CURRICULUM VITAE

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Education

Massachusetts Institute of Technology	Cambridge, MA	S.B., Physics	2021
Mat-Su Career and Technical High School	Wasilla, AK	*valedictorian*	2017

Work and Research Experience

Technical Associate, MIT Laboratory for Nuclear Security and Policy, August 2022 – Present

- Provide technical and scientific expertise to promote nuclear disarmament and develop a safe, stable non-proliferation regime
- Created and continue to maintain a C/C++ software stack for guidance and navigation modeling with real-time Bayesian filtering and uncertainty propagation
- Developed novel radar and lidar techniques for robust exoatmospheric positioning
- Supervised undergraduate student research into inertial sensor noise modeling and nonlinear control system response
- Propagated noise in dynamic control systems for hypersonic flows
- Compose technical reports and presentations of research results
- Accelerate Python and C/C++ code for large-scale simulation and optimization tasks

Tutor, Cambridge Coaching, May 2023 – Present

- Provide one-on-one tutoring in math, physics, and computer science
- Topics include quantum mechanics, statistical physics, classical mechanics, probability and statistics, inference, and probabilistic programming at the advanced undergraduate and introductory graduate levels

Researcher, MIT Center for Theoretical Physics, August 2019 – September 2021

- Numerically calculated bound state formation rates, annihilation rates, and Sommerfeld enhancements for self-interacting dark matter models
- Performed new calculations for pseudo-Dirac dark matter bound states in a non-relativistic, perturbative framework

Undergraduate Teaching Staff, MIT Department of Physics, January 2021 – May 2021

- Graded problem sets for 8.044 Statistical Physics I, taught at the level of Reif's *Fundamentals of Statistical and Thermal Physics*
- Answered student questions and provided feedback on student progress and problem solving during remote instruction

Other Experience

Content Advisor, Yale University Kimball Smith Series, August 2021 – Present

- Consult regarding topic and speaker selection, event framing and scope, and content design for the Kimball Smith Series, an interdisciplinary program partnered with the Yale Departments of Physics and Political Science
- Design events focused on the intersection of science, technology, ethics, and global affairs by addressing issues ranging from nuclear proliferation to artificial intelligence governance

MIT Outing Club, September 2017 – April, 2024

- Served as president from April 2019 to May 2021, managing a 48-person executive board and overseeing events and operations with 1,800 members, including during the COVID-19 pandemic
- Led over 50 trips, teaching participants outdoor skills and safe practices in a variety of hiking, mountaineering, and climbing contexts
- Established risk management policies, oversaw leader training and ratings, reviewed incidents, and approved trip itineraries and risk assessments as one of three members of the Safety Committee

Continuing Education and Professional Development

NSF Institute for Artificial Intelligence and Fundamental Interactions Workshop and Summer School, August 2023

- Attended lectures and participated in tutorials at the intersection of physics and artificial intelligence
- Applied machine learning techniques to physics research and practiced using physics domain knowledge to improve AI systems

MIT Advanced Study Program Fellow, Spring 2023

- Studied low-level programming in the Department of Electrical Engineering and Computer Science
- Implemented low-level utilities in embedded systems and learned optimization techniques in C and RISC-V assembly

Papers and Publications

1. L.M. Arthur, F. Chelazzi, D. Lawrence, and M.D. Price, "Probabilistic Reconstruction of Paleodemographic Signals," (2023), arXiv:2312.05152 [stat.AP] .
2. L.M. Arthur and R.S. Kemp, "Intensity Modulated Direct Detection LiDAR for Robust Exoatmospheric Positioning," IEEE Journal of Lightwave Technology (Expected submission June 2024).
3. L.M. Arthur and R.S. Kemp, "Guidance Uncertainty in Ballistic Trajectories," Science & Global Security (Expected submission summer 2024).

Lectures and Invited Talks

- **"SLBM[Submarine Launched Ballistic Missile] Guidance Under the Microscope"** *Princeton School on Science and Global Security*, Princeton, NJ, October 2023
- **"Nuclear Security in the 21st Century"** *Dartmouth College Pugwash*, Hanover, NH, April 2023
- **"Numerical Study of Higgsino Dark Matter"** *MIT Kavli Institute for Astrophysics and Space Research*, Cambridge, MA, September 2020
- **"Numerical Calculation of Higgsino Sommerfeld Enhancement and Bound State Formation Rate"** *MIT PRISM 2020*, Cambridge, MA, August 2020

Technical Skills

- Python, including the Numpy, SciPy, Astropy, PyTorch, Pyro, NumPyro, and JAX libraries
- C and C++ for scientific programming, including the GSL, Eigen, and mlpack libraries
- HPC with Linux and SLURM, and cloud computing with Azure and the Google Compute Engine
- CMake, Make, Docker, and Git for software development
- RISC-V assembly language for embedded systems and program optimization
- Wolfram Mathematica
- LaTeX typesetting