DR. TISHTRYA MEHTA

tishtrya.mehta@gmail.com London

Data scientist with six years of experience, specialising in data processing, analysis, and modelling of non-stationary signals. Designed and led research projects, producing publications in peer-reviewed high-impact journals, using Python. Created nationally showcased public outreach initiatives, receiving awards for outstanding contributions to science communication.

PROFESSIONAL EXPERIENCE

2023– Present **Post-Doctoral Research Fellow**
University of Warwick, *Coventry*

- Developed a pre-processing *Python* script to mitigate data biases in solar spectroscopic data caused by mode inertia and frequency weighting. Authored a subsequent *Python* script to examine instantaneous period evolution in any input data using the continuous wavelet transform, which I used to investigate azimuthal dependence of the Quasi-Biennial Oscillation, leading to the discovery of a roughly 2-year period increase in the Quasi-Biennial Oscillation over the last 22 years.
- Discovered strong evidence of non-stationarity in quasi-periodic pulsations in a statistical survey of 98 solar flares, challenging the assumptions of the standard flare model used widely in the solar physics community.

2017– Present **Outreach** & **Public Engagement**
Greater London, West Midlands, Fife, Highlands

- Successfully created public engagement initiatives, engaging over 8000 individuals through innovative art-based science communication activities, working in collaboration with *STEM Connections* and as a foundational fellow of the *Warwick Institute of Engagement*.
- Awarded funding to develop and exhibit my embroidery-based coding outreach to national science festivals and conferences to audiences of over 3000 students, for which I received the *Warwick Wows and Wonders Award* and the *Warwick Award for Public and Community Engagement*

2018 – 2021 **Senior Graduate Class Teacher**
University of Warwick, *Coventry*

- Taught weekly classes to 30+ students on *Electricity and Magnetism*, *Classical mechanics*, *Special Relativity*, and *Quantum phenomena*.

EDUCATION

2018 – 2022 **Ph.D in Physics**
University of Warwick, *Coventry*

- Thesis title: *"Analysing Solar Quasi-Oscillatory Signals"*
- Created new analysis methods, using combinations of the Fast Fourier Transform, Empirical Mode Decomposition and Wavelet transforms to investigate period evolution of the Quasi-Biennial Oscillation in heliosesimic data
- Authored scripts in Python and IDL to pre-process solar and stellar data and to visualise and quantify rapidly evolving periodicities with low signal-to-noise ratios

2017 – 2018 **MSc by Research in Physics**
University of Warwick, *Coventry*

- Thesis title: *"Investigating quasi-periodic pulsations in solar flares using Empirical Mode Decomposition"*
- Assessed the most effective methods of detecting non-stationary quasi-periodic pulsations in solar and stellar flares

2014 – 2017 **BSc (Hons.) in Physics and Mathematics**
University of St. Andrews, *Fife*

- Specialisms in Linear Algebra, Mathematical Modelling, Advanced Fluid Dynamics, Computational Biology

AWARDS & ADDITIONAL QUALIFICATIONS

2023 *Warwick Wows and Wonders Award* for 5 years of organising and presenting the Warwick Christmas Lecture series

2022 *Warwick Award for Public and Community Engagement* for outstanding contributions to public engagement

2022 *EPSRC in New and Sustainable Photovoltaics Grant* awarded to fund the design and exhibition of an embroidery-based scientific outreach activity to pupil premium funded schools in the Highlands, Scotland

2019 *Mobility of Young Researchers Grant* awarded by the SOLARNET network for a 6-week research stay at the National Solar Observatory, Colorado.

2022 Certification in Child Protection Fundamentals

2021 Deep Machine Learning Module for Physicists (using KERAS, FASTAI, TENSORFLOW and PYTORCH)

2019 Science Communication for the Postgraduate Certificate in Transferable Skills

SELECTED PUBLICATIONS & TALKS

2023 **T. Mehta**, A.-M. Broomhall, L. Hayes *Prevalence of non-stationarity in Quasi-Periodic Pulsations associated with M- and X- class solar flares* (Accepted). Monthly Notices of the Royal Astronomical Society

2022 **T. Mehta**, K. Jain, S. C. Tripathy, R. Kiefer, D. Kolotkov, A.-M. Broomhall *Cycle dependence of a quasi-biennial variability in the solar interior*. Monthly Notices of the Royal Astronomical Society

2022 **T. Mehta**, C. McDonald, and B. Nealon. *Reach out, Touch Space!* Astronomy & Geophysics

2023 L. Hayes and **T. Mehta** *Evolution of Quasi-Periodic Pulsations in a long duration flare* (In prep.) Astronomy & Astrophysics

2018 – Present **Invited talks** Spoke at international scientific conferences (National Astronomy Meeting, Committee on Space Research, CoolStars) presenting research and chairing informal discussions. Invited participant for numerous international workshops (International Space Science Institute, International European Research Council Advanced Grant), leading discussions on non-stationarity in solar and stellar databases and exhibiting new methods of detecting rapidly evolving periodicities

2018 – 2019 **Summer Schools** Completed Introductory and Advanced summer schools in Solar System Plasma (University of Exeter, University of Lancaster), and Introductory summer school in Research Computing (University of Hull)

OTHER SKILLS

Programming Python (PANDAS, SCIPY, NUMPY, MATPLOTLIB), IDL (IDLDE, IDLSSW)

Software & Tools LaTeX, MS Office, Vim, Terminal, Linux, LibreOffice, Overleaf

Professional science communication Demonstrated ability to captivate audiences of over 1000 attendees through engaging and informative public lectures. Designed interactive hands-on demonstrations, working with Health and Safety teams to ensure compliance with risk assessment protocols. Highly sought-after by repeat audiences following well-received shows.

REFEREE

Dr. Anne-Marie Broomhall, CFSA, Coventry, CV4 7AL