Sidney Lower

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Education

University of Florida
College of Liberal Arts & Sciences, Department of Astronomy
M.S. Astronomy | June 2020
Ph.D Astronomy Candidacy | April 2021
Ph.D Astronomy Expected December 2023

University of Illinois, Urbana-Champaign
College of Engineering, Department of Physics
B.S. Engineering Physics | May 2018

Research

Graduate Research Assistant
UF Department of Astronomy

- Active in several collaborations across 20+ institutions to pool expertise, code, and data
- Maintained a research group documentation resource for onboarding purposes, introducing users to the UF supercomputing cluster, Hipergator, and various group tools
- Performed ray-tracing calculations of mock galaxies to generate spectra using the open-source software produced by research group PI (Powderday; Narayanan et al. 2021)
- Routinely performed literature reviews and generated data compilations to stay current on research and analysis across several disciplines
- Made improvements to several code bases used within the research group, ranging from day-1 bug mitigations and code clarity edits to repackaging loose Python scripts into trackable code repos
- Used Bayesian inference techniques to analyze mock galaxy spectral data in order to determine the efficacy of several models commonly used in the galactic astronomy community (Lower et al. 2020; Lower et al. 2022)
- Developed galaxy spectral data analysis pipeline to make predictions for observational proposals for ground-based and space-based facilities, leading to hundreds of hours of awarded time
- Routinely queried and analyzed large data sets, including 3D particle information, and spectral and time-series data
- Co-implemented an open source machine learning method to improve upon traditional spectral and time-series fitting algorithms, outperforming community standard benchmarks by 50% across the board (Mirkwood; Gilda, Lower, and Narayanan et al. 2020)
- Developed a suite of state-of-the-art galaxy formation simulations, improving upon previous resolution limits and model parameterizations (Lower et al. in prep)

Teaching, Mentoring, & Outreach

Graduate Research Mentor
UF Department of Astronomy

- Mentored an advanced undergraduate student as part of the NSF REU 2022 program, developing and implementing a research plan to study properties of simulated galaxies
- Co-led a series of professional development seminars and weekly research check-ins as part of the 2021 Cosmic Dawn Center IRES program
- Sought out and offered routine advice and tools across research areas within the UF astronomy department
- Encouraged wider communication and a culture of collaboration between graduate students in the UF astronomy department by initiating and cultivating discussions about code and analysis issues
- Led twice-weekly journal club discussions with other graduate students, reviewing current research literature across a variety of sub-fields in astronomy

Graduate Teaching Assistant
UF Department of Astronomy

- Assisted undergraduate and graduated students with Python projects, including MCMC and Bayesian inference methods
- Introduced students to coding in a high performance environment, including tutorials on interfacing with SLURM and other cluster tools
- Gave lectures to non-STEM students covering basics of astronomy with hands-on labs covering telescope basics, spectroscopy, CCD cameras, and cosmology

Graduate Outreach Chair
UF Department of Astronomy

- During COVID, coordinated with the Florida Museum of Natural History to bring virtual lectures to K-8th grade schools across Florida, as part of the Scientist in Every Florida Classroom program
- Collaborated with local community and school district leaders to organize in-person astronomy outreach events including Starlab shows and hands-on activities at local elementary schools

Programming Experience

Languages: Python (7 years), Bash (5 years), Fortran (4 years), ANSI C (2 years), SQL (2 years)

Tools: MPI, hdf5, git