Andrew Gibbs

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EDUCATION

University of Connecticut Aug. 2022 - Present
Graduate Student Storrs, CT

- **Research** Astrophysics

University of Florida Aug. 2019 – May 2022
Bachelor of Science in Astrophysics with a Minor in Physics (GPA: 3.98/4.00) Gainesville, FL

- **Summa Cum Laude**
- **Coursework**:Machine Learning, Computational Astrophysics, Exoplanets, Compact Objects, Electromagnetism, Mechanics, Quantum Mechanics
- **Research**:Bayesian Inference of Quasar Absorption Line Spectroscopy

Santa Fe College Aug. 2017 – May 2019
Associate of Science in Astronomy (GPA: 4.00/4.00) Gainesville, FL

- **Coursework**: Calculus, Physics, Astronomy

EXPERIENCE

Teaching Assistant Fall 2022-Spring 2023
University of Connecticut Storrs, CT

- Employed by the Department of Physics at UConn.
- Ran labs and tutorial sessions for Physics 1 for Engineers and Elements of Physics.

Research Assistant May. 2022– Aug. 2022
University of Florida Gainesville, FL

- Finalized my undergraduate research at the University of Florida
- Continued daily meetings and 40 hour work weeks
- Uploaded my code and work onto a GitHub Repository.
- Became expericened in creting user defiend functions in Python as well as working with Linux.

Research Assistant May. 2021 – Aug. 2021
University of Florida Gainesville, FL

- During the summer of my final year as an undergraduate, I was able to work on my research project full time
- Made a routine of working up to 8 hours a day and 40 hours a week on research and sharing progress during daily meetings.
- Through this, I was able to get an idea of what my schedule would be like in a Graduate-level program or as an employed researcher.
- Was able to make significant progress and collaborated with professors and researchers from various institutions.

Teaching Assistant Spring 2021
University of Florida Gainesville, FL

- Worked for the Astronomy Department as an undergrad teaching assistant.
- During class I would help answer questions and ensure the online aspect of the class (as half of the class was online due to Covid-19) was running smoothly.
- Helped prepare students for homework assignments and exams by hosting virtual breakout rooms in class.

RESEARCH PROJECT

Model Comparison of Absorption Line Spectra Using Bayesian Evidence
Jan. 2020 – Present

Paul Torrey, Rongmon Bordoloi, Tansu Daylan, Jessica Werk

- Sampling Quasar Absorption Line Spectra using Markov Chain samplers to recover the physical properties of column density, Doppler broadening, and velocity.
- Use Bayesian Evidence to constrain column density and the overall number of parameters.
- Knowledgeable in Bayesian Statistics and various manipulations of Bayes' Theorem
- Developed proficiency in different sampling algorithms such as Dynesty and Emcee in order to determine which would be best for the project.
- Poster presentations on project for UF's Undergraduate research Symposium in May 2021 and at the American Astronomical Society's 239th Winter Meeting at Salt Lake City in January 2022.

PROGRAMMING PROJECTS

Sampling Quasar Absorption Line Spectra

- Coding featured in my research project, programs/languages used were: Python 3, Jupyter Notebook, Git, SLURM, Linux. Modules used: dynesty, emcee, matplotlib, numpy, scipy, astropy, and pandas.
- Started off using emcee as the sampling module, and later switched to a nested sampler, dynesty, to better compare models.
- Developed an understanding of Bayesian Statistics and how dynesty can approximate the Bayesian Evidence necessary for model comparison.

Various Computational/Machine Learning Projects

- Through different course work, I have made several python scripts that have successfully accomplished the following: Solving Differential Equations, Markov Chain Monte Carlo Sampling, Neural Networks, k Nearest Neighbors, Decision Trees, Support Vector Machines, bootstrapping, bolstering, RandomForests, ...
- All projects were made using Python 3 and Jupyter Notebooks. Within these projects, I used several modules such as: sklearn, numpy, emcee, matplotlib, and astropy.

Exoplanet Orbital Code / Transit Light Curve Predictions

- Used emcee to predict certain parameters from a transiting light curve of an exoplanet and its host star.
- Created a Jupyter notebook that would create a one planet system to graph/analyze the relative velocity of the star, and determine the shape of a transit on a light curve.

TALKS and PRESENTATIONS

American Astronomical Society Summer Meeting 240
June 2022

Poster Presentation

- Created an i-Poster at the AAS 240 Summer Meeting in Pasadena, CA.
- Poster highlighted my research with text, figures and animated gifs showcasing the sampling algorithm.

Senior Thesis Presentation
April 2022

Slideshow Presentation

- Created a 10 minute presentation on the undergraduate research I had done while at the University of Florida under Dr. Paul Torrey.
- Presented to other undergraduates as well as various faculty present.

University of Florida Center of Undergraduate Research Symposium
May. 2021

Poster Presentation

- Hosted a Zoom room for 2 hours while attendees rotated through the projects. Presented my research project and answered any questions those in my room had.

The Importance of Undergraduate Research Jan. 2021 and Oct. 2021

Slideshow Presentation

- Presented slides to Astronomy and Astrophysics Society at the University of Florida on why undergraduate research is a valuable skill and how it can be conducted.

OUTREACH

Department of Astronomy Outreach Committee - Undergraduate Representative Oct. 2021 – May 2022

University of Florida

- Served as undergraduate representative during Outreach Committee meetings
- Shared ideas and brainstormed on how to perform outreach within the local community and represent the Department.

UF Astronomy and Astrophysical Society - Treasurer Aug. 2017 – May 2022

University of Florida

- Student Organization ran by the Astronomy Department
- Organized fundraisers, held club funds, participated in outreach events with the club such as tabling, planetarium trips, inflatable star lab, club meetings, and Starry Nights.

Starry Nights Nov. 2017 – Nov. 2019

Florida Museum of Natural History

- Volunteered at a public outreach event dedicated to local astronomical groups.
- While at Santa Fe I would go representing the on campus planetarium and walk around teaching attendees about the night sky and about planetariums.
- While at the University of Florida, I would represent the Astronomy and Astrophysics Society and host mini-planetarium shows in our "Star-Labs".
- Cancelled in 2020 and 2021 due to Covid-19 concerns.

Kika Silva Pla Planetarium Aug. 2017 – May 2019

Santa Fe College

- Volunteered and then was later employed at the on-campus Planetarium with the Director, James Albury.
- During the week, I would present shows to smaller groups such as local clubs or field trips from nearby schools as well as classes at Santa Fe.
- On the weekend I would present our main shows to as many as 60 people. Show topics included: the night sky, the Solar System, Black Holes, Cosmology, Stellar Evolution, and the History of Astronomy.
- Developed a skill for local astronomy. While working there I was able to identify 50+ stars and objects visible to the naked eye.
- Also became skilled in presenting complex ideas or topics to the public in a way that was easy to understand.

PROGRAMMING SKILLS

Languages : Python, MATLAB, Maple, Anaconda

Tools : Git, GitHub, Jupyter Notebook

HONORS and AWARDS

Summa Cum Laude : Graduated with highest honors from the the University of Florida in May 2022. Distinction was awarded based on senior thesis.

Phi Beta Kappa : Elected as a Graduating Senior to the University of Florida Chapter in March of 2022.

Deans List : Spring 2019, Fall 2019 , Spring 2020, Fall 2020, Spring 2021

University Scholar Scholarship : Fall of 2020 and Spring of 2021. Awards given to those with exemplary work in undergraduate research at the University of Florida

Presidential Honor Roll : Fall 2019