

# JOANNA PIPER MORGAN

Corvallis, OR

joannapipermorgan@gmail.com

<https://jpmorgan98.github.io/>

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## EDUCATION

- **Ph.D., Mechanical Engineering** September 2020 – June 2025  
School of Mechanical Industrial and Manufacturing Engineering; Oregon State University (OSU), Corvallis, Oregon  
**Emphasis:** Thermal Fluid Sciences (TFS)  
**GPA:** 3.84  
**Minor:** Nuclear Engineering  
**Academic Advisor:** Kyle E. Niemeyer  
**Minor Advisor:** Todd S. Palmer
- **M.S., Mechanical Engineering** (non-thesis), September 2020 – March 2022  
School of Mechanical Industrial and Manufacturing Engineering; Oregon State University (OSU), Corvallis, Oregon  
**Emphasis:** Thermal Fluid Sciences (TFS)  
**GPA:** 3.83  
**Project Report:** *Explorations of Monte Carlo Solution and Implementation Methods for Thermal Radiation and Neutron Transport*  
**Academic Advisor:** Kyle E. Niemeyer
- **B.S., Mechanical Engineering**, *magna cum laude*, September 2016 – June 2020  
Dept. of Mechanical and Manufacturing Engineering Technology; Oregon Institute of Technology, Klamath Falls, Oregon  
**Minors:** Applied Physics; Applied Mathematics  
**Academic Advisor:** Hong Yee (Randy) Shih
- **High School Diploma** September 2012 – June 2016  
Sisters High School, Sisters, Oregon

## PUBLICATIONS

- J. P. Morgan, I. Variansyah, T. S. Palmer, and K. E. Niemeyer. "Exploring One-Cell Inversion Method for Transient Transport on GPU." In *Proceedings International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering*. Niagara Falls, Ontario, Canada (2023).
- J. P. Morgan, T. J. Trahan, T. P. Burke, C. J. Josey, and K. E. Niemeyer. "Hybrid-Delta Tracking on a Structured Mesh in MCATK." In *Proceedings International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering*. Niagara Falls, Ontario, Canada (2023).
- I. Variansyah, J. P. Morgan, K. E. Niemeyer, and R. G. McClarren. "Development of MC/DC: a performant, scalable, and portable Python-based Monte Carlo neutron transport code." In *Proceedings International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering*. Niagara Falls, Ontario, Canada (2023)
- J. P. Morgan, A. Long, K. Long, and K. E. Niemeyer, "Novel MC TRT Method: Vectorizable Variance Reduction for Energy Spectra" In *Transactions of the American Nuclear Society*, volume 126, pp. 276–278. Anaheim, California, USA (2022).
- J. P. Morgan, T. S. Palmer, and K. E. Niemeyer. "Explorations of Python-Based Automatic Hardware Code Generation for Neutron Transport Applications." In *Transactions of the American Nuclear Society*, volume 126, pp. 318–320. Anaheim, California, USA (2022).
- J. P. Morgan & B. Mustpaha, "Analysis of an X-Y Scanner magnet for Use in Cancer Radiotherapy Treatment," 23 August 2019.  
<https://indico.fnal.gov/event/21420/session/4/material/3/0.pdf>.

## RESEARCH EXPERIENCE

- **Graduate Research Assistant**  
Oregon State University, *School of MIME*, June 2020 – Present  
**Subject (1):** Python based acceleration and abstraction of compute kernels for dynamic Monte Carlo in a rapid methods development code MC/DC<sup>1</sup> as part of the Center for Exascale Monte Carlo Neutron Transport<sup>2</sup> (CEMeNT)  
**Subject (2):** Explorations of the one cell inversion method as an alternative to transport sweeps for deterministic dynamic neutron transport on GPUs  
**Mentors:** Kyle E. Niemeyer & Todd S. Palmer
- **Co-Op Research Intern**  
Advanced Micro Devices (AMD), September 2023 - December 2023
- **Graduate Research Intern**  
Los Alamos National Laboratory, XCP-3, June 2022 – May 2023  
**Subject:** Implementing Woodcock delta tracking on a structured mesh within the production code MCATK. *This work was pushed to a production version release.*  
**Mentors:** Travis J. Trehan, Timothy P. Burke, & Collin J. Josey
- **Graduate Research Intern**  
Los Alamos National Laboratory, CCS-2, June 2021 – June 2022  
**Subject:** Novel methods exploration in vectorizable variance reduction for thermal radiation transport (TRT)  
**Mentors:** Kendra Long & Alex Long
- **Lee Teng Undergraduate Research Fellow**  
Argonne National Laboratory, June 2019 – September 2019  
**Subject:** Cancer radiotherapy scanner magnet design & analysis  
**Mentors:** Brahim Mustapha
- **Science Undergraduate Laboratory Intern (SULI)**  
Thomas Jefferson National Accelerator Facility, June 2018 – August 2018  
**Subject:** Superconducting quadrupole magnet optimization  
**Mentors:** Renuka Rajput-Ghoshal

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<sup>1</sup> <https://github.com/CEMeNT-PSAAP/MCDC>

<sup>2</sup> <https://cement-psaap.github.io/>

## POSTER PRESENTATIONS

- J. P. Morgan, T. J. Trahan, T. P. Burke, C. J. Josey, and K. E. Niemeyer. "Hybrid-Delta Tracking on a Structured Mesh in MCATK." International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering. Niagara Falls, Ontario, Canada (2023).
- J. P. Morgan, I. Variansyah, T. S. Palmer, and K. E. Niemeyer. "Exploring One-Cell Inversion Method for Transient Transport on GPU." High Energy Density Summer School, San Diego, California. July 2023
- J. P. Morgan, T. S. Palmer, and K. E. Niemeyer "Exploring One-Cell Inversion as a Transport Solver", CEMeNT AST Meeting, Corvallis, Oregon. October 2022
- J. P. Morgan and B. Mustapha, "Carbon therapy X-Y scanner magnet analysis," in Lee Teng Internship - Posters and Final Report Presentations, Fermi National Accelerator Facility, Batavia, Illinois. August 2019.
- J. P. Morgan and R. Rajput-Ghoshal, "Jefferson lab electron ion collider interaction region quadrupole magnet optimization," in Undergraduate Research Poster Presentations, Thomas Jefferson National Accelerator Facility, Newport News, Virginia, August, 2018.

## SUMMER SCHOOLS

- High Energy Density Science (HEDS) Summer School, July 2023, San Diego, California at University of California San Diego
- United States Particle Accelerator School (USPAS), June 2018, Albuquerque, New Mexico  
**Course:** *Fundamentals of Accelerator Physics and Technology with Simulations and Measurements Lab*  
Credit provided by University of New Mexico

## CONFERENCE ATTENDANCE

- International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering (ANS M&C International), August 2023, Niagara Falls, Ontario, Canada\*
- Scientific Computing in Python, July 2022, Austin, Texas\*
- American Nuclear Society Annual Conference, June 2022, Anaheim, California\*

- Conference on Mathematics and Computational Methods Applied to Nuclear Science (ANS M&C), October 2021, Raleigh, North Carolina (*virtual*)

\* presented at

## CONFERENCE PRESENTATIONS

- J. P. Morgan, I. Variansyah, T. S. Palmer, and K. E. Niemeyer. "Exploring One-Cell Inversion Method for Transient Transport on GPU." International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering. Niagara Falls, Ontario, Canada (2023).
- J. P. Morgan, T. S. Palmer, & K. E. Niemeyer, "Hardware Code Generation Techniques for Accelerating Python.", Scientific Python, Austin, Texas, USA, July 2020
- J. P. Morgan, T. S. Palmer, & K. E. Niemeyer, "Hardware Code Generation Techniques for Accelerating Python", Annual Meeting of the American Nuclear Society, Anaheim, California, USA, June 2020
- J. P. Morgan, A. Long, K. Long & K. E. Niemeyer, "A novel MC TRT method: vectorizable variance reduction for the energy spectra", Annual Meeting of the American Nuclear Society, Anaheim, California, USA, June 2020

## TEACHING EXPERIENCE

- Supplemental Instructor, *Student Services & Dept. Natural Sciences*  
Oregon Institute of Technology, September 2017 – March 2020  
Class: Physics for medical imaging  
Directed by: Robyn Wilde
- Peer Consultant, *Student Services*  
Oregon Institute of Technology, January 2018 – June 2020  
**Subjects:** Numerical methods, differential & integral calculus, linear algebra, intro to algebra, trigonometry, college algebra, statistics, heat transfer, statics, thermodynamics, fluid dynamics, strengths of materials, physics with calculus.
- Mathematics Grader, *Dept. Mathematics*  
Oregon Institute of Technology, January 2018 – March 2020  
Subjects: Numerical methods (in MATLAB), differential & integral calculus, linear algebra, intro to algebra, trigonometry, college algebra, statistics.  
Directed by: Cristina Negoita and Terri Torres

## PROFESSIONAL AFFILIATIONS

- Member, American Nuclear Society (ANS)
- Member, Tau Beta Pi (Engineering Honors Society)

## OTHER ACTIVITIES

- Volunteer; Whiteside Theater, Corvallis, OR (March 2023 – Present)
- Student Commissioner; Library Recourse Commission (October 2017 – June 2020).
- Committee Member; University Librarian Search Committee (March 2018 – June 2018).
- Student Building Manager; Oregon Institute of Technology College Union (February 2017 – March 2020).
- President; Oregon Institute of Technology Chapter of Circle K International Community Service Club (May 2019 – June 2020)
- Treasurer; Oregon Delta – Tau Beta Pi (May 2019 – May 2020)
- Notary Public; State of Oregon (November 17<sup>th</sup>, 2016 – November 16<sup>th</sup>, 2020)

## AWARDS and FELLOWSHIPS

- Illinois Accelerator Institute; *Lee Teng Undergraduate Research Fellowship in Accelerator Science* (2019).
- ASME; *Irma and Robert Bennett Scholarship* (2019).
- Pride Foundation; *Lenahan-Warn Technical Education Scholarship* (2017).

## SKILLS

- C/C++ (OpenMP, C-CUDA, Kokkos, AVX, SIMD, MPI)
- Intel Vtune, NVIDIA N-Sight, TotalView
- Python (Numba, mpi4py, Numpy, Scipy, Matplotlib, CuPy, CProfiler)
- Matlab
- CAD/CAE: Creo, SolidWorks, AutoCAD, Inventor, NX, CST, OperaOptimizer, EES, FEMM
- Nuclear Engineering Codes: MCNP, SERPENT, MCATK, Jayenne, Simulate

- MISC Development Tools: Git(hub)/Gitlab/Bitbucket, Slurm, Bash, LSF, z-shell, ssh, Linux terminal, valgrind

## REFERENCES

Available upon request

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