Lindsey Gordon

UMN Astrophysics • ML + Computational MHD
gordo840@umn.edu • lcgordon.github.io

EDUCATION

University of Minnesota, Minneapolis, MN, USA — Sep 2021 –

- Second year graduate student in Astrophysics. Jones lab.
- **Cumulative GPA:** 3.71

Wellesley College, Wellesley, Massachusetts, USA — Sep 2017 – Jun 2021

- B.A. in Astrophysics with Honors, minor in Computer Science.
- **Cumulative GPA:** 3.73
- **Honors Thesis:** Analysis of the Early Rise Light Curves of Four TESS-Observed Supernovae

CURRENT RESEARCH

***WombatWisdom* - MHD Simulations of AGN Jets** — Jun 2021 –
Supervisor: Dr. Tom W. Jones (UMN), Dr. Pete Mendygral (HPE) — **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 through a series of buffers and queues.
- C, Python, Cython, FORTRAN, Docker.
- A wisdom is a group of wombats.

***WombatWiser* - ML Analysis of WOMBAT Outputs** — Jun 2021 –
Supervisor: Dr. Tom W. Jones (UMN) — **UMN**

- Simulating AGN jets propagating through a pseudo-ISM.
- Developing ML analysis of WOMBAT simulation outputs, including identifying simulations with boundary condition effects and classifying phenomena (i.e., compression versus rarefaction). This is precursor work to *wombatwisdom*, which will allow *in situ* ML analysis through the shared memory model.
- Python, PyTorch. DSMMA Fellowship Capstone Project

Analysis of the Early Rise Light Curves of Four TESS-Observed Supernovae — Aug 2020 –
Supervisors: Dr. Tansu Daylan (MIT), Dr. Richard French (Wellesley) — **Wellesley College**

- Python data mining program to identify Type Ia supernovae observed by TESS.
- Bayesian model fitting to recovered data including use of Gaussian Processes for noise removal. Python package **[etsfit]**, available via GitHub. Paper in prep.

PRIOR PROJECTS

***Mergen*: An Unsupervised Pipeline for TESS Light Curve Classification** — Feb 2020 – Jun 2021
Supervisors: Dr. Tansu Daylan, Dr. George Ricker — **MIT**

- 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.
- Project passed on to another student. Paper (3rd author) in progress.

TESS Follow-Up Observing Program — Feb 2020 – Jun 2021
Supervisor: Dr. Kim McLeod — **Astronomy Dept, Wellesley College**

- 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 — Aug 2019 – Dec 2019
Supervisor: Dr. Arun Persaud — **Lawrence Berkeley National Laboratory**

- SULI Internship in the Accelerator Technology and Applied Physics Dept.
- 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 Python simulations of the internal fields and ion motion within the accelerator.
- Summary paper & poster presentation.

Searching for Dual Quasars in Archival Hubble Data Jun 2019 – Aug 2019
Supervisor: Dr. Eilat Glikman **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]**.

Fiber Optic Fed Spectrometer Spring 2019
Supervisor: Dr. Kim McLeod **Astronomy Dept, Wellesley College**

- Designed the internal optics and guide system for a fiber-optic-fed spectrometer for a 0.7m telescope.

LANGUAGES & SKILLS

- Python - Most Experienced (6+ years)
  - General Packages: NumPy, pandas, matplotlib, PyMySQL, emcee, yt, SciPy
  - Machine learning: scikit-learn, PyTorch, tensorflow
  - Astronomy: Astropy, Astroquery, lightkurve
- Java, SQL, C - Experienced (4+ years)
- HTML/CSS & Javascript - Most Experienced (6+ years)
  - Flask, Ajax for dynamic web frameworks
- FORTRAN, R - Familiar (1-2 Projects)
- VR/AR/MR Development: Unity, SteamVR, Windows MR - Familiar (1-2 Projects)
- Astronomy: Telescope driving, AIJ, SAOds9, TOPCAT
- Microsoft Office, LaTeX

PUBLICATIONS

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

[2] **L. Gordon**, T. Daylan, E. Chickles, *et al.* "etsfit: Bayesian Modeling of Early Time TESS Supernovae" In prep.

[3] E. Chickles, T. Daylan, **L. Gordon**, *et al.* "Stellar Variability Classification of TESS Data" In prep.

AWARDS & HONORS & FELLOWSHIPS

NSF Data Science in Multi-Messenger Astronomy Fellowship 2022-2023

- A year of funding, training, and professional development for the application of modern data science methods to astrophysics research.

UMN Astrophysics - Best Grad TA Award Fall 2021

John Charles Duncan Prize in Astronomy 2021

- Department award given to one graduating astronomy senior in recognition of outstanding interest, ability, and accomplishment in the study of astronomy.

NASA Massachusetts Space Grant Spring 2020, Fall 2020, Spring 2021

- Funding for TESS follow-up observing program research at Wellesley.

Albright Institute for Global Affairs Fellowship 2020

- Interdisciplinary fellowship on global affairs. Month of programming work and funding for an internship abroad (cancelled due to COVID).

POSTERS & PRESENTATIONS

Wellesley College Ruhlman Conference - Talk May 2021

- 10 min talk on *Analysis of the Early Rise....*

AAS 237 - Poster & Talk Jan. 2021

- Poster on *Classification of Supernovae in TESS Data* (1/15). Short talk during the *Mining TESS Data with Machine Learning and Other Advanced Methods* Special Session (1/14).

KNAC 2020 Symposium - Talk Oct. 3 2020

- Ten minute talk on *Mergen* and submitted a short paper to the symposium proceedings.

TESS Science Talk Sept. 9 2020

- Hour talk on *Mergen* at the weekly TESS Science Talk.

Summer MKI Undergraduate Research Forum - Talk Aug. 24 2020

- Ten minute talk on *Mergen* at the final project presentations for MIT's summer research program.

LBNL Fall Presentations - Poster Dec. 6 2019

- Presented poster on *A Compact Multi-Beam Linear Accelerator* at a session held at LBNL.

KNAC 2019 Symposium - Talk Oct. 5 2019

- Ten minute talk on *Searching for Dual Quasars...* and paper in symposium proceedings.

Middlebury College Summer Research Poster Session - Poster July 25 2019

- Poster on *Searching for Dual Quasars....*

TEACHING + OUTREACH

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

- 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.

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

- **[click here for link]**

Universe in the Park - UMN Summer 2021, 2022

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

TA - AST 1001 Exploring the Universe - UMN Sept 2021 – May 2022

- Fall 2021 - TA for three 115 minute lab sections per week ($\sim$70 students).
- Spring 2022 - support TA offering make-up labs and rewriting lab manual.

Universe @ Home - UMN October 2021

- Virtual public talk on exoplanets streamed live via the MIfA Youtube channel.

Night Assistant - Wellesley College Dec 2018 – Mar 2020

- Night lab TA for ASTR 100 and ASTR 107, 90 students/semester.

Public Nights - Wellesley College Sept 2017 – March 2020

- Operated Whitin Observatory's historic telescopes and gave short talks and constellation tours at monthly public nights. Events suspended during COVID.

Public Nights - Middlebury College Summer 2019

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

OTHER WORK

Welp: A Yelp Reconstruction Oct. 2020

- Built a Yelp-style database and communication platform using SQL, Flask, Ajax & Jinja2.

AstroHackWeek 2020 8/31-9/4 2020

- Led project to convert existing code into a GitHub package **[hubble_contours]**, which produces contour plots from Hubble images.

Wellesley Resources App: UX Design July 2020

- Designed and user-tested a UI for a hypothetical application to consolidate health, career, and residential life resources. **(link)**

MIT Astronomy Field Camp, Lowell Observatory January 2019

- Short project on Python analysis of stellar flares.