

# Yu Chen

[ychen.adastra@gmail.com](mailto:ychen.adastra@gmail.com) | 256.585.7439 | [LinkedIn/yu-chen-astra](https://www.linkedin.com/in/yu-chen-astra) | [ychenxastra.github.io](https://github.com/ychenxastra)

## EDUCATION

Doctor of Philosophy, Space Science, THE UNIV. OF ALABAMA IN HUNTSVILLE  
Master of Science, Space Science, THE UNIV. OF ALABAMA IN HUNTSVILLE  
Bachelor of Science, Atmospheric Science, NANJING UNIV. OF INFO. SCI. AND TECH.

June 2018 - Dec 2020  
Aug 2015 - May 2018  
Sep 2011 - June 2015

## WORK EXPERIENCE

### CENTER FOR SPACE PLASMA AND AERONOMIC RESEARCH

RESEARCH SCIENTIST

POSTDOCTORAL RESEARCHER

Huntsville, AL

Jan 2023 - present

Jan 2021 - Dec 2022

- **Analyzed** extensive high-resolution spacecraft datasets spanning over 50 years (over 50GB) and **designed** data science **algorithms** with scientific computing applications to investigate solar wind structures. **Applied time-series, statistical analyses, and case study methodologies** to derive comprehensive insights.
- **Visualized** data products and **summarized** findings into **20 peer-reviewed journal publications**. **Presented** key insights through oral presentations and posters at large **conferences** for **18 times**, effectively communicating complex information to both expert and non-expert audiences.
- **Administered and updated** the small-scale magnetic flux rope database at fluxrope.info, ensuring public accessibility. **Developed and managed** the team website, facilitating dissemination of valuable information.
- **Led** two national research grants as **Principal Investigator**, contributed as a **Co-Investigator** to multiple projects over \$2 million. **Collaborated** with scholars across institutions and **mentored** a non-physics undergraduate in the National Science Foundation (NSF) funded undergraduate research program.
- Served as a **peer reviewer** for NSF, NASA panels, and the Astrophysical Journal, ensuring the integrity of science through rigorous evaluations and **constructive feedback** for around 20 articles and proposals.

## PROJECTS

### PYGS: A PYTHON PACKAGE FOR FLUX ROPE ANALYSIS

PYTHON, NUMPY, PANDAS, SCIPY, MATPLOTLIB

- **Optimized** the existing detection algorithm by incorporating new theoretical concepts and complex data analytics. **Migrated** separate Matlab-based techniques to Python 3, refactored and merged over 30 scripts into a **modular Python library**, substantially minimizing manual intervention in data processing workflows.
- **Implemented technical upgrades** on several modules including enhancing the cleaning of raw data, reducing both time and space complexity. **Streamlined the architecture** to boost operational efficiency, resulting in a **100x faster** in performance and significantly broadening the applicability for various analytical needs.
- Released the open-source package on GitHub, successfully met the standards and listed on the Python in Heliophysics Community website. **Provided tutoring** and comprehensive instructions to users through **detailed documentation**, and disseminated the package to the wider scientific community.

### DATABASE OF SMALL-SCALE MAGNETIC FLUX ROPE (SFR)

PYTHON, MATLAB, EXCEL

- **Implemented detection** for large spacecraft datasets exceeding 50 GB and **designed** sophisticated filtering algorithms to sift through over 200k event candidates. Aggregated qualified SFRs into an online database.
- Utilized **statistical methods**, such as linear regression, to conduct an **in-depth analysis** of distinctive properties. **Presented** parameters and time-series variations in various visual formats, enhancing data interpretability.
- Expertly interpreted variances among different groups, provided clear, **data-driven insights** for formulating and testing hypotheses. **Summarized findings** through detailed publications and presentations, thereby enriching the scientific community's understanding of the object.

### ANALYSES OF FOOTBALL MATCHES AND PREDICTING RESULTS

PYTHON, SCIKIT-LEARN, SEABORN

- **Analyzed** the Kaggle dataset of the English Premier League (spanning over 20 years), with a special focus on Manchester United. **Visualized statistics** to uncover various factors influencing team performance.
- **Constructed machine learning pipelines** to predict match outcomes using various models such as Naive Bayes, Adaboost, and Random Forest, etc. **Assessed the optimal model** based on metrics and applicability.
- **Refined model accuracy** through advanced techniques like rolling averages, strategic feature selection, and principal component analysis (PCA). Integrated empirical findings with real-world scenarios and conducted comprehensive analyses to address the underlying causes of suboptimal model performance.

## SKILLS

Programming Languages: Python, Matlab, SQL, C/C++

Technology and Tools: GitHub,  $\LaTeX$ , Jupyter Notebook, Microsoft Office