Yu Chen

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EDUCATION

Doctor of Philosophy, Space Science, The Univ. of Alabama in Huntsville   June 2018 - Dec 2020
Master of Science, Space Science, The Univ. of Alabama in Huntsville   Aug 2015 - May 2018
Bachelor of Science, Atmospheric Science, Nanjing Univ. of Info. Sci. and Tech.   Sep 2011 - June 2015

WORK EXPERIENCE

CENTER FOR SPACE PLASMA AND AERONOMIC RESEARCH   Huntsville, AL
Research Scientist   Jan 2023 - present
Postdoctoral Researcher   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** the detection to multiple spacecraft datasets over 50 GB, and **designed conditional criteria** to filter through over 200k event candidates, and aggregated qualified SFRs into an accessible online database.
- **Displayed physical parameters** and showcased time-series variations for each event, **conducted an in-depth** analysis of distinctive properties, **illustrated findings** through statistical measures such as mean values, linear regression parameters. **Presented results** in both 2D and 3D visual formats, enhancing interpretability.
- **Interpreted nuances** between different groups, **formulated hypotheses** about intrinsic relationships, and **summarized insights** in publications and presentations, contributing valuable knowledge to the field.

ANALYSES OF FOOTBALL MATCHES AND PREDICTING RESULTS ⬈   Python, Scikit-learn, Seaborn

- **Analyzed** the Kaggle dataset of the English Premier League (spanning over 20 years), focusing on a case study of Manchester United. Visualized statistical data and explored various factors influencing team performance.
- **Implemented 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** by applying rolling averages, strategic feature selection, and principal component analysis (PCA). Integrated findings with real-world scenarios and conducted comprehensive analyses to address the root causes of suboptimal model performance.

SKILLS

Programming Languages: Python, Matlab, MySQL, C/C++
Technology and Tools: GitHub, LaTeX, Jupyter Notebook, Microsoft Office