Criston Hyett

Fields Of Interest

Energy transition, Dynamical Systems & Control, Reduced-Order Modeling, Physics-Informed Machine Learning, Uncertainty Quantification

Education

2019-2025 (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

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 gas and energy grids upon inclusion of intermittent renewable energies and under stressing scenarios.

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.

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

May, 2023 **Control of Line Pack in Natural Gas System: Balancing of Limited Resources Under Uncertainty**
Pipeline Simulation Interest Group 2023

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

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

Fellowships

Aug 2021 - May 2023	NSF Data-Driven Research Training Group Traineeship	*University of Arizona College of Science, Mathematics*
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, (SciML/DifferentialEquations/Flux)*
C/C++	Proficient	*Used extensively in an embedded environment at Raytheon Missile Systems*
Python	Comfortable	*Used weekly, (pytorch/tensorflow)*
Bash	Comfortable	*Basic functionality used daily*
Matlab	Comfortable	*Interpretted monthly*
Cuda	Beginner	

Computer skills

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

Service and Leadership

Apr 2023	Organized and presented "Introduction to Parallelization" for NSF Data-Driven Research Training Group
Mar 2023	Graduate Mentor for American Statistical Association DataFest Competition
Quarterly 2021-2022	Organized and presented "Introduction to HPC" seminar for Math PhD students
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

Contact

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Email	cmhyett@math.arizona.edu

Publications & Conference Proceedings

[1] **Hyett, Criston** et al. **2023**. *Control of Line Pack in Natural Gas System: Balancing Limited Resources under Uncertainty*. arXiv: 2304.01955 [math.DS].

[2] **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*.

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

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

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

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

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

[8] 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.

[9] **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.

[10] 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.

[11] 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.

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

[13] **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.