Lyra Zhornyak

PhD Candidate in Computer and Information Science, University of Pennsylvania

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SKILLS

Research focus: physics-guided machine learning for dynamical systems, PDEs and robot locomotion
Methods: transformers, time-series modeling, variational methods, bifurcation analysis, computer vision
Languages & tools: Python, PyTorch, JAX, C/C++, MATLAB, Mathematica, Java, Git, Docker, Linux, Jupyter, LaTeX

EDUCATION

Ph.D., Computer and Information Science, *University of Pennsylvania* 2020 – 2027
GRASP Lab · Advised by M. Ani Hsieh · Expected Fall 2027

B.A.Sc., Engineering Science, *University of Toronto* 2015 – 2020
Thesis: *Minimum Torque Gait Transitions in Quadruped Rovers Using Central Pattern Generators*
Mitacs Globalink Research Award (2019) · NSERC Undergraduate Student Research Award (2017)

EXPERIENCE

Engineering Intern, *Orbis Investment Management* 2019
Data Science Team · London, UK
- Designed and built a vision pipeline that detects brand logos in video streams for investment research.

Research Intern, *University of Leeds* 2019
Supervised by Prof. Richard Romano · Leeds, UK
- Developed a vision-based hand pose tracking system for a driver awareness study in a vehicle simulator.

Undergraduate Technical Intern, *Intel* 2018 – 2019
Programmable Solutions Group · San Jose, CA
- Built a constraint verification system for PCIe module configuration on the Intel Agilex FPGA platform.
- Implemented message-signaled interrupt (MSI) support in Linux kernel drivers.

Selected Research Projects, *University of Pennsylvania*
GRASP Lab · Advised by M. Ani Hsieh
- Built learned Lagrangian models of PDEs that derive structure-preserving neural integrators from variational principles by minimizing Euler–Lagrange residuals (NeurIPS 2026, Spotlight).
- Designed a transformer that recovers bifurcation diagrams from as few as 30 noisy trajectories, predicting critical transitions in nonlinear dynamical systems (Chaos 2024).

PUBLICATIONS

Learned Lagrangian Models of PDEs via Euler–Lagrange Residual Minimization ★ SPOTLIGHT 2026
Lyra Zhornyak, Eric Forgoston, M. Ani Hsieh. *Advances in Neural Information Processing Systems (NeurIPS)*, to appear.

Inferring Bifurcation Diagrams with Transformers 2024
Lyra Zhornyak, M. Ani Hsieh, Eric Forgoston. *Chaos: An Interdisciplinary Journal of Nonlinear Science* 34(5), 051102.

Beyond mAP: Towards Better Evaluation of Instance Segmentation 2023
Rohit Jena, **Lyra Zhornyak**, Nehal Doiphode, et al. *CVPR*, pp. 11309–11318.

HashEncoding: Autoencoding with Multiscale Coordinate Hashing 2022
Lyra Zhornyak, Zhengjie Xu, Haoran Tang, Jianbo Shi. *arXiv:2211.15894*.

Gait Optimization for Quadruped Rovers 2020
Lyra Zhornyak, M. Reza Emami. *Robotica* 38(7), pp. 1263–1287.

LEADERSHIP & SERVICE

Seminar Co-organizer, GRASP SFI Seminar Series, *University of Pennsylvania* 2026 – Present
Reviewer, NeurIPS (Top Reviewer, 2026), ICLR, CVPR; *Chaos*; *RA-L*; *Chaos, Solitons & Fractals* 2023 – Present
Teaching Assistant, CIS 680: Advanced Topics in Machine Perception, *University of Pennsylvania* 2021 – 2023