

# GRiffin T. GOODWIN

Ph.D. Graduate Student in Astronomy

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## EDUCATION

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5/2022 - Present	<b>Georgia State University</b> Candidate for Ph.D. in Astronomy - <b>NASA FINESST Fellow</b> GPA: 4.20/4.30	Atlanta, Georgia
8/2018 - 5/2022	<b>Georgia Institute of Technology</b> Bachelor of Science in Physics Concentration in Astrophysics, Minor in Computational Data Analysis GPA: 3.94/4.00	Atlanta, Georgia
8/2017 - 5/2018	<b>Kennesaw State University</b> High School Dual Enrollment GPA: 4.00/4.00	Kennesaw, Georgia

## PUBLICATIONS

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10/2025	<b>FOXES: A Framework For Operational X-ray Emission Synthesis</b> <i>Goodwin, G.T. et al, arXiv</i>	<a href="#">arXiv Link</a>
3/2025	<b>The Impacts of Magnetogram Projection Effects on Solar Flare Forecasting</b> <i>Goodwin, G.T. et al, The Astrophysical Journal</i>	<a href="#">IOP Link</a>
3/2024	<b>Investigating Performance Trends of Simulated Real-time Solar Flare Predictions: The Impacts of Training Windows, Data Volumes, and the Solar Cycle</b> <i>Goodwin, G.T. et al, The Astrophysical Journal</i>	<a href="#">IOP Link</a>

## RESEARCH

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6/2025 - Present	<b>HelioLab Researcher</b> Advisors: Angelos Vourlidas, Christoph Schirniger, Robert Jarolim, Lorien Pratt Collaborating with an interdisciplinary team of expert data scientists and heliophysicists to address critical challenges in the space weather community through the application of machine learning methodologies. Specifically, our team has been able to develop a model capable of accurately localizing individual solar flares and quantifying their intensities by applying a vision transformer architecture to extreme ultraviolet (EUV) solar imagery input data.	Frontier Development Lab - Remote
5/2022 - Present	<b>Graduate Student</b> Advisors: Petrus Martens, Viacheslav Sadykov, Dustin Kempton Developing machine learning and visualization approaches for solar flare prediction using Georgia State's Space Weather Analytics for Solar Flares (SWAN-SF) dataset.	Georgia State University - Atlanta, Georgia
8/2021 - 5/2022	<b>Undergraduate Research Assistant</b> Advisor: James Sowell Used R, B, V, and Transiting Exoplanet Survey Satellite light curve data to determine various stellar parameters (temperature, radius, mass ratio, luminosity, period, etc.) of the eclipsing binary star system AK UMi.	Georgia Institute of Technology - Atlanta, Georgia
6/2021 - 8/2021	<b>NSF Physics REU</b> Advisor: Heidi Newberg Determined the absolute magnitude distribution of color-selected main-sequence turnoff stars in eight Milky Way halo globular clusters from the Dark Energy Survey Data Release 2.	Rensselaer Polytechnic Institute - Troy, New York (Remote)

## CONFERENCES

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9/2025	<b>Machine Learning in Heliophysics</b> Poster: FOXES: A Framework for Operational X-ray Emission Synthesis / An EUV Extension To The SWAN-SF Flare Forecasting Dataset	Madrid, Spain
6/2025	<b>Solar Heliospheric and Interplanetary Environment</b> Session Organizer: Intertwining Physics-Based Simulations and Machine Learning in Heliophysics: How Can We Do It and Why Do We Need It? & Poster: An EUV Extension To The SWAN-SF Flare Forecasting Dataset	Charleston, South Carolina

3/2025	<b>Space Weather Workshop</b> <b>Selected Lighting Talk</b> & Poster: <i>Assessing the Impacts of Magnetogram Projection Effects on Solar Flare Forecasting and Extending the SWAN-SF Dataset</i>	Boulder, Colorado
12/2024	<b>American Geophysical Union</b> Poster: <i>The Impacts of Magnetogram Projection Effects on Solar Flare Forecasting</i>	Washington, DC
10/2024	<b>Annual International AL Plasma Physics Conference</b> <b>Invited Talk</b> : <i>The Data Mining Lab at Georgia State University: Harnessing Big Data and AI for Solar Transient Event Forecasting</i>	Huntsville, Alabama
8/2024	<b>Solar Heliospheric and Interplanetary Environment</b> Poster: <i>The Impacts of Magnetogram Projection Effects on Solar Flare Forecasting</i>	Juneau, Alaska
1/2024	<b>243rd American Astronomical Society</b> Poster: <i>Investigating Performance Trends of Simulated Real-time Solar Flare Predictions: The Impacts of Training Windows, Data Volumes, and the Solar Cycle</i>	New Orleans, Louisiana
11/2023	<b>Georgia Regional Astronomy Meeting</b> Poster: <i>Investigating Performance Trends of Simulated Real-time Solar Flare Predictions: The Impacts of Training Windows, Data Volumes, and the Solar Cycle</i>	Atlanta, Georgia
8/2023	<b>Solar Heliospheric and Interplanetary Environment</b> Poster: <i>Investigating Performance Trends of Simulated Real-time Solar Flare Predictions: The Impacts of Training Windows, Data Volumes, and the Solar Cycle</i>	Stowe, Vermont
4/2023	<b>Space Weather Workshop</b> Poster: <i>Exploring Performance Trends of Simulated Real-time Solar Flare Predictions</i>	Boulder, Colorado
12/2022	<b>American Geophysical Union</b> Poster: <i>Exploring Performance Trends of Simulated Real-time Solar Flare Predictions</i>	Chicago, Illinois
10/2021	<b>Council on Undergraduate Research REU Symposium</b> Poster: <i>Mapping Milky Way Halo Substructure Using Dark Energy Survey Data</i>	Remote

## PROJECTS

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5/2022 - Present	<b>Data Mining Lab</b> Member of a collaborative group of computer scientists and astronomers focused on space weather prediction. We meet monthly to give updates on the current research being done in the group.	Georgia State University - Atlanta, Georgia
5/2022 - 12/2022	<b>Orbits of Outer-Solar System Bodies</b> Used decision tree, support vector machine, and neural network models to classify unknown outer-Solar System bodies as Jupiter trojans, centaurs, or trans-Neptunian objects based on a variety of orbital and physical characteristics.	ASTR 8850 – Georgia State University – Atlanta, Georgia
5/2022 - 12/2022	<b>Active Region Rotation Rates &amp; Projection Effects</b> Explored the relationship between active region rotation rates and their strengths, along with analyzing the impact of magnetogram projection effects on solar flare forecasting.	ASTR 8140 – Georgia State University – Atlanta, Georgia
1/2022 - 5/2022	<b>MARTAVIZ</b> Used Node.js to develop a visualization that can intuitively display MARTA bus arrival times. This application was consistently rated higher than the existing MARTA On The Go app based on an anonymous 15 person survey.	CX 4242 – Georgia Institute of Technology – Atlanta, Georgia
1/2021 - 5/2021	<b>Stroke Prediction</b> Used naïve Bayes, logistic regression, support vector machine, and decision tree models to predict strokes in patients. The project resulted in a model with a 75% stroke accuracy and a 70% non-stroke accuracy.	CX 4240 – Georgia Institute of Technology – Atlanta, Georgia
1/2021 - 5/2021	<b>Big Data &amp; Quantum Mechanics</b> Generated trajectory data using simulations based on density-functional theory and trained neural network machine learning models to predict the associated energies and forces.	VIP 3601 – Georgia Institute of Technology – Atlanta, Georgia

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**SKILLS**

- Physics:** Solar Physics, Space Weather, Astronomy, Electrostatics and Dynamics, Quantum Mechanics, Classical Mechanics, Statistical Mechanics, Thermodynamics, Neutrino-physics
- Programming:** Python, SQL, C, OpenMP, Java, HTML, JavaScript/D3, MATLAB, Julia
- Mathematics:** Multivariable Calculus, Statistics, Differential Equations, Linear Algebra
- Packages:** Scikit-learn, Pandas, Matplotlib, Seaborn, PyTorch, Sunpy, Astropy, NumPy
- Software:** LaTeX, Tableau, Google Cloud Platform, Microsoft Office, Linux

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**AWARDS**

- FINESST Fellow**, NASA (9/2023 - 9/2026)
- ML-Helio Travel Grant**, (9/2025)
- Space Weather Workshop Student Travel Aid**, Georgia State University (4/2023 & 3/2025)
- SHINE Student Travel Aid**, Georgia State University (8/2023 & 8/2024)
- Second Century Initiative Fellow**, Georgia State University (9/2022 - 9/2023)
- President's Undergraduate Research Award**, Georgia Institute of Technology (12/2021)
- Faculty Honors**, Georgia Institute of Technology (2018 - 2020, 2022)
- Dean's List**, Georgia Institute of Technology (2018 - 2022)