Criston Hyett

Fields Of Interest

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

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

We incorporate modern ML architectures in physics-informed reduced order models of the inherently chaotic evolution of the velocity gradient tensor in isotropic turbulence.

- *Physics-informed machine learning*; *Interpretable ML*; *Transformers*; *Reduced-order modeling*

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.

- *PDE-constrained optimization*; *Differentiable programming*; *Optimization under uncertainty*

Work Experience

May '24 - present, Summers 2020-22 **Graduate Student Researcher**, *Los Alamos National Labs*, Los Alamos, NM

Summer 2023 **Google Summer of Code contributor**, *NumFocus/Julia SciML*

2020-2024 **Graduate Research Assistant**, *University of Arizona*, Tucson, AZ

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

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

Computer Languages

Julia	Proficient	*Develop research software, Contribute to OSS, (SciML/DifferentialEquations/Flux)*
Python	Proficient	*Develop research software, (pytorch/tensorflow)*
C/C++	Proficient	*Used extensively in an embedded environment at Raytheon Missile Systems*
Bash	Comfortable	*Basic functionality used daily*
Matlab	Comfortable	
Cuda	Beginner	

Computer Skills

Open Software git/workflow, LaTeX, Linux

cmhyett@arizona.edu • *cmhyett.github.io* • *cmhyett*
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HPC	Slurm, Docker, MPI/parallel computing
Methodologies	CI, TDD, Agile

Fellowships

May 2024	Orin Flanigan Scholarship	*Pipeline Simulation Interest Group*
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*

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

Selected Publications

Hyett, Criston et al. **2024a**. "Differentiable Simulator For Dynamic and Stochastic Optimal Gas and Power Flows". In: *(To appear) 2024 63nd IEEE Conference on Decision and Control (CDC)*. IEEE.

Hyett, Criston et al. **2024b**. "Improving velocity gradient statistical topology using parameterized Lagrangian deformation networks". In: *preparation*.

Hyett, Criston et al. **2023**. "Control of Line Pack in Natural Gas System: Balancing Limited Resources under Uncertainty". In: *PSIG Annual Meeting*. PSIG, PSIG–2314.

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

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

Selected Talks

Hyett, Criston et al. **2023**. "Velocity gradient prediction using parameterized Lagrangian deformation models". In: *Bulletin of the American Physical Society*.

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

Human Languages

English	Native Speaker
Spanish	Basic
Amharic	Beginner