NICHOLAS GALIOTO

660 Hidden Valley Club Dr. #207, Ann Arbor, MI 48104

(515)724-3897 ⋄ ngalioto@umich.edu ⋄ https://ngalioto.github.io

EDUCATION

University of Michigan — September 2018 - July 2023
PhD and MSE in Aerospace Engineering — *Ann Arbor, MI*

Vanderbilt University — August 2014 - May 2018
BE in Mechanical Engineering — *Nashville, TN*
summa cum laude

EXPERIENCE

University of Michigan — July 2023 - Present
Postdoctoral Research Fellow — *Ann Arbor, MI*

· Researches generative AI models and likelihood-free inference methods for efficient sampling and evaluation of conditional distributions with time-series data
· Creates novel algorithms for probabilistic inference and then develops and debugs them in PyTorch
· Mentors a PhD student on the project of detection and estimation of time-varying sensor manipulation using switching Kalman filters

University of Michigan — August 2018 - July 2023
Graduate Research Assistant — *Ann Arbor, MI*

· Researched the effects and benefits of modeling uncertainty with stochastic dynamics models for sample-efficient Bayesian system identification leading to conference talks and paper publications
· Worked collaboratively with researchers across universities resulting in a conference paper and a pending journal submission

Sandia National Laboratories — May 2022 - August 2022
R&D Graduate Summer Intern — *Livermore, CA*

· Independently researched the applicability of functional tensor networks and variational inference for scalable Bayesian estimation of dynamical systems
· Implemented functional tensor-train and variational sampling algorithms using Python and Pyro and integrated them with pre-existing code
· Composed a peer-reviewed technical report detailing research findings, conclusions, and future work

AWARDS AND HONORS

Michigan Institute for Computational Discovery & Engineering Fellowship — September 2021

Academic Achievement Award — May 2018

NASA Student Launch Champion — May 2018

PUBLICATIONS

Galioto, Nicholas, and Alex Arkady Gorodetsky. "Likelihood-based generalization of Markov parameter estimation and multiple shooting objectives in system identification." *Physica D: Nonlinear Phenomena* 462 (2024): 134146.

Galioto, Nicholas, et al. "Bayesian identification of nonseparable Hamiltonians with multiplicative noise using deep learning and reduced-order modeling." *arXiv preprint arXiv:2401.12476* (2024).

Sharma, Harsh, et al. "Bayesian identification of nonseparable Hamiltonian systems using stochastic dynamic models." *2022 IEEE 61st Conference on Decision and Control (CDC)*. IEEE, 2022.

Galioto, Nicholas, and Alex Arkady Gorodetsky. "A new objective for identification of partially observed linear time-invariant dynamical systems from input-output data." *Learning for Dynamics and Control*. PMLR, 2021.

Galioto, Nicholas, and Alex Arkady Gorodetsky. "Bayesian identification of Hamiltonian dynamics from symplectic data." *2020 59th IEEE Conference on Decision and Control (CDC)*. IEEE, 2020.

Galioto, Nicholas, and Alex Arkady Gorodetsky. "Bayesian system ID: Optimal management of parameter, model, and measurement uncertainty." *Nonlinear Dynamics* 102.1 (2020): 241-267..

CONFERENCE AND WORKSHOP PRESENTATIONS

"Correcting for error in reduced-order modeling using experimental partial observations and Bayesian system ID." SIAM Conference on Uncertainty Quantification, 28 Feb. 2024, Trieste, Italy. Conference presentation.

"Learning partially observed stochastic dynamical systems." SIAM Conference on Mathematics of Data Science, 26 Sept. 2022, San Diego, CA. Conference presentation.

"Accounting for model uncertainty in the identification of partially known models." 8th European Congress on Computational Methods in Applied Sciences and Engineering, 9 June 2022, Oslo, Norway. Conference presentation.

"Bayesian learning of stochastic dynamical models for quantities of interest." SIAM Conference on Uncertainty Quantification, 15 April, 2022, Atlanta, GA. Conference presentation.

"Enforcing physical phenomena in system identification using Bayesian inference and stochastic models." Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering & Technology, 29 Sept. 2021, San Diego, CA. Conference presentation.

"Accounting for model errors in probabilistic linear identification of nonlinear PDE systems." 16th U.S. National Congress on Computational Mechanics, 27 July 2021, Virtual. Conference presentation.

"A new objective function for identification of partially observed LTI dynamical systems from input-output data." Learning for Dynamics & Control Conference, 8 June 2021, Virtual. Poster presentation.

"Robust Bayesian inference by accounting for model error: with applications to Hamiltonian systems." SIAM Conference on Computational Science and Engineering, 4 March 2021, Virtual. Conference presentation.

"Bayesian identification of Hamiltonian dynamics from symplectic data." 59th IEEE Conference on Decision and Control, 14 Dec. 2020, Virtual. Conference presentation.

"Bayesian approaches for data-driven learning of dynamical systems." 3rd Physics Informed Machine Learning, 13 Jan. 2020, Santa Fe, NM. Poster presentation.

TEACHING ASSISTANTSHIPS

University of Michigan, Ann Arbor   *Ann Arbor, MI*

· AEROSP 567: Statistical inference, estimation and learning   Fall 2020, 2021

Vanderbilt University   *Nashville, TN*

· ME 3224: Fluid mechanics   Fall 2017
· ME 4267: Aerospace propulsion   Spring 2018

PROFESSIONAL SERVICE

Journal Reviewer

· Journal of Aerospace Information Systems
· Journal of Machine Learning for Modeling and Computing

Societal Membership

· United States Association for Computational Mechanics (USACM)   2021 - Present
· Society for Industrial and Applied Mathematics (SIAM)   2021 - Present
· Institute of Electrical and Electronics Engineers (IEEE)   2020 - Present