SACHIN ALEXANDER REDDY

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EDUCATION

2020 – Present
PhD in Space Physics, University College London
Investigating terrestrial space plasmas via machine learning and simulations
Supervisors: *Colin Forsyth, Anasuya Aruliah & Gethyn Lewis*

2022 – Present
Visiting Research Student, California Institute of Technology

2018 – 2019
MSc in Systems Engineering & Space Systems, University College London
Grade: *Distinction*
Awards: *Best Overall Performance 2018* and *Best Research Project 2018*

2010 – 2015
BSc in Computer Science & Business, Oxford Brookes University
Grade: *Second Class Honours.*

RESEARCH EXPERIENCE

February 2023 – Present
Research Affiliate, NASA Jet Propulsion Laboratory
Modelling plasma dynamics in the near-space environment
Advisors: Xiaoqing Pi & Olga Verkhoglyadova, Ionospheres Group

October 2022 – December 2022
Research Intern, NASA Jet Propulsion Laboratory
Assessing the habitability of Jupiter's moon Europa
Advisors: Tom Nordheim & Kevin Hand, Ocean Worlds Laboratory

July 2020 – February 2022
Operations Engineer, Mullard Space Science Laboratory
Analysis and troubleshooting of in-flight data on SOAR. Testing pre-flight scripts for spectrometer on CIRCE. Creation of fitting routines and modelling techniques.

TEACHING EXPERIENCE

November 2021 – Present
Mentor, Orbyts Education Programme
Teach 14-15yr old pupils space physics, Python in Colab, and research skills. Work exclusively with students from under-represented and non-privileged backgrounds

October 2020 – Present
Teaching Assistant, University College London
Taught: Space Systems, Systems Thinking and Engineering Management
Audited: Machine Learning with Big Data and Space Plasma Physics

Spring 2020
Teaching Assistant, University of Bath
Tutored on *Introduction to Python* module. Co-supervised 3 undergraduate students for their final year projects. Invigilated exams and cross-checked assessment marks

INDUSTRY EXPERIENCE

April 2018 – July 2018 **Design Engineer**, Synergy Circuits - Bengaluru, India
Designed next gen. circuit boards for use in commercial and semiconductor systems. Created diagrams of systems architectures to visualise product relationships and highlight potential pitfalls

March 2016 – April 2017 **Process Engineer**, Gorilla Circuits – San Jose, USA
Led 20+ experiments to improve the manufacture of advanced circuit boards for clients such as Waymo. Deployed inferential statistics on manufacturing data which improved yield by 4% and productivity by 9%. Trained 30+ colleagues on operating procedures

CORE SKILLS

Data Science
Inferential statistics (correlation/association, regression analysis, analysis of variance, hypothesis testing), summary statistics, dispersion analysis, experiment design

Programming
Proficient: Python {import scipy, numpy, pandas, seaborn}, LaTeX, git
Familiar with: SQL, MATLAB

Machine Learning
Ensemble learning, explainable AI (XAI), Shapley values, recurrent neural networks
Modules {import Tensorflow, Keras, sklearn, shap}

Apps
VSCode, Colab, Github, Overleaf, MiniTab, Workspace

PUBLICATIONS

2023 **Reddy, S.**, et al. Predicting Swarm Equatorial Plasma Bubbles via Machine Learning and Shapley Values. Journal of Geophysical Research: Space Physics. (Under Review)

Reddy, S., et al. Surface Charging of Jupiter's Moon Europa. Geophysical Research Letters. (Draft Stage)

2022 **Reddy, S.**, et al. CubeSat measurements of thermospheric plasma: spacecraft charging effects on a plasma analyzer. CEAS Space J (2022). https://doi.org/10.1007/s12567-022-00439-y Link

REFERENCES

Dr Tom Nordheim, Research Scientist at NASA Jet Propulsion Laboratory
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Prof. Anasuya Aruliah, Professor of Ionospheric Physics at UCL
a.aruliah@ucl.ac.uk