Aoife McCloskey

Ph.D.

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Location
Berlin,
Germany

Web
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Programming

Python
IDL
R
SQL
HTML
PHP
C++

Skills

Data Mining
Probability/Statistics
Machine Learning
Sci-kit Learn
Pandas
Numpy
Linux
QGIS
Pytorch
Git

Executive Summary

*Enthusiastic scientist with extensive experience in **computer programming**, **mathematics** and **statistics**. Developed a novel **forecasting model** that improved the forecasting of solar flares using modern **machine learning** techniques. **Co-founded** an educational company (Codify Ltd.) that taught **Python programming** courses to adults. Exceptional ability to **communicate complex ideas** and concepts to a wide range of audiences. Passionate about understanding the stories that lie within data and using these insights to provide solutions to **challenging real-world problems**.*

Relevant Experience

2020-2022 **Machine Learning for Space Weather** **Dept. of Space Weather Impact, DLR**

Carried out ML research and led a project on the topic of Space Weather impacts on German infrastructure & satellites

- Led a team on a project to assess the impact of space weather on the German Electricity Network. Within 1 year developed a geospatial model that estimated the vulnerability of the power grid to geomagnetic disturbances using SQL, QGIS & Scipy.
- Developed a new ML method to predict solar wind arrival timing for satellites which led to >50% improvement over previous methods.
- Led my own research project to continue to develop & improve my flare forecasting model. Applied additional ML techniques that led to a two-fold increase in the prediction power of the model.

2014-2019 **PhD Researcher** **Astrophysics Research Group, Trinity College Dublin**

Carried out research in the area of Space Weather to improve the forecasting of Solar Flares

Statistical Flare Forecasting Project

- Cleaned, analysed and optimised 30+ years of historical data catalogues using Python libraries e.g., Pandas, Numpy
- Developed a new predictive model for solar flares using a combination of statistical techniques and machine learning methods (e.g. K-Nearest Neighbour, Logistic Regression, Random Forests etc.) via Sci-Kit Learn
- Quantified the improvement and impact of my forecasting models using verification techniques (i.e. skill scores) which yielded a >30% improvement over previous models.

SolarMonitor Website Developer

- Collaborated with an international team in developing a website that provided real-time information on solar activity at SolarMonitor.org.
- Developed full-stack code to improve the stability and efficiency of the data pipeline, gained experience using version-control software (Git) and implemented my new flare forecasting model (Flare Prediction System) which runs forecasts daily.

2016-2018 **Co-Founder** **Codify Ltd.**

Co-founded Codify Ltd. which provided data science and Python programming workshops in Dublin for adults.`

- Created curricula for courses, including an 8-week ”Introduction to Python” and 3-day intensive “Python for Scientists” programme.
- Organised 50+ classes and taught 200+ students to date.
- Mentored students in the creation of their own data science projects including: NLP, House Price Prediction using ML, Twitter Bots and NYPD Data Analysis

Languages

English (Fluent)
German (Level A2/B1)

Awards

2014-2018
Irish Research Council
Postgraduate Scholarship

2018
US Space Weather Workshop
Student Travel Award

2015
Trinity College Dublin
PG Teaching Excellence Award

2012 & 2013
Trinity College Dublin
First Class Book Prize

Interests

Dancing
Yoga
Meditation
Music
Travel

References

Available Upon Request

Education

2014-2018 **Ph.D. in Astrophysics** **Trinity College Dublin, Ireland**
Funded by the Irish Research Council Postgraduate Scholarship Program
Thesis: Magnetic Characteristics of Sunspot Groups and their Role in Producing Adverse Space Weather

2014-2015 **Postgraduate Certificate in Statistics, I** **Trinity College Dublin, Ireland**
35 ECT course in frequentist statistics

2010-2014 **B.A. Mod. in Astrophysics, II.I** **Trinity College Dublin, Ireland**
Thesis: Connecting Geomagnetic Storms in Ireland to Coronal Mass Ejections

Publications

Baumann, C., **McCloskey, A. E.** (2021)
"Timing of the solar wind propagation delay between L1 and Earth based on machine learning"
Journal of Space Weather and Space Climate, 11, 41

Leka, K. D., Park, S. H., [et. al, including **McCloskey, A. E.**] (2019)
"Comparison of Flare Forecasting Methods. II. Benchmarks, Metrics and Performance Results for Operational Solar Flare Forecasting Systems"
The Astrophysical Journal Supplement Series

McCloskey, A. E., Gallagher, P. T., Bloomfield, D. S. (2018)
"Flare forecasting using the evolution of McIntosh sunspot classifications"
Journal of Space Weather and Space Climate, 8, A34

McCloskey, A. E., Gallagher, P. T., Bloomfield, D. S. (2016)
"Flaring rates and the evolution of sunspot group McIntosh classifications"
Solar Physics, 291, 6, 1711-1738

Conferences, Events & Communication

Oct 2019 **Predict Conference** Dublin, Ireland
Session host at Europe's leading Predict Data Science Conference (1000+ attendees)

2014-2017 **Sunspotter Project** Dublin, Ireland
Visited 20+ primary & secondary schools all over Ireland presenting workshops about the importance of sunspots and their role in Space Weather.

Feb 2017 **Bright Club** Dublin, Ireland
Invited to give a talk/stand-up comedy gig about my field of research to an audience of 100+ people

May 2016 **Mercury Transit 2016** Trinity College Dublin, Ireland
Organised and co-hosted an event that invited the public (>1000 attendees) to come and witness the transit of Mercury in Trinity College Dublin. Event gained press coverage and was covered in the national newspapers.

Mar 2015 **Solar Eclipse 2015** Trinity College Dublin, Ireland
Organised and co-hosted a public event that invited the public (>1000 attendees) to come and view the solar eclipse in Trinity College Dublin. Event gained significant press coverage and was covered on the national news (RTE).