

# Dr Joseph Callingham

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## PERSONAL DETAILS

**Nationality:** Australian

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## EDUCATION

THE UNIVERSITY OF SYDNEY

2013 - 2017 PHD IN ASTROPHYSICS

**Title:** The Extragalactic Sky at Low Radio Frequencies: A Study of Peaked-Spectrum Sources

2009 - 2012 BACHELOR OF SCIENCE (ADVANCED) - FIRST CLASS HONOURS (PHYSICS)

**Majors:** Physics, Applied Mathematics. **Minors:** Ancient Greek History, Political Science.

## EMPLOYMENT

2017 - Present ASTRON Fellow, Netherlands Institute for Radio Astronomy

## REFEREED PAPERS

I am first author of **six papers** published in *Nature Astronomy*, *The Astrophysical Journal*, and *Monthly Notices of the Royal Astronomical Society*. I am also co-author of an additional 51 papers published in a range of peer-reviewed journals, 10 of which I have contributed to significantly. My **h-index is 12**, with a total of 601 citations. Two of my papers have over 100 citations each. Bibliographic information for my highest impact work can be found at the end of this curriculum vitae and my total publication list can be found on my website.

## SUCCESSFUL TELESCOPE PROPOSALS

I have been the principal investigator and a co-investigator on successful proposals for a range of telescopes spanning the electromagnetic spectrum. They include (boldface indicates I was the principal investigator and the time awarded is indicated in parentheses):

**Radio:** LOFAR (254 hrs) • ALMA (2 hrs) • ATCA (76 hrs) • VLA (20 hrs) • MWA (840 hrs - for the all-sky survey)

**Optical/IR:** VLT (20 hrs - on VISIR, SINFONI, NACO, and XSHOOTER) • TNG (5 hrs - on Harps-N) • 6.5 m Magellan Telescopes (4 hrs) • AAT (6 hrs)

**X-ray:** Swift X-ray Telescope (2 hrs)

## SKILLS

### LOW RADIO FREQUENCY INTERFEROMETRY

I am an **integral member** of the teams producing the high-impact LOFAR and Murchison Widefield Array all-sky surveys. This has provided me with **extensive experience in radio observations** and developing data reduction software for new telescopes. Producing the all-sky survey also means I detailed knowledge about radio astronomy instrumentation.

### STATISTICS AND BIG DATA

Experience in **Bayesian statistics** and **Markov Chain Monte Carlo (MCMC)** methods, with a speciality in model inference. These skills allow me to robustly leverage the most information out of large data sets, which is key for scientifically exploiting the science from the new generation of astronomical instruments.

## SKILLS (CONTINUED)

### COMMUNICATION

Proficient **public speaker** and **debater**. I have presented complex scientific results to the general public and professional audiences (including majority Dutch audiences).

### TEAMWORK AND LEADERSHIP

Successfully worked in, and led, **large international consortia** to achieve complex research goals. I have had many **leadership roles** within academia allowing me to be highly adaptable in team environments.

### PROGRAMMING

Comprehensive experience in a diverse range of programming languages, with an **ability to quickly adapt** to a new language most suited to a task. I have extensive experience with Python, MySQL, Shell and Matlab. I also have practice utilising supercomputers to **process large data sets**.

### MULTI-WAVELENGTH EXPERIENCE AND DIVERSE SCIENCE INTERESTS

I am first author of a range of papers in galactic and extragalactic astrophysics that cover the electromagnetic spectrum. This demonstrates that when I see projects that I think are high-impact, I have the necessary skills to quickly learn the area and make a significant contribution.

## SELECTED ACADEMIC AWARDS AND RECOGNITIONS

2017	The University of Sydney Graduate Merit Award
2016	Australian Delegate for the 66th Lindau Nobel Laureate Meeting
2014 - 2017	Office of the Chief Executive (OCE) CSIRO Postgraduate Scholarship
2013 - 2017	Australian Postgraduate Award (APA)
2012	Australian Gemini Undergraduate Summer Studentship
2011	Foundation of Physics Foundation Senior Scholarship
2009 - 2013	The University of Sydney Undergraduate Scholarship of Merit

## SELECTED UNIVERSITY, TEACHING, AND COMMUNITY

### INVOLVEMENT

2018 - present	Board Member for the QUOCKA Survey
2018	Senior Lecturer for the Development in Africa with Radio Astronomy (DARA) in Kenya
2018	Organiser of the ASTRON Hackathon event
2014 - 2016	Board Member of the CAASTRO Student Committee
2013 - 2016	Tutor for Immediate Experimental Laboratory and Senior Computational Physics
2013 - 2016	Councillor of the Sydney University Postgraduate Representative Association
2012	Vice-President of the University of Sydney Physics Society
2010 - 2012	Senior Mentor for University of Sydney's Science Leadership Program

## FORMALLY SUPERVISED STUDENTS

2018 - Present	M. Keim (University of Leiden), Masters Student (Co-supervised with Prof. H. Rottgering)
2018 - Present	K. Ross (University of Curtin), PhD Student (Co-supervised with Dr N. Hurley-Walker)
2017 - 2018	C. Bozon (University of Amsterdam), Bachelor Student
2017	M. Rose (Harvard University), ASTRON Summer Student

## OTHER PASSIONS AND INTERESTS

Ancient Greek History	Reading Science Fiction	Scuba Diving
Surfing	Soccer	Rugby League
Politics	Motorcycling	Independent Cinema

## KEY SELECTED PAPERS

Four publications that I view as my most significant work:

1. **Joseph R. Callingham**, P. Tuthill, B. Pope, and 5 others  
Anisotropic winds in a Wolf–Rayet binary identify a potential gamma-ray burst progenitor  
*Nature Astronomy*, 2018, in press
2. **Joseph R. Callingham**, R. Ekers, B. Gaensler, and 23 others  
Extragalactic Peaked-spectrum Radio Sources at Low Frequencies  
*The Astrophysical Journal*, 2017, 836, 174-196
3. **Joseph R. Callingham**, B. Gaensler, R. Ekers, and 40 others  
Broadband Spectral Modeling of Extreme Gigahertz-Peaked Radio Source PKS B0008-421  
*The Astrophysical Journal*, 2015, 809, 168-182
4. N. Hurley-Walker, **Joseph R. Callingham**, P. Hancock, and 42 others  
GaLactic and Extragalactic All-sky Murchison Widefield Array (GLEAM) survey – A low-frequency extragalactic catalogue  
*Monthly Notices of the Royal Astronomical Society*, 2017, 464, 1146-1167