GRIFFIN T. GOODWIN

Ph.D. Graduate Student in Astronomy
Atlanta, Georgia

770-861-0288 | ggoodwin5@gsu.edu
/griffin-goodwin/ | /in/griffin-goodwin/

EDUCATION

5/2022 – Present **Georgia State University** — **Atlanta, Georgia**
Ph.D. Candidate in Astronomy (anticipated graduation 10/2026) – **NASA FINESST Fellow**
Master of Science in Physics (2024)
GPA: 4.19/4.30

8/2018 – 5/2022 **Georgia Institute of Technology** — **Atlanta, Georgia**
Bachelor of Science in Physics
Concentration in Astrophysics, Minor in Computational Data Analysis
GPA: 3.94/4.00

EXPERIENCE

6/2025 – Present **HelioLab Researcher** — **Frontier Development Lab**
Advisors: Angelos Vourlidas, Robert Jarolim, Viacheslav Sadykov, Christoph Schirninger, Lorien Pratt
Collaborated with an interdisciplinary team of data scientists and heliophysicists to address critical challenges in space weather through machine learning (ML). Developed a Vision Transformer-based regression and localization model using a large-scale dataset of over 200,000 extreme ultraviolet (EUV) solar images (3,300+ hours of observations). The model accurately identifies the locations and intensities of individual solar flares, achieving a 79% reduction in RMSE over a simple baseline. Our data and model are publicly deployed on Hugging Face Spaces, enabling real-time inference via web interface. Read more about this project at my Frontier Development Lab blog post here.

5/2022 – Present **Graduate Student - Sun and Space Environment Team (SunSET)** — **Georgia State University**
Advisors: Petrus Martens, Viacheslav Sadykov, Dustin Kempton
Awarded the competitive NASA FINESST Fellowship to develop ML-based solar flare forecasting models using magnetogram and EUV time series data (2012-2018). Explored multiple architectures (LSTMs, CNNs, SVMs, ensemble methods) for binary flare prediction. Currently building an end-to-end data pipeline to extend the TB-scale SWAN-SF benchmark dataset, including automated ingestion, preprocessing, feature engineering, and MySQL database storage. Provide technical mentorship to a CS graduate student through weekly meetings, code reviews, and research direction guidance. Served as TA for introductory astronomy labs over two years.

8/2021 – 5/2022 **Undergraduate Research Assistant** — **Georgia Institute of Technology**
Advisor: James Sowell
Analyzed R, B, V, and TESS light curve data to determine stellar parameters (temperature, radius, mass ratio, luminosity, period) of the eclipsing binary star system AK UMi.

6/2021 – 8/2021 **NSF Physics REU** — **Rensselaer Polytechnic Institute**
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.

TECHNICAL SKILLS

Languages: Python, SQL, C, OpenMP, Java, HTML, JavaScript/D3, MATLAB, Julia

ML/AI: Scikit-learn, PyTorch, TensorFlow, Keras, XGBoost, Vision Transformers, Ensemble Methods

Data: Pandas, NumPy, Matplotlib, Seaborn, SciPy

Cloud/Tools: Hugging Face, Google Cloud Platform, Docker, Git, Linux, Spark, MySQL, Tableau, LaTeX, Excel

Expertise: Machine Learning, Data Science, Predictive Modeling, Data Visualization, Feature Engineering

AWARDS & HONORS

NASA FINESST Fellow - $150,000 Grant (2023 – 2026)

ML-Helio Travel Grant (2025)

Space Weather Workshop Travel Aid (2023, 2025)

SHINE Student Travel Aid (2023, 2024, 2026)

Second Century Initiative Fellow, GSU (2022 – 2023)

President's Undergraduate Research Award, Georgia Tech (2021)

Dean's List, Georgia Tech (2018 – 2022)

SELECTED PROJECTS

12/2025 – Present **SOL.SWx** App Store Link
iOS app built in Swift integrating live data from NASA and NOAA public APIs. Published on the App Store with 120+ downloads.

5/2022 – Present **Data Mining Lab Member** Georgia State University
Collaborative research group of computer scientists and astronomers focused on space weather prediction through machine learning applications.

5/2022 – 12/2022 **Outer-Solar System Body Classification** ASTR 8850 – Georgia State University
Developed decision tree, SVM, and neural network classifiers to categorize unknown outer-Solar System bodies as Jupiter trojans, centaurs, or trans-Neptunian objects based on orbital and physical characteristics.

1/2022 – 5/2022 **MARTAVIZ: Transit Visualization Application** CX 4242 – Georgia Institute of Technology
Built Node.js visualization tool for MARTA bus arrival times, rated higher than official app by 15-person user study.

1/2021 – 5/2021 **Stroke Prediction Project** CX 4240 – Georgia Institute of Technology
Implemented naïve Bayes, logistic regression, SVM, and decision tree models achieving 75% stroke prediction accuracy and 70% non-stroke accuracy.

SELECTED PUBLICATIONS

2026 **Improving Solar Flare Soft X-ray Classification With FOXES** Submitted
Goodwin, G.T. et al.

10/2025 **FOXES: A Framework For Operational X-ray Emission Synthesis** arXiv
Goodwin, G.T. et al., arXiv
Accepted to the ML4PS Workshop at NeurIPS

3/2025 **The Impacts of Magnetogram Projection Effects on Solar Flare Forecasting** ApJ
Goodwin, G.T. et al., The Astrophysical Journal

3/2024 **Investigating Performance Trends of Simulated Real-time Solar Flare Predictions** ApJ
Goodwin, G.T. et al., The Astrophysical Journal

SELECTED CONFERENCES & PRESENTATIONS

9/2025 **Machine Learning in Heliophysics** Madrid, Spain
Poster: *FOXES: A Framework for Operational X-ray Emission Synthesis*

6/2025 **Solar Heliospheric and Interplanetary Environment** Charleston, South Carolina
Session Organizer: Intertwining Physics-Based Simulations and Machine Learning in Heliophysics

3/2025 **Space Weather Workshop** Boulder, Colorado
Selected Lightning Talk: *Assessing the Impacts of Magnetogram Projection Effects on Solar Flare Forecasting*

10/2024 **Annual International AL Plasma Physics Conference** Huntsville, Alabama
Invited Talk: *The Data Mining Lab at GSU: Harnessing Big Data and AI for Solar Transient Event Forecasting*