Lindsey Gordon

gordo840@umn.edu
lindseycgordon
lcgordon.github.io

Education

Doctor of Astrophysics *Sept. 2021 – Present*
University of Minnesota

Third year Astrophysics Ph.D., Data Science in Astrophysics Graduate Minor
Advisor: Tom Jones. Cumulative GPA: 3.74

B.A. in Astrophysics *Sept. 2017 – June 2021*
Wellesley College

Major: Astrophysics with Honors; Minor: Computer Science. Cumulative GPA: 3.73
Honors Thesis: Analysis of the Early Rise Light Curves of Four TESS-Observed Supernovae

Current Research

***WisdomWombat* - MHD Simulations of AGN Jets** *June 2021 – Present*
UMN

- Rewriting the WOMBAT simulation suite for HPC optimization in partnership with HPE/Cray. Shared memory model programming with an optimized graph workflow.
- Ownership of grid subregion boundary passing; code uses a series of buffers and queues to synchronize.
- Polyglot C/Python/Fortran application built in Docker. Conference paper accepted to SC23.

***WombatWiser* - ML Analysis of WOMBAT Outputs** *Sept. 2022 – Present*
UMN

- Developing ML analysis of WOMBAT simulation outputs using PyTorch to classify 2D shock phenomena (fronts, compressions/rarefactions, directionality).
- Precursor work for in situ analysis of outputs made possible by *WisdomWombat*. DSMMA Fellowship Capstone Project

Prior Research

etsfit: Early Time Supernova model FITting *Sept 2020 – Present*
Wellesley & MIT

Python data mining program to identify serendipitous early time supernova observations from TESS. Bayesian model fitting to recovered data including use of Gaussian Processes for noise modeling. Python package **[etsfit]**, available via GitHub. Paper in prep.

Device Parallelized Kernel Offloading in FLAG *Summer 2023*
Los Alamos National Lab

- Improving *FLAG*'s device utilization via GPU offloading. Application was profiled via VTune and MAP, and select calculations were offloaded via Fortran-CUDA interfacing and Fortran OpenMP.
- Identified areas of future work in the build system to create optimized offload workflows in FLAG.

An Unsupervised Pipeline for TESS Light Curve Classification *Jan. – August 2020*
MIT Kavli Institute for Astrophysics

Python pipeline to perform unsupervised ML classification and anomaly detection on TESS light curves. Feature extraction through a convolutional autoencoders coupled with prepackaged learning algorithms.

TESS Follow-Up Observing Program *Jan. 2020 – June 2021*
Wellesley
Observed TESS candidate planets using the local 0.7m PlaneWave and performed data reduction. Assisted with target scheduling, training new hires, and observational projects for the astronomy research methods course. *n*-th author credit for work on TOI-628b.

A Compact Multi-Beam Linear Accelerator Prototype *August – December 2019*
Lawrence Berkeley National Lab *Accelerator Technology and Applied Physics*
Electrical engineering work on parts testing for new components (RF voltage amplifier, microelectromech. wafers) for an energy upgrade to a prototype accelerator design. Computational physics work on updating and running Python simulations of the internal fields and ion motion within the accelerator.

Searching for Dual Quasars in Archival Hubble Data *June – August 2019*
Middlebury College
Wrote a Python search algorithm to find candidate double quasar systems in the Hubble archive using contour maps. Analyzed resulting density of identified candidates. Symposium talk & paper. Small Python package **[hubble_contours]** developed at a hackathon in 2020.

Technical skills

Programming Languages	Python, C Java, SQL, HTML/CSS FORTRAN
Development Tools	Git, Jira, Docker
Parallel Computing	CUDA, MPI, OpenMP, VTune
Misc. Computing	SLURM, Paraview, Unity
Office Skills	Microsoft Office, LaTeX, GSuite, Canva

Journal Publications

J. Rodriguez *et al.*	"TESS Delivers Five New Hot Giant Planets Orbiting Bright Stars from the Full Frame Images"; ApJ Jan. 2021
L. Gordon *et al.*	"`etsfit`: Bayesian Modeling of Early Time TESS Supernovae"; AJ in prep.

Conference Papers

SuperComputing23, Denver CO	WisdomWombat: A polyglot dataflow CFD code using Python and Dragon	*Nov. 2023*
KNAC 2020 Symposium, Virtual	Unsupervised TESS Stellar Classification	*Oct. 2020*
KNAC 2019 Symposium, Vassar	Double Quasar Systems	*Oct. 2019*

Posters, Presentations, and Talks

AAS 242, Albuquerque	iPoster	*June 2023*
Wellesley Ruhlman Conference	Short talk	*May 2021*
AAS 237, Virtual	iPoster & short talk	*Jan. 2021*
TESS Science Talk, MIT	Hour talk	*Sept. 2020*
Summer MKI Undergraduate Research Forum, MIT	Short talk	*August 2020*
LBNL Fall Presentations	Poster	*Dec. 2019*
Middlebury Summer Research Poster Session	Poster	*July 2019*

Awards, Honors, and Fellowships

Data Science in Multi-Messenger Astronomy Fellowship	NSF	*2022-2023*
Best Grad TA Award	UMN Astrophysics	*Fall 2021*
John Charles Duncan Prize in Astronomy	Wellesley College	*2021*
NASA Massachusetts Space Grant(s)	Wellesley College	*2020-2021*
Albright Institute for Global Affairs Fellowship	Wellesley College	*2020*

Teaching & Outreach

Astronomy on Tap Twin Cities - Branch Founder/Coordinator *Summer 2022 – Present*
UMN

Founded our new branch of AoT (see national site **[here]**, our local site **[here]**). Organizing and publicizing periodic casual astronomy outreach events at bars/breweries in the Twin Cities.

Graduate TA *Sept 2021 – June 2022*
UMN

Fall 2021, Spring 2022: AST 1001 (Intro Astro) Lab TA

Extended Reality in Astronomy Education/Outreach *April 2022*
astrobites Guest Post

Universe in the Park *Summers 2021 –*
UMN

Summer public outreach program that brings short talks, telescopes, and constellation tours to various state parks in MN on weekends.

Night Assistant *Dec. 2019 – June 2021*
Wellesley College

Night lab TA for ASTR 100 and ASTR 107, 90 students/semester. Also worked at public nights, operating Whitin Observatory's historic telescopes and giving short talks and constellation tours at monthly events.

Public Night Assistant *Summer 2019*
Middlebury College

Operated small mounted telescopes and gave constellation tours in English and French.