SACHIN ALEXANDER REDDY

email • twitter

Education

2020 – Present
UCL, Mullard Space Science Laboratory [MSSL]
PhD in Space Physics
Thesis: *Particles and plasma structures in Earth's ionosphere*
Supervisors: *Colin Forsyth, Anasuya Aruliah, Dhiren Kataria & Gethyn Lewis*

Oct 2022 – Dec 2022
California Institute of Technology
Visiting Research Student

2018 – 2019
UCL, MSSL
MSc in Systems Engineering & Space Systems
Grade: *Distinction | GPA: 3.88 / 4.0*
Awards: Highest mark & best research project

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

Research Experience

February 2023 – Present
Research Affiliate, NASA Jet Propulsion Laboratory
Doing something cool Supervisor: Xiaoqing Pi, Ionospheres Group

October 2022 – December 2022
Research Intern, NASA Jet Propulsion Laboratory
Modelling surface-plasma interactions at Jupiter's moon Europa. Supervisor: Tom Nordheim, Planetary Science Division.

July 2020 – February 2022
Ops. Engineer, MSSL
In-flight operations of plasma analyzer on SOAR CubeSat. Pre-flight testing of ion spectrometer on CIRCE CubeSat. Creation of fitting routines and modelling techniques.

October 2019 – June 2020
Researcher, University of Bath
Developed advanced remote sensing techniques to improve the assessment of earthquake induced building damage. Supervisors: Giorgina Giardina [TU Delft] & Pietro Milillo [NASA JPL].

Teaching Experience

November 2021 – Present
Teacher, Orbyts Education Programme
Teach a class of 14-15 yr old students space plasma physics, Python, and research skills. Scheme focuses on pupils from under-represented and non-privileged backgrounds.

October 2020 – Present
Teaching Assistant, UCL
Taught: Space Systems, and Systems Thinking and Engineering Management. Audited: Machine Learning with Big Data. Co-supervise student for masters research project.

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

Industry Experience

April 2018 – July 2018
Design Engineer, Synergy Circuits – Bengaluru, India
Designed complex printed circuit boards for use in space and defence systems.

March 2016 – April 2017
Process Engineer, Gorilla Circuits – San Jose, USA
Spearheaded 20+ projects to improve the manufacture of mission critical printed circuit boards. Defined and implemented actions for faults based on FMEA. Trained 30+ colleagues and developed standard operation procedures to improve productivity.

Skills

Programming Languages
Python: numpy, pandas, xarray, seaborn
Also proficient in: LaTeX, git
Familiar with: SQL, MATLAB

Machine Learning
Deep Learning (DL), Explainable AI (XAI), Data Visualisation
Tensorflow, Keras, sklearn, shap
Interested in: Generative Networks (GAN) & Reinforcement Learning (RL)

Applications
VSCode, Jupyter / Colab, Github, Overleaf

Science
Space plasma physics, ionospheric physics, data science

Publications

2022
Reddy, S., et al. (2022). Predicting Swarm Equatorial Plasma Bubbles via Machine Learning and Shapley Values. Journal of Geophysical Research: Space Physics, (Submitted)

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

Conferences, Events & Press

Topic: Predicting SWARM Equatorial Plasma Bubbles & Machine Learning
AGU Fall Meeting, December 2022 [talk]
Triennial Earth Sun Summit, August 2022 [talk]
National Astronomy Meeting, July 2022 [talk]
RAS Specialist Discussion Meeting, April 2022 [poster]
Machine Learning in Heliophysics, March 2022 [poster]

Topics: Measuring Equatorial Ions & Spacecraft Charging Effects
European Space Weather Week, poster, October 2021 [poster]
National Astronomy Meeting, July 2021 [talk]
DISCOVERER Conference, June 2021 [talk]
Spacecraft Plasma Interactions In Europe (SPINE), May 2021 [talk]

Press Releases:
Royal Astronomical Society: Plasma bubble prediction via ML

Awards and Funding

2022 Student Travel Grant, £250 [Dept. of Space and Climate Physics]
EA Milne Travel Grant, £1000 [Royal Astronomical Society]
Student Travel Grant, £450 [Dept. of Space and Climate Physics]
Student Travel Grant, £200 [Dept. of Physics and Astronomy]

2021 Team achievement award, SOAR mission [MSSL]
Team achievement award, CIRCE mission [MSSL]

2020 42-month doctoral studentship, £60k [Science and Technology Facilities Council]

2019 Top of class and best performance award for MSc cohort [MSSL]
Best research project award on Msc [MSSL]
Interplanetary cubesat committee travel grant [Europlanet Society]

Professional Membership

2021 American Geophysical Union
Member

2021 Royal Astronomical Society
Fellow

2021 Institute of Physics
Member