

GRIFFIN T. GOODWIN

Ph.D. Graduate Student in Astronomy

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EDUCATION

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

PUBLICATIONS

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

RESEARCH

6/2025 - Present	HelioLab Researcher <i>Advisors: Angelos Vourlidas, Christoph Schirninger, Robert Jarolim, Lorien Pratt</i> 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	Graduate Student <i>Advisors: Petrus Martens, Viacheslav Sadykov, Dustin Kempton</i> 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	Undergraduate Research Assistant <i>Advisor: James Sowell</i> 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	NSF Physics REU <i>Advisor: Heidi Newberg</i> 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

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

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

PROJECTS

5/2022 - Present	Data Mining Lab 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	Orbits of Outer-Solar System Bodies 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	Active Region Rotation Rates & Projection Effects 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	MARTAVIZ 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	Stroke Prediction 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	Big Data & Quantum Mechanics 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

SKILLS

Physics:	Solar Physics, Space Weather, Astronomy, Electrostatics and Dynamics, Quantum Mechanics, Classical Mechanics, Statistical Mechanics, Thermodynamics, Neuropysics
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

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)