October 2024

Mike Pozulp

Computational Scientist
pozulp1@llnl.gov
(925) 422-0653
Lawrence Livermore National Laboratory
7000 East Avenue, P.O. Box 808, L-170
Livermore, California 94550
United States

Personal Information

Citizenship: U.S.

Interests

Numerical Methods, Computer Architecture, Compilers

Education

University of California, Berkeley — Berkeley, CA — Expected May 2025
PhD, Applied Science & Technology
Thesis: "Hybrid Monte Carlo Deterministic Second Moment Method for Thermal Radiative Transfer"
Advisors: J. L. Vujic (UCB) and T. S. Haut (LLNL)

The College of William & Mary — Williamsburg, VA — May 2015
Bachelor of Science, *magna cum laude*
Major: Computer Science
Minor: Economics

Presentations and Publications

Lead author indicated by *

- **"A Hybrid Second Moment Method for Thermal Radiative Transfer"** (with T. Haut, P. Brantley, S. Olivier, J. Vujic). In review for publication in *Proceedings of M&C 2025*. Denver, Colorado. April 2025.*
- **"Status of Mercury and Imp: Two Monte Carlo Transport Codes Developed Using Shared Infrastructure at Lawrence Livermore National Laboratory"** (with B. Beck, R. Bleile, P. Brantley, S. Dawson, N. Gentile, E. Gonzalez, J. Grondalski, M. Lambert, M. McKinley, M. O'Brien, R. Procassini, D. Richards, A. Robinson, S. Sepke, D. Stevens, R. Vega, M. Yang). Published in *EPJ-N* and presented at *SNA+MC 2024*. Paris, France. October 2024.*
- **"Achievement of Target Gain Larger than Unity in an Inertial Fusion Experiment"** (with O. Hurricane, A. Kritcher, A. Zylstra, D. Callahan, and many others). *Physics Review Letters* 132, 065102. February 2024.
- **"Noisy Radiation Diffusion in MFEM"** (with T. Haut, P. Brantley, J. Vujic). Presented at *MFEM Community Workshop*. Internet. October 2023.*
- **"An Implicit Monte Carlo Acceleration Scheme"** (with T. Haut, P. Brantley, J. Vujic). In *Proceedings of M&C 2023*. Niagara Falls, Canada. August 2023.*
- **"Progress Porting LLNL Monte Carlo Transport Codes to Nvidia GPUs"** (with R. Bleile, P. Brantley, S. Dawson, M. McKinley, M. O'Brien, A. Robinson, M. Yang). In *Proceedings of M&C 2023*. Niagara Falls, Canada. August 2023.*
- **"Lawson Criterion for Ignition Exceeded in an Inertial Fusion Experiment"** (with O. Hurricane, A. Kritcher, A. Zylstra, D. Callahan, and many others). *Physics Review Letters* 129, 075001. August 2022.
- **"Fast Solvers for the Finite Element Method"** (with B. Muldoon). Unpublished. May 2022.
- **"Enhancements supporting IC usage of PEM libraries on next-gen platforms"** (with D. Richards, B. Ryujin). Technical Report LLNL-TR-823775, Lawrence Livermore National Laboratory, Livermore, California. June 2021.
- **"RISC-V Code Generation Comparison"** (with Y. Miyasaka). Unpublished. May 2021.*
- **"Heterogeneity, Hyperparameters, and GPUs: Towards Useful Transport Calculations Using Neural Networks"** (with P. Brantley, T. Palmer, J. Vujic). In *Proceedings of M&C 2021*, 1252-1261. Raleigh, North Carolina. October 2021.*

- **"Extending 1D Transport Using Neural Nets to GPUs"** (with P. Brantley). Accepted for presentation at *SNA+MC 2020*. Tokyo, Japan. May 2020.*
- **"Transitioning the Scientific Software Toolchain to Clang/LLVM"** (with S. Dawson, R. Bleile, P. Brantley, M. McKinley, M. O'Brien, D. Richards). Accepted for presentation at *EuroLLVM 2020*. Paris, France. April 2020.*
- **"Status of LLNL Monte Carlo Transport Codes on Sierra GPUs"** (with M. McKinley, R. Bleile, P. Brantley, S. Dawson, M. O'Brien, D. Richards). In *Proceedings of M&C 2019*, 2160-2165. Portland, Oregon. August 2019.
- **"1D Transport Using Neural Nets, SN, and MC."** In *Proceedings of M&C 2019*, 876-885. Portland, Oregon. August 2019.*
- **"Porting the Opacity Client Library to a CPU-GPU Cluster Using OpenMP4.5"** (with J. Kimko, R. Haque, L. Grinberg). In *Proceedings of SC17*. Denver, Colorado. November 2017.
- **"Introduction to Monte Carlo."** Presented at *LLNL's Computation Intern Seminar Series*, June, 2017 and *W&M Math Department Colloquium Series*, October, 2017.*
- **"LLNL Monte Carlo Transport Research Efforts for Advanced Computing Architectures"** (with P. Brantley, R. Bleile, S. Dawson, N. Gentile, M. McKinley, M. O'Brien, D. Richards, D. Stevens, J. Walsh, H. Childs). In *Proceedings of M&C 2017*. Jeju, Korea. April 2017.
- **"Optimizing Application I/O by Leveraging the Storage Hierarchy Using the Scalable Checkpoint Restart Library with a Monte Carlo Particle Transport Application on the Trinity Advanced Computing System"** (with G. Becker, P. Brantley, S. Dawson, K. Mohror, A. Moody, M. O'Brien). In *Proceedings of SC16*. Salt Lake City, Utah. November 2016.*
- **"Creating a Framework for Systematic Benchmarking of High Performance Computing Systems."** In *Proceedings of SC14*. New Orleans, Louisiana. November 2014.*

EPJ-N	is the European Physics Journal - Nuclear Sciences & Technologies
SNA+MC	is the Joint International Conference on Supercomputing in Nuclear Applications + Monte Carlo.
EuroLLVM	is the European LLVM Developers' Meeting.
M&C	is the International Conference on Mathematics and Computational Methods applied to Nuclear Science and Engineering.
SC	is the International Conference for High Performance Computing, Networking, Storage, and Analysis.

Work Experience

Lawrence Livermore National Lab Livermore, CA July 2015 - Present
Position: Staff Scientist

- Software development for the Monte Carlo Transport Project

Computer Skills

- C/C++, Python, Java, R, Bash, MPI, OpenMP, CUDA, Git/Github, LLVM, Latex, PyTorch, Mathematica
- Linux, OS X, Windows, Solaris, Android, Web

Fellowships, Research Grants, and Contracts

- LLNL LEARN Research Funding ($115,434) 2020 January
- W&M Small Hall Makerspace Grant Recipient ($700) 2014 May
- ACM Student Research Competition Travel Award ($500) 2014 September
- Virginia Space Grant Consortium Grant Recipient ($6,750) 2013 June

Honors, Prizes, and Awards

- LLNL Code Development Bronze Star Award 2024 September
- LLNL Computer Science Spot Award 2023 March
- LLNL Computational Physics Monthly Recognition Award 2021 July
- LLNL Computational Physics Monthly Recognition Award 2020 July
- LLNL Code Development Bronze Star Award 2019 August
- LLNL Computational Physics Monthly Recognition Award 2018 November
- Stanford CS148 Raytracing Project, 2nd Place 2015 December
- NASA Ames Poster Contest, 1st Place 2013 August

Professional Development

- M&C 2025 Denver, Colorado 2025 April 27-30

• SNA + MC 2024	Paris, France	2024 October 20-24
• MFEM Community Workshop	Internet	2023 October 26
• NECDC 2023	Los Alamos, New Mexico	2023 October 16-20
• M&C 2023	Niagara Falls, Canada	2023 August 13-17
• M&C 2021	Raleigh, North Carolina	2021 October 3-7
• J34 Applied Computer Science Meeting	Livermore, California	2020 February 24-27
• LLVM Developer Meeting	San Jose, California	2019 October 22-23
• NSSC Fall Workshop	Livermore, California	2019 October 7-9
• M&C 2019	Portland, Oregon	2019 August 25-29
• LLVM Developer Meeting	San Jose, California	2018 October 17-18
• J34 Applied Computer Science Meeting	Albuquerque, New Mexico	2018 February 11-16
• Supercomputing (SC)	Denver, Colorado	2017 November 12-17
• DoE CoE Performance Portability Meeting	Denver, Colorado	2017 August 21-24
• Supercomputing (SC)	Salt Lake City, Utah	2016 November 13-18
• DoE CoE Performance Portability Meeting	Glendale, Arizona	2016 April 18-22
• ATPESC	St. Charles, Illinois	2016 July 31 - August 12
• Supercomputing (SC)	New Orleans, Louisiana	2014 November 16-21
• Supercomputing (SC)	Denver, Colorado	2013 November 17-22

Technical Coursework

University of California, Berkeley

- Finite Elements in Nonlinear Continua (ME 280B) — 2022 Spring
- Numerical Linear Algebra (MATH 221) — 2022 Spring
- Introduction to the Finite Element Method (ME 280A) — 2021 Fall
- Radiation Processes in Astronomy (PHY C207) — 2021 Fall
- Graduate Computer Architecture (CS 252A) — 2021 Spring
- Numerical Solution of Differential Equations (MATH 228B) — 2021 Spring
- Numerical Analysis (MATH 128A) — 2020 Fall
- Nuclear Reactor Theory (NE 250) — 2020 Fall
- Numerical Simulation in Radiation Transport (NE 255) — 2018 Fall

University of California, Davis

- Network Architecture & Resource Management (EEC 273/ECS 258) — 2018 Fall
- Quantum Mechanics (PHY 115A) — 2017 Spring
- Analytical Mechanics II (PHY 105B) — 2017 Winter
- Analytical Mechanics I (PHY 105A) — 2016 Fall

University of California, San Diego

- High Energy Density Physics (MAE 207) — 2017 Fall

Stanford University

- Partial Differential Equations in Engineering (CME 204) — 2018 Winter
- Compilers (CS 143) — 2016 Spring
- Introduction to Computer Graphics (CS 148) — 2015 Fall

The College of William & Mary

- Random Walks in Biology (APSC 456) — 2015 Spring
- Reliability (CS 668) — 2015 Spring
- General Physics II, Honors (PHYS 102H) — 2015 Spring
- Analog Electronics (PHYS 252) — 2015 Spring
- Ordinary Differential Equations (MATH 302) — 2014 Fall
- General Physics I, Honors (PHYS 101H) — 2014 Fall
- Digital Electronics (PHYS 351) — 2014 Fall
- Finite Automata (CS423) — 2013 Fall
- Operating Systems (CS 424) — 2013 Fall
- Applied Financial Derivatives (ECON 415) — 2013 Fall
- Probability (MATH 401) — 2013 Fall
- Numerical Analysis (MATH 413) — 2013 Fall

- Programming Languages (CS 312) 2013 Spring
- Systems Programming (CS 415) 2013 Spring
- Econometrics (ECON 308) 2013 Spring
- Multivariable Calculus (MATH 212) 2013 Spring
- Algorithms (CS 303) 2012 Fall
- Computer Organization (CS 304) 2012 Fall
- Intermediate Microeconomics (ECON 303) 2012 Fall
- Software Development (CS 301) 2012 Spring
- Database Systems (CS 321) 2012 Spring
- Intermediate Macroeconomics (ECON 304) 2012 Spring
- Linear Algebra (MATH 211) 2012 Spring
- Data Structures (CS 241) 2012 Fall
- Discrete Structures (CS 243) 2012 Fall