Evolution of the Coarse-Grained Velocity Gradient Tensor
APS Division of Fluid Dynamics Meeting

Mar, 2021 Machine Learning Stochastic Differential Equations: Applications in Reduced-Order Models of Turbulence
SIAM Student Brownbag

Nov, 2020 Machine Learning Statistical Lagrangian Geometry of Turbulence
APS Division of Fluid Dynamics Meeting

Fellowships

Jan 2022 - May 2022 Roots for Resilience Data Science Scholarship *University of Arizona Data Science Institute, Arizona Institute for Resilience*

Computer Languages

Julia	Proficient	*Used daily in development of research software*
C/C++	Proficient	*Used extensively in an embedded environment at Raytheon Missile Systems*
Bash	Comfortable	*Basic functionality used daily*
Python	Comfortable	*Used weekly*
Matlab	Comfortable	*Interpretted monthly*
Cuda	Beginner	

Computer skills

Open Software	git, github, LaTeX
HPC	Slurm
Methodologies	CI, TDD, Agile
Operating Systems	Linux, Windows

Service and Leadership

2021-2022 Organized and presented "Introduction to HPC" seminar for Math PhD students quarterly

Aug 2021 - May 2022 SIAM Brownbag Student Colloquium Organizer

Jul 2018 - Jul 2019 Certified Scrum Master: Scaled Agile Framework

Human Languages

English	Native Speaker
Spanish	Basic
Japanese	Beginner
Amharic	Beginner

Contact

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Publications & Conference Proceedings

[1] **Hyett, Criston** et al. **2022a**. "Applicability of Machine Learning Methodologies to Model the Statistical Evolution of the Coarse-Grained Velocity Gradient Tensor". In: *Bulletin of the American Physical Society*.

[2] Tian, Yifeng et al. **2022b**. "Lagrangian Large Eddy Simulations via Physics Informed Machine Learning". In: *arXiv preprint arXiv:2207.04012*.

[3] Chertkov, Michael et al. **2022c**. "Lagrangian Large Eddy Simulations via Physics-Informed Machine Learning". In: *Bulletin of the American Physical Society*.

[4] Woodward, Michael et al. **2022d**. "Physics Informed Machine Learning with Smoothed Particle Hydrodynamics: Compressiblity and Shocks". In: *Bulletin of the American Physical Society*.

[5] Tian, Yifeng et al. **2022e**. "Physics-informed Machine Learning for Reduced-order Modeling of Lagrangian Turbulence". In: *Bulletin of the American Physical Society*.

[6] **Hyett, Criston** et al. **2021a**. "Data-Analysis of the Coarse-Grained Velocity Gradient Tensor". In: *APS Division of Fluid Dynamics Meeting Abstracts*, N01–011.

[7] Tian, Yifeng et al. **2021b**. "Machine Learning Lagrangian Large Eddy Simulations with Smoothed Particle Hydrodynamics". In: *APS Division of Fluid Dynamics Meeting Abstracts*, A11–008.

[8] **Hyett, Criston** et al. **2021c**. "Machine Learning Statistical Evolution of the Coarse-Grained Velocity Gradient Tensor". In: *APS Division of Fluid Dynamics Meeting Abstracts*, E31–009.

[9] Woodward, Michael et al. **2021d**. "Physics Informed Machine Learning of Smooth Particle Hydrodynamics: Solving Inverse Problems using a mixed mode approach". In: *APS Division of Fluid Dynamics Meeting Abstracts*, N01–050.

[10] Woodward, Michael et al. **2021e**. "Physics Informed Machine Learning of Smooth Particle Hydrodynamics: Validation of the Lagrangian Turbulence Approach". In: *APS Division of Fluid Dynamics Meeting Abstracts*, T24–008.

[11] Woodward, Michael et al. **2021f**. "Physics Informed Machine Learning of SPH: Machine Learning Lagrangian Turbulence". In: *arXiv preprint arXiv:2110.13311*.

[12] **Hyett, Criston**, Chertkov, Michael, Tian, Yifeng, and Livescu, Daniel. **2020**. "Machine Learning Statistical Lagrangian Geometry of Turbulence". In: *APS Division of Fluid Dynamics Meeting Abstracts*, S01–024.