Erik Osinga

PhD candidate Astrophysics · Leiden University

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Research interests

My research interests include the properties and origins of magnetic fields in galaxy clusters and cosmic filaments, the role of magnetic fields in structure formation, and the physics of particle acceleration due to shocks and turbulence in galaxy clusters. I study these phenomena mostly in the field of radio astronomy with telescopes such as LOFAR and the VLA, and surveys such as POSSUM, but often combine multi-wavelength information from optical surveys such as the DESI Legacy Imaging Surveys and X-ray telescopes such as the Chandra X-ray Observatory.

Employment

2023-present	**Postdoctoral Research Fellow**, Dunlap Institute for Astronomy and Astrophysics	*University of Toronto*
2019-2023	**PhD in Astrophysics**, Thesis: *Untangling Cosmic Collisions*. Advisors: Prof. Huub Röttgering & Asst. Prof. Reinout van Weeren	*Leiden University*

Education

2019	**MSc. in Astrophysics & Data Science**, *Cum Laude*, GPA 8.9/10, Thesis: *Data compression for weak lensing with Information Maximizing Neural Networks*. Advisors: Prof. Henk Hoekstra & dr. Mohammadjavad Vakili	*Leiden University*
2017	**BSc. in Astrophysics**, GPA 7.9/10, Minor in Data Science.	*Leiden University*

Professional Experience & Leadership

2020-present	**Project scientist LOFAR Decametre Sky Survey**, Commissioning, planning, and scheduling observations for the LOFAR Decametre Sky Survey, a new rapid 16-30 MHz sky survey.	*Leiden University*
2019-present	**Project manager Radio Galaxy Zoo: LOFAR**, Coordinated the citizen science project LOFAR Galaxy Zoo. Collaborated with researchers in 7 countries to make the project available in 8 languages.	*Online: link*
2022	**Visiting researcher IRA/INAF**, Visited the Institute for Radio astronomy (IRA-INAF) for 9 weeks. Advisor: Dr. Gianfranco Brunetti	*Bologna, Italy*

Supervision & Teaching

Supervision

2022 - present	**Supervision of MSc. student**, Joppe Swart. Thesis: *MeerKAT's view of the polarization properties of the Bullet Cluster*	*Leiden University*
2022	**Supervision of LEAPS summer student**, Tombo Fitahiana Rarivoarinoro. Project: *Tailed radio galaxies at sub-30 MHz frequencies - a unique diagnostic of clusters*	*Leiden University*
2021 - 2022	**Supervision of BSc. student**, Wout Goesaert. Thesis: *Faraday rotation of radio sources in Abell 85 using the MeerKAT Galaxy Cluster Legacy Survey*	*Leiden University*
2020 - 2021	**Supervision of MSc. student**, Stefan van der Jagt. Thesis: *Tales of Tails and Trails*	*Leiden University*

Teaching

2019 - present	**Teaching assistant 'Modern Astrostatistics'**, MSc. course by Asst. Prof. Elena Sellentin. I was graded 8.7/10 as tutor by student evaluations.	*Leiden University*
2015 - 2019	**Tutor of BSc. students**, Gave weekly extracurricular 2-hour lectures for groups of up to 5 students on any first-year course.	*Leiden University*
2016 - 2017	**Teaching assistant 'Introduction to Astrophysics'**, BSc. course by Prof. Ignas Snellen. I organised the seminars.	*Leiden University*

Scientific Presentations

2022	**SPARCS XI - 2022**, **Contributed talk**: *The detection of cluster magnetic fields via radio source depolarisation*	*Dinokeng Reserve, South Africa*
2022	**LOFAR Early Career Researchers Conference**, **Contributed talk**: *Particle acceleration mechanisms in the famous cluster Abell 2256: From 16 MHz radio emission to gamma rays*. Awarded best talk of Day 1.	*Leiden, Netherlands*
2022	**IAU General Assembly 2022**, **Contributed talk**: *The detection of cluster magnetic fields via radio source depolarisation*	*Busan, South Korea*
2022	**LOFAR Family Meeting**, **Contributed talk**: *Particle acceleration mechanisms in the famous cluster Abell 2256: From 16 MHz radio emission to gamma rays*	*Cologne, Germany*
2022	**Seminar at Institute for Radioastronomy (IRA-INAF)**, **Invited talk**: *Particle acceleration and magnetic fields in galaxy clusters*	*Bologna, Italy*
2021	**European Astronomical Society Annual Meeting**, **Contributed talk**: *Probing cluster magnetic fields through depolarisation of background radio sources*	*Online*
2021	**Science at Low Frequencies VIII**, **Contributed talk**: *Studying particle acceleration mechanisms in Abell 2256 down to 16 MHz*	*Online*
2021	**German Long Wavelength Consortium Annual Meeting**, **Invited talk**: *Diffuse Radio Emission from Galaxy Clusters in the LOFAR Two-metre Sky Survey Deep Fields*	*Garching, Germany*
2020	**European Astronomical Society Annual Meeting**, **Contributed talk**: *Diffuse Radio Emission from Galaxy Clusters in the LOFAR Two-metre Sky Survey Deep Fields*	*Online*
2020	**Science at Low Frequencies VII**, **Contributed talk**: *Diffuse Radio Emission from Galaxy Clusters in the LOFAR Two-metre Sky Survey Deep Fields*	*Online*
2020	**ESCAPE Citizen Science Workshop**, ESCAPE is the European Science Cluster of Astronomy & Particle Physics ESFRI Research Infrastructures. **Invited talk**: *Radio Galaxy Zoo: LOFAR*.	*Online*
2019	**LOFAR Key Science Projects Meeting**, **Contributed talk**: *Radio Galaxy Zoo: LOFAR*	*Turin, Italy*
2019	**LOFAR Cosmology meeting**, **Contributed talk**: *Alignment in the orientation of LOFAR radio sources*	*Bielefeld, Germany*
2018	**LOFAR Key Science Projects Meeting**, **Contributed talk**: *Alignment in the orientation of LOFAR radio sources*	*Leiden, Netherlands*

Service & Outreach

2022-present	**Wellbeing committee member**, The aim of the well-being committee is to monitor and help improve the mental health of employees at Leiden Observatory. In particular, I conducted a survey with another PhD student on the social safety and workplace experience in the Observatory. We wrote a 20-page report on the results to aid management in improving the workplace.	*Leiden Observatory*
2020-2022	**PhD Ambassador**, Organised informational meetings and social events sponsored by the observatory to promote the integration of first-year PhD candidates.	*Leiden Observatory*
2020-2022	**PhD talks organiser**, Organised bi-weekly informal meetings for PhD candidates to present their work and foster collaboration.	*Leiden Observatory*
2022	**Workshop "Life in the Universe"**, Gave an astronomy workshop as part of an outreach program for primary schools in underprivileged areas of Den Haag.	*Den Haag, Netherlands*
2021	**Astronomy on Tap**, Gave an outreach talk titled 'Looking at Galaxy clusters with radio eyes' at a local 'Astronomy on Tap' event.	*Leiden, Netherlands*
2021	**Zenit Article**, Wrote a popular science article in the Dutch magazine Zenit on LOFAR observations of galaxy clusters, titled *'De grootste botsingen in het heelal'*. (Jan. 2021 edition, page 18-21)	*Physical article*
2021	**VICE Interview**, Interviewed for VICE Magazine about LOFAR Galaxy Zoo and citizen science. An article was published online.	*Online*
2021	**Cape Town Astronomy Society**, Gave an outreach talk titled 'The Universe at the longest wavelengths' to the Cape Town branch (Cape Centre) of the national Astronomical Society of Southern Africa.	*Online*
2021	**Fine Music Radio**, Interviewed on Africa's Jazz FM radio station 'FMR' for a podcast called 'Looking up' with Kechil Kirkham to talk about LOFAR Galaxy Zoo.	*South African radio*
2020	**Leidse Weer- en Sterrekundige Kring**, Gave an outreach talk titled 'The Universe at the longest wavelengths' to the LWSK, an association of ∼160 amateur astronomers in Leiden.	*Online*

Peer Review

Astronomy & Astrophysics, A&A is a journal with 2021 impact factor of 6.24	*1 paper*
Publications of the Astronomical Society of Australia, PASA is a journal with 2021 impact factor of 6.51	*2 papers*
Giant Metrewave Radio Telescope (GMRT), Reviewer of GMRT telescope time proposals	*4 proposals*

Observational experience

Proposals

I have been awarded a total of 104 hours through competitive proposals as PI. Including co-I, the total time awarded is 529 hours, where I made substantial contributions as co-I to the preparations and execution of the LOFAR Decametre Sky Survey.

The first direct test of particle re-acceleration models in distant galaxy clusters *LOFAR*
Cycle 16 proposal (PI) *24 hours*

Tailed radio galaxies at sub-30 MHz frequencies - a unique diagnostic of clusters *LOFAR*
Cycle 15 proposal (PI) *48 hours*

The most detailed low-frequency investigation of particle acceleration in Abell 2256 *LOFAR*
Cycle 15 proposal (PI) *16 hours*

LOFAR Images Below 30 Megahertz *LOFAR*
Commisioning proposal (PI) *16 hours*

The LOFAR Decametre Sky Survey *LOFAR*
Cycle 16 Proposal (co-I) *365 hours*

The LOFAR Decametre Sky Survey *LOFAR*
Commisioning proposal (co-I) *60 hours*

On-site observing

Isaac newton telescope *La Palma, Canary Islands*
Hα observations of Jellyfish galaxies (co-I) *5 Nights*

IRAM 30m *Sierra Nevada, Spain*
CO J=1-0 observations of starforming galaxies with jet-mode AGN (co-I) *6 Nights*

Computational experience

Programming	Python, C++, LaTeX, R
Web	PHP, Javascript, HTML5
Languages	Dutch, English
Supercomputers	ALICE High-Performance Computing facility, SURF Supercomputers
Radio astronomy	CASA, WSClean, DP3, prefactor, facet calibration, DDFacet.