Lindsey Gordon

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Education

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

Fourth year Astrophysics Ph.D. Candidate, Data Science in Astrophysics Graduate Minor
Advisor: Tom Jones. **Cumulative GPA**: 3.73

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

AGN Jet Simulations in Athena++ *May 2024 – Present*
Los Alamos National Lab

- GRA position in T-2 working on simulations of magnetic tower AGN jets in varied turbulent background environments studying the evolution of the lobes in the ICM.
- Used Athena++ MHD simulations with a 5-level nested SMR grid. Ran on Chicoma supercomputer.

Device Parallelized Kernel Offloading in FLAG *Summer 2023; Jan – Mar 2025*
Los Alamos National Lab

- Improving *FLAG*'s device utilization via GPU offloading using a the Lokkos Fortran wrapper of the Kokkos model.
- Application was profiled via VTune and Kokkos-Tools to determine hotspots for kernel generation. Wrote ∼30 kernels, performed optimization of performance, contributed to the documentation, and added to the offloaded communications network within the FLAG database.

***WisdomWombat* and *WiserWombat* - MHD Simulations with ML In-The-Loop** *June 2021 – Present*
UMN

- Rewriting the WOMBAT simulation suite in partnership with HPE/Cray in a polyglot C/Python/Fortran application built in Docker. Code ownership of ghost zone boundary management agent. Conference paper accepted to SC23.
- Developing *WiserWombat* framework for in-situ machine learning agents (PyTorch) to run concurrently on simulation outputs. Writing a simplified neural architecture search to create rescalable networks.

AGN Jet Interactions with Ambient Material *June 2021 – Present*
UMN

- Using original version of the Wombat MHD code to study the progression of AGN jets in inhomogeneous media. Focus is on causes of extended radio sources with unique morphologies.

Prior Research

etsfit: Early Time Supernova model FITting *Sept 2020 – June 2021*
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]**.

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 auto-encoders 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*

Parts testing for new device components for an energy upgrade to a prototype accelerator design. 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, C++ Fortran, SQL, HTML/CSS
Development Tools	Git, Jira, Docker
Parallel Computing	CUDA, MPI, OpenMP, VTune, Kokkos
Misc. Computing	slurm, flux, Paraview, Unity

Journal Publications

J. Rodriguez *et al.* "TESS Delivers Five New Hot Giant Planets Orbiting Bright Stars from the Full Frame Images"; ApJ Jan. 2021

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 245, National Harbor MD	iPoster	*Jan. 2025*
T-Division Lightning Talks, LANL	Short talk	*July 2024*
AAS 242, Albuquerque	iPoster	*June 2023*
Ruhlman Conference, Wellesley College	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, & Advising

SuperComputing Conference Volunteer *2023, 2024*

SC23 student volunteer, SC24 lead student volunteer on the Students @ SC Committee

astrobites author *Jan. 2024 – Present*

Joined the regular author rotation writing accessible summaries of astrophysical research in 2024; ran social media coverage of AAS 245 for the collaboration. [link to my posts]

Advising: Katrine Kompanets *Jan. 2023 – May 2024*

Kat was a research assistant on the *WiserWombat* project, funded through the DSMMA program.
Oswald Award Recipient 2024; LANL Computational Physics Workshop 2024

SPA Climate & Diversity Committee *Fall 2023*

UMN

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

UMN

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

Graduate TA *Fall 2021, Spring 2022*

UMN *AST 1001 Lab TA*

Universe in the Park *Summers 2021, 2022*

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.