

JORDAN LAUNE

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EDUCATION

Cornell University, Ithaca, NY

Ph.D. Student, Department of Astronomy and Astrophysics

University of Chicago, Chicago, IL

Mar 2019

Bachelor of Arts, Physics,

Bachelor of Science with Honors, Mathematics

RESEARCH EXPERIENCE

Department of Astronomy and Planetary Science

Aug 2019 – Present

Cornell University, Ithaca, NY.

Graduate Student Researcher

- Performed N-body simulations to study how convergent planet migration affects the orbital dynamics of a system.

Nuclear, Particle, Astrophysics and Cosmology, Theoretical Division (T-2),

Los Alamos National Laboratory, Los Alamos, NM.

Post Baccalaureate Researcher

Apr 2019 – Aug 2019

Science Undergraduate Laboratory Internship

Jun 2018 – Sep 2018

- Designed and executed two-fluid hydrodynamic and dust coagulation simulations of protoplanetary disks with the Los Alamos Computational Astrophysics Simulation Suite (LA-COMPASS).
- Utilized Los Alamos National Laboratory's high performance compute clusters for simulations and data analysis.
- Examined effects of dust coagulation on the ring formation process in protoplanetary disks with simulated data and analytic calculations.
- Simulated millimeter-scale radio observations of protoplanetary disks using the radiative transfer code RADMC-3D.
- Created Python analysis library built upon matplotlib and NumPy for use with the Los Alamos Computational Astrophysics Simulation Suite (LA-COMPASS).

Flash Center for Computational Science,

Jul 2016 – Mar 2019

Department of Astrophysics and Astronomy, University of Chicago, Chicago, IL.

Undergraduate Researcher

- Designed and executed 2-D FLASH hydrodynamical simulations of the experiments at LULI in Gregori et al. (2012).
- Utilized Argonne National Laboratory's Mira and Cetus high-performance computing platforms to perform 2-D laser plasma simulations.
- Implemented reconstruction algorithm of Bott et al. (2017) into a Python library for experimental and simulated plasma physics diagnostics.
- Collaborated to create Python library which reads in various simulation and experimental proton radiography diagnostic data for use with reconstruction tools.
- Tested diagnostic reconstruction algorithm on the Midway compute cluster at the University of Chicago.

- Refined and developed Python module for conversion and analysis of equation of state tabulated data into FLASH Code.
- Assisted with analysis and visualization of FLASH simulation data with VisIt on Argonne's Mira supercomputer.
- Deployed open source scientific software to the community through GitHub.
- Created comprehensive API documentation for scientific Python software.
- Created user-friendly command line tools for scientific computing.

University of Chicago Analysis Bootcamp

Jul – Aug 2017

Department of Mathematics, University of Chicago, Chicago, IL.

- Participated in four advanced mathematics courses lead by undergraduate teaching assistants on dynamical systems, probability theory, complex analysis, and differential geometry.
- Prepared three lectures to give to peers in the program.

University of Chicago Mathematics REU

Jun – Aug 2016

Department of Mathematics, University of Chicago, Chicago, IL.

- Participated in a five week course in graph theory and linear algebra.
- Authored expository paper on the applications of probability theory to large graphs (<https://math.uchicago.edu/~may/REU2016/REUPapers/Laune.pdf>).

PUBLICATIONS

JT Laune, H. Li, S. Li, Y. P. Li, L. G. Walls, T. Birnstiel, J. Drazkowska, S. Stammler. *Ring Morphology with Dust Coagulation in Protoplanetary Disks*. *Astrophysical Journal Letters* (accepted).

JT Laune, P. Tzeferacos, S. Feister, M. Fatenejad, R. Yurchack, N. Flocke, K. Weide, D. Q. Lamb. *Opacplot2: Enabling tabulated EoS and opacity compatibility for HEDLP simulations with the FLASH code* (abstract). 59th Annual Meeting of the APS Division of Plasma Physics.

PRESENTATIONS

FLASH Simulations of Laser Experiments that Study Biermann Battery Generation of Magnetic Fields at LULI (poster). JT Laune, P. Tzeferacos. 2019 NIF & JLF User Group Meeting, Livermore, CA, 3-6 Feb 2019.

PROBLEM Solver: A nonlinear proton radiography reconstruction algorithm implemented in Python (poster). JT Laune, A. F. A. Bott, S. Feister, A. Bogale, N. Flocke, K. Weide, T.G. White, G. Gregori, A. A. Schekochihin, D. Q. Lamb, P. Tzeferacos. 2018 NIF & JLF User Group Meeting, Livermore, CA, 4-7 Feb 2018.

Opacplot2: Enabling tabulated EoS and opacity compatibility for HEDLP simulations with the FLASH code (poster). JT Laune, P. Tzeferacos, S. Feister, M. Fatenejad, R. Yurchack, N. Flocke, K. Weide, D. Q. Lamb. 59th Annual Meeting of the APS Division of Plasma Physics, Milwaukee, WI, 23-27 Oct 2017.

AWARDS

Cornell Fellowship Aug 2019
Cornell University

Science Undergraduate Laboratory Internship Feb 2018
United States Department of Energy, Office of Science

Second Place Undergraduate Poster Award Apr 2018

SKILLS

Computer Languages & Packages

Python, NumPy, SciPy, matplotlib

Simulation Codes

LA-COMPASS, RADMC-3D, REBOUND, FLASH

Tools

Emacs, Git, Vim