# Oscar Sage David O'Hara

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Oscar Sage David O'Hara | oscar-o-hara | 0009-0006-3633-5816 | oharao

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## Employment

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| May - Oct. 2021 | **Research Assistant**, Trinity College Dublin, supported by Air Force Office of Scientific Research. Developed and published SIDpy, a Python package for processing and archiving VLF data, enabling more efficient analysis of space weather phenomena. Conducted a large-scale statistical study of 334 solar flare events, analyzing their impact on the ionospheric D-region throughout the past solar cycle. Leveraged advanced data analysis techniques to generate insights into solar activity's influence on Earth's ionosphere. |
| Jun. - Sep. 2019 & 2020 | **Summer Research Project**, Dublin Institute for Advanced Studies. Designed and constructed two high-sensitivity wire-loop VLF antennas for real-time ionospheric disturbance monitoring. Revamped and redeployed solarmonitor.org, a live data visualization platform for solar activity, significantly enhancing usability and responsiveness. Developed a Python-based backend using Flask, SQLAlchemy, and SunPy, with extensive testing via Pytest, and deployed within Docker containers for streamlined, scalable development. Collaborated with a multidisciplinary team to integrate ground- and space-based data for real-time solar monitoring. |
| Jun. 2018 - Sep. 2021 | **Program Assistant**, Trinity Walton Club. Managed and coordinated STEM-focused educational sessions for secondary school students, fostering engagement in science, technology, engineering, and mathematics. Designed and delivered interactive workshops aimed at inspiring students with hands-on STEM experiences. Led a team of educators, ensuring smooth planning, execution, and alignment of all class sessions within the clubs curriculum. Played a key role in optimizing student learning experiences through creative curriculum development and interactive session design. |

## Education

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| Sep. 2021 - *present* | **PhD in Physics**, Cavendish Laboratory, University of Cambridge. Funded by the European Space Agency & National Physics Laboratory at Clare Hall. Supervised by Dr. Eloy de Lera Acedo, Prof. Tian Loh, & Dr. Johannes Wolf. |
| Sep. 2017 - Jun. 2021 | **B.A. in Physics and Astrophysics**, First Class Honours, Trinity College Dublin. Thesis on the "High-Speed Monitoring of Fast Radio Bursts" with Dr. Sophie Murray and Dr. Laura Hayes supervised by Peter T. Gallagher. |

## Publications

C=Conference, J=Journal, R=In Review, T=Thesis

**[C.4]** **Oscar S.D. O'Hara**, Quentin Gueuning, Eloy de Lera Acedo, Fred Dulwich, et al. (2025). **Modelling Large Radio Telescope Visibilities Including Array Mutual Coupling Effects**. In *2025 19th European Conference on Antennas and Propagation (EuCAP)*, pp. 1-5. IEEE. 30 March - 4 April 2025, Stockholm, Sweden. DOI: XX.XXXX/XXXXXXX.XXXX.XXXXXXX

**[R.2]** **Oscar S.D. O'Hara**, Quentin Gueuning, Eloy de Lera Acedo, Fred Dulwich, et al. (2024). **Uncovering the Effects of Array Mutual Coupling in 21-cm Experiments with the SKA-Low Radio Telescope**. *Monthly Notices of the Royal Astronomical Society*, Vol. xx, Issue xx, pp. xx. DOI: 10.48550/arXiv.2412.01699

**[C.3]** Quentin Gueuning, Eloy de Lera Acedo, Anthony K. Brown, **Oscar S.D. O'Hara** (2024). **A broadband multipole method for the scattering analysis of antenna arrays**. In *2024 International Conference on Electromagnetics in Advanced Applications (ICEAA)*, pp. 1-1. IEEE. 2-6 September 2024, Lisbon, Portugal. DOI: 10.1109/ICEAA61917.2024.10701866

**[C.2]** John Cumner, Dominic Anstey, Quentin Gueuning, **Oscar S.D. O'Hara**, et al. (2024). **Antenna gain pattern blindness due to mutual coupling in broadband arrays**. In *2024 International Conference on Electromagnetics in Advanced Applications (ICEAA)*, pp. 171-171. IEEE. 2-6 September 2024, Lisbon, Portugal. DOI: 10.1109/ICEAA61917.2024.10702000

**[R.1]** Quentin Gueuning, Eloy de Lera Acedo, Anthony K. Brown, Christophe Craeye, **Oscar S.D. O'Hara** (2024). **A Broadband Multipole Method for Accelerated Mutual Coupling Analysis of Large Irregular Arrays Including Rotated Antennas**. *IEEE Transactions on Antennas and Propagation*, Vol. xx, Issue xx, pp. xx. DOI: 10.48550/arXiv.2409.00153

**[J.2]** **Oscar S.D. O'Hara**, Fred Dulwich, Eloy de Lera Acedo, Jiten Dhandha, Thomas Gessey-Jones, et al. (2024). **Understanding spectral artefacts in SKA-Low 21-cm cosmology experiments: the impact of cable reflections**. *Monthly Notices of the Royal Astronomical Society*, Vol. 533, Issue 3, pp. 2876-2892. DOI: 10.1093/mnras/stae1952

**[C.1]** Dominic Anstey, John Cumner, Quentin Gueuning, **Oscar S. D. O'Hara**, et al. (2024). **Mitigating Zenith Blindness from Mutual Coupling in a Sunflower Phased Array**. In *2024 18th European Conference on Antennas and Propagation (EuCAP)*, pp. 1-5. IEEE. 17-22 March 2024, Glasgow, United Kingdom. DOI: 10.23919/EuCAP60739.2024.10501737

**[J.1]** Laura A Hayes, **Oscar S.D. O'Hara**, Sophie A. Murray, Peter T. Gallager. (2021). **Solar flare effects on the earth's lower ionosphere**. *Solar Physics*, Vol. 296, Issue 11, pp. 157. DOI: 10.1007/s11207-021-01898-y

## Talks

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| November 2024 | Invited talk: *Rydberg atoms for electromagnetic sensing - the development of a non-intrusive electric-field probe*, TEC-EPE section at the European Space Research and Technology Centre. |
| June 2024 | *Predictive Interferometric Measurement of the 21-cm signal with SKA-LOW Simulations*, Hills Coffee Talk, Battcock Centre, University of Cambridge. |
| February 2024 | *Understanding spectral artefacts in SKA-LOW 21-cm cosmology experiments: the impact of cable reflections*, Kavli Science Focus Meetings - Science with the 21-cm line. |
| February 2023 | *Forward modelling of SKA-LOW with end-2-end simulations*, Development in Africa with Radio Astronomy (DARA) Workshop. |
| April 2022 | *Analysis of instrumental effects in SKA1-LOW with end-2-end simulations*, Kavli Science Focus Meetings - Observational and Theoretical 21-cm Cosmology. |

## Additional Information

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| Programming | **Fluent:** Python, and Matlab. **Advanced:** C++, HTML, CSS, and Bash. |
| Languages | **Native:** English. **Conversational**: Irish, and Spanish |
| Extracurriculars | **President Clare Hall Boat Club (2022-24)**: Increased membership by 150%, fostering a stronger, more engaged community of rowers. Orchestrated successful fundraising initiatives, securing essential resources to support club growth and development. Enabled club participation in national competitions, leading the team to higher levels of performance and visibility.<br>**Debating and Public Speaking (2017-21)**: participated in second-level Concern Debates and university-level debates, honing persuasive communication and critical thinking skills.<br>**Captained a DOTA 2 Team (2021-23)**: led a competitive DOTA 2 team in international broadcasted tournaments, demonstrating strategic leadership and teamwork. Advocated for gender equality in esports, fostering an inclusive environment and raising awareness on diversity issues within gaming communities. |