Ana Pervan

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EDUCATION

Northwestern University — Evanston, IL
Master of Science in Mechanical Engineering — *September 2016 - September 2018*

University of Notre Dame — Notre Dame, IN
Bachelor of Science in Mechanical Engineering, Cum Laude — *August 2012 - May 2016*

EXPERIENCE

Neuroscience and Robotics Laboratory (NxR) — Evanston, IL
Ph.D. Candidate — *September 2016 - Present*
- Researcher in Dr. Todd Murphey's lab
- Developing methods for algorithmic robot design, in which physical designs for robotic systems (specifically microscopic, computationally-limited robots called synthetic cells) are created from projecting simplified control policies onto physically feasible interconnections of sensors and actuators
- Formulating techniques for identifying and exploiting emergent behaviors, such that groups of robots are able to achieve more collectively than they are capable of individually
- Collaborating with multiple universities and groups to implement algorithms and investigate theories across various experimental platforms of different scales, media, and abilities: from macroscopic robots with deterministic dynamics to microscopic devices operating under extreme uncertainty

Active Learning in Robotics Course — Evanston, IL
Co-teacher — *April 2019 - June 2019*
- Lectured a graduate seminar class, responsibilities included writing and editing lecture notes and homework assignments, holding office hours, and assisting students with conceptual and coding questions
- Topics included optimal control, probability, filtering, entropy and information, ergodicity, and function approximation (e.g., Gaussian processes)

Locomotion and Biomechanics Laboratory — Notre Dame, IN
Research Assistant — *January 2015 - May 2016*
- Developed new algorithms and code to model humanoid walking on inclines and declines
- Results are applicable to the control of humanoid robots and to downhill treadmill training for patient rehabilitation from stroke and spinal-cord injuries

Accenture — Chicago, IL
Product Analyst Intern — *Summer 2015*
- Supervised development of TouchCast, an app that allows users to create interactive videos
- Oversaw the product from pilot to production, when it was deployed to thousands of employees

PUBLICATIONS

- Pervan, A., and T. D. Murphey, "Algorithmic Design for Embodied Computation in Synthetic Cells", *IEEE Transactions on Automation Science and Engineering (T-ASE)*, Conditionally Accepted.

- Pervan, A., and T. D. Murphey, "Bayesian Particles on Cyclic Graphs", *arXiv preprint arXiv:2003.03793*, 2020.

- Liu, A. T., J. F. Yang, L. N. LeMar, G. Zhang, A. Pervan, T. D. Murphey, M. Strano, "Autoperforation of Two-Dimensional Materials to Generate Colloidal State Machines Capable of Locomotion", *Faraday Discussions*, Royal Society of Chemistry, 2020.

- Nilles, A. Q., A. Pervan, T. A. Berrueta, T. D. Murphey, S. M. LaValle, "Information Requirements of Collision-Based Micromanipulation", *Workshop on the Algorithmic Foundations of Robotics (WAFR)*, June 2020.

- Savoie, W., T. Berrueta, Z. Jackson, A. Pervan, R. Warkentin, S. Li, T. D. Murphey, K. Wiesenfeld, D. I. Goldman, "A robot made of robots: emergent transport and control of a smarticle ensemble", *Science Robotics*, vol. 4, issue 34, September 2019.

- Berrueta, T., A. Pervan, K. Fitzsimons, and T. D. Murphey, "Dynamical System Segmentation for Information Measures in Motion", *IEEE Robotics and Automation Letters*, vol. 4, issue 1, pp. 169-176, January 2019.

- Nilles, A. Q., A. Pervan, T. Berrueta, T. D. Murphey, and S. M. LaValle, "Information Requirements of Collision-Based Micromanipulation", *Workshop on the Algorithmic Foundations of Robotics (WAFR)*, June 2020.

- Pervan, A., and T. D. Murphey, "Bayesian Particles on Cyclic Graphs", *arXiv preprint arXiv:2003.03793*, March 2020.

- Nilles, A. Q., A. Pervan, T. Berrueta, and T. D. Murphey, "Corralling Active Brownian Particles With 'Active Billiard' Particles", *Bulletin of the American Physical Society*, March 2020.

- Berrueta, T., A. Pervan, and T. D. Murphey, "Towards Robust Motion Planning for Synthetic Cells in a Circulatory System", *Robotics Science and Systems (RSS) Workshop on Robust Task and Motion Planning*, June 2019.

- Pervan, A., and T. D. Murphey, "Low Complexity Control Policy Synthesis for Embodied Computation in Synthetic Cells", *Workshop on the Algorithmic Foundations of Robotics (WAFR)*, December 2018.

- Pervan, A., and T. D. Murphey, "Algorithmic materials: Embedding computation within material properties for autonomy", *Robotic Systems and Autonomous Platforms:* Woodhead Publishing, pp. 197-221, 2019.

Honors

- **National Science Foundation Graduate Research Fellowship**, 2018

- **Murphy Fellowship**, 2016

- **Boeing Scholar**, 2015, 2016

- **Pi Tau Sigma**, 2015, 2016

- **Notre Dame Engineering Honors Program**, 2015, 2016

Other

- **Programming Languages**: Python, Matlab, Mathematica, LaTeX

- **Mentoring**: Meet weekly with a 3rd grade student through an organization called College Mentors for Kids, to introduce her to higher education, engage in community-based and educational activities, and encourage her to pursue her interests and goals

- **Volunteering**: Demonstrate robots and current research at the Museum of Science and Industry in Chicago during National Robotics Week each year, and interact with families and children of all ages to encourage their interest in science and robotics