Dr. Jack F. **Radcliffe**

LECTURER AT THE UNIVERSITY OF PRETORIA
& **HONORARY RESEARCH FELLOW** AT THE UNIVERSITY OF MANCHESTER

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Summary

A dedicated, proactive lecturer at the University of Pretoria whose research interests encapsulates both technical and scientific aspects, with a strong focus on high-resolution radio observations. A unique specialist in wide-field VLBI surveys of faint AGN, previous research has included pioneering radio interferometric calibration routines, radio transient and variability studies, and investigations of star-formation in galaxies. Experience in software development individually, and as part of a team, has been obtained through the development of the multi-source self-calibration technique, European VLBI Network primary beam correction scheme, and the co-founding of the e-MERLIN CASA pipeline. Extensive teaching experience has been obtained through 6 years of lecturing and workshop development for the Development in Africa with Radio Astronomy (DARA) project, the foundation, design and conduction of the inaugural radio astronomy lecture programme for postgraduate students and the re-design of the undergraduate Observational Astronomy course at the University of Pretoria. A proven scientific communicator, presentations have been given national and international conferences, colloquia, and outreach events across the world. Active and productive collaborations have been established and developed across the globe, including the founding of the Square Kilometre Array VLBI simulations task force.

Publications

Summary – 17 peer-reviewed publications, all of which are in high-impact journals (impact factor > 5). Radcliffe has a h-index of 8 and is the first author in ~35% of these publications. Below each publication is a short summary of the paper. Papers in preparation, where Radcliffe is a key contributing author and will be submitted in the next 12 months, are included to illustrate current research trajectory.

PUBLISHED, ACCEPTED & SUBMITTED

2022

SPARCS-North Survey: Exploring the resolved μJy extra-galactic radio source population with EVN+e-MERLIN, A. Njeri, R. J. Beswick, *J. F. Radcliffe*, (+ 8 authors) — *MNRAS submitted*
- First wide-field VLBI survey using a combined EVN+e-MERLIN array focusing on the SPARCS-N field.

A super-linear 'radio-AGN main sequence' links mean radio-AGN power and galaxy stellar mass since *z*~3, I. Delvecchio, E. Daddi (+ 17 authors including *J. F. Radcliffe*) — *A&A submitted*
- Latest updates on VLBI data, software, algorithms, and results.

Software and techniques for VLBI data processing and analysis, M. Janssen, *J. F. Radcliffe* & J. Wagner — *Universe submitted*
- Latest updates on VLBI data, processing and results.

An ultra-deep multi-band VLA survey of the faint radio sky (COSMOS-XS): the radio luminosity function to redshift ~5, D. van der Vlugt, H. S. B. Algera, (+ 7 authors including *J. F. Radcliffe*) — *ApJ submitted*
- New study at the faint end of the radio luminosity function down to sources with sub-microJy flux densities and high redshifts.

Flux density systematics arising from irregular interferometric point spread functions, *J. F. Radcliffe*, A. P. Thomson, R. J. Beswick, (+ 3 authors) — *MNRAS submitted*
- Outlines the flux density systematics that occur when an irregular point spread function is used. Important for upcoming radio arrays.

Identifying active galactic nuclei via brightness temperature with sub-arcsecond International LOFAR Telescope observations, L. Morabito, F. Sweijen, *J. F. Radcliffe* (+ 10 authors) — *MNRAS in press*
- First publication showing LOFAR-VLBI observations can be used to identify active galactic nuclei.

2021

The radio emission from active galactic nuclei, *J. F. Radcliffe*, P. D. Barthel, M. A. Garrett, (+ 3 authors)*(link*; *press release)* — *A&A, 649, L9*
- Ground-breaking observations that finally reveals (after 30 years) that the radio emission in radio-quiet AGN is related to star-formation rather than the central supermassive black-hole.

Nowhere to hide: Radio-faint AGN in GOODS-N – II. Multi-wavelength AGN selection techniques and host galaxy properties, *J. F. Radcliffe*, P. D. Barthel, M. A. Garrett, (+ 3 authors)*(link)* — *A&A, 649, A27*
- Second paper in series that reveals that high-resolution radio observations remain key in identifying a true consensus of AGN activity across cosmic time.

An Ultra-deep Multi-band VLA Survey of the Faint Radio Sky (COSMOS-XS): Source Catalog and Number Counts, D. van der Vlugt, H. S. B. Algera, (+ 7 authors including *J. F. Radcliffe*)*(link)* — *ApJ, 907, 1, 5*
- COSMOS-XS is the deepest radio survey ever conducted with sub-microJy sensitivity. This paper presents the survey and source counts. JFR was key in reducing, imaging and analysing these data.

2020

A Multi-wavelength Analysis of the Faint Radio Sky (COSMOS-XS): The Nature of the Ultra-faint Radio Population, H. S. B. Algera, D. van der Vlugt, (+ 8 authors including *J. F. Radcliffe*)*(link)* — *ApJ, 903, 2, 139*
- Second paper from the COSMOS-XS survey investigating the multi-wavelength properties of the faintest radio sources. JFR was key in data analysis.

The e-MERLIN Galaxy Evolution Survey (e-MERGE) – Overview and Survey Description, T. W. B. Muxlow, A. P. Thomson, *J. F. Radcliffe*, (+ 33 authors)*(link)* — *MNRAS, 495, 1, 1188*
- First paper from the e-MERGE e-MERLIN legacy project that investigates galaxy evolution through high-resolution radio observations. JFR was key in reducing, imaging and analysing these data.

	Searching for Obscured AGN in *z*~2 Submillimetre Galaxies, H. Chen, M. A. Garrett, S. Chi, (+ 13 authors including *J. F. Radcliffe*)*(link)* - Investigation into dusty sub-millimetre galaxies using VLBI revealed obscured AGN in ~25% of sources.	*A&A, 638, A113*
2019	**An insight into the extragalactic transient and variable microJy radio sky across multiple decades**, *J. F. Radcliffe*, R. J. Beswick, A. P. Thomson, (+ 3 authors) *(link)* - First paper revealing that the radio variability of the faintest radio sources across decadal timescales is extremely rare (<2%).	*MNRAS, 490, 3, 4024*
2018	**Nowhere to hide: Radio-faint AGN in GOODS-N – I. Initial catalogue and radio properties**, *J. F. Radcliffe*, M. A. Garrett, T. W. B. Muxlow, (+ 6 authors) *(link)* - Pioneering wide-field observations of the GOODS-N deep field using VLBI that almost triple the number of previously detected radio-AGN in the field.	*A&A, 619, A48*
	Measuring the size evolution of distant, faint galaxies in the radio regime, L. Lindroos, K. K. Knudsen, F. Stanley, (+ 5 authors including *J. F. Radcliffe*) *(link)* - Novel *uv* stacking techniques revealed that star-formation in distant, faint galaxies is typically concentrated in the centre of the objects.	*MNRAS, 476, 3, 3544*
2017	**The e-MERGE Survey – I. JVLA 5.5 GHz observations of the GOODS-North Field**, D. Guidetti, M. Bondi, I. Prandoni, (+ 8 authors including *J. F. Radcliffe*) *(link)* - Deep 5 GHz radio observations revealed, for the first time, that a large proportion of galaxies detected contained active supermassive black holes.	*MNRAS, 471, 1, 210*
2016	**Multi-source self-calibration: Unveiling the microJy population of compact radio sources**, *J. F. Radcliffe*, M. A. Garrett, R. J. Beswick, (+ 4 authors) *(link)*(*source code*) - Publicly available direction-dependent calibration routine for wide-field VLBI observations that allows any possible field to now be observed with VLBI arrays. The code to perform this is publicly available and in use by the community.	*A&A, 587, A85* *ASCL 1709.007*

IN PREPARATION

The VLBA CANDELS GOODS-North Survey – I. Survey Strategy, Design, Processing, and Catalogues, R. P. Deane, *J. F. Radcliffe* (+ 14 authors)
- First paper of the series outlining the ambitious survey with the VLBA to process and image the entire primary beam at milli-arcsecond resolution

The VLBA CANDELS GOODS-North Survey – II. Wide-field source catalogue comparison with *e*-MERLIN and EVN, A. Njeri, *J. F. Radcliffe*, (+ 12 authors)
- Novel investigation of detected source properties across 3 orders of magnitude in angular resolution. Paper lead by co-supervised DARA PhD student Ann Njeri.

Primary beams of heterogeneous interferometric arrays – I. Issues, challenges and considerations, *J. F. Radcliffe*, A. Keimpema, Z. Paragi, (+ 12 authors)
- This paper deals with the issues associated with heterogeneous elements in an interferometric array illustrated through a host of theoretical arguments and simulations. These issues have important implications for future arrays including the SKA.

Primary beams of heterogeneous interferometric arrays – II. 1.6 GHz beam measurements of EVN and *e*-MERLIN stations, *J. F. Radcliffe*, A. Keimpema, Z. Paragi, (+ 12 authors)
- Second paper in the series providing the first 1.6 GHz beam maps of EVN and e-MERLIN stations thus allowing future wide-field observations to mitigate the issues highlighted in Paper I.

Employment Experience

Lecturer
UNIVERSITY OF PRETORIA (UP)

2021 – present
South Africa

Key Responsibilities & Achievements:
- Research into high-resolution studies of distant galaxies, continuing the work set out during the previous fellowship.
- Re-designed, coordinates and lectures the undergraduate Observational Astronomy course, comprising of lectures, workshops, assignments & exams, at UP.
- Contributed and lead grant proposals to help grow the group reputation and size.

SARAO Postdoctoral Fellow & Lecturer (part-time)
UNIVERSITY OF PRETORIA (UP)

2019 – 2021
South Africa

Key Responsibilities & Achievements:
- Funded by the South African Radio Astronomy Observatory (SARAO) that focused upon galaxy evolution though pioneering high-resolution interferometric observations of the COSMOS field that is complemented by exquisite data from MeerKAT. *(link to research proposal)*.
- Founded, designed, and delivered the postgraduate Radio Astronomy course, comprising of lectures, workshops, assignments & exams, at UP.
- Key contributions to the UP astrophysics group. e.g., contributed to the research direction and grant proposals.

Research Associate

UNIVERSITY OF MANCHESTER

Jan – Jun 2019

United Kingdom

Key Responsibilities & Achievements:
- UK Research and Innovation (UKRI) Global Impact Accelerator Accounts (GIAA) funded research associate on *'Enhancing and expanding the impact and sustainability of the Development in Africa with Radio Astronomy (DARA) graduate training programme in sub-Saharan Africa'*.
- Developed teaching materials including lectures, workshops and tutorials for DARA training and collated materials taught by lecturers from multiple international institutions. These have had a large impact as shown by their use in various other radio astronomy courses.

Education

Ph.D. in Astrophysics

UNIVERSITY OF MANCHESTER & UNIVERSITY OF GRONINGEN (JOINT DEGREE)

2014 – 2019

United Kingdom & the Netherlands

- Thesis – *'Nowhere to hide: identifying AGN in the faint radio sky'* (*link to thesis*).
- Supervisors: M. A. Garrett, P. D. Barthel, R. J. Beswick & T. W. B. Muxlow.
- The work in this Ph.D. investigated the role of faint Active Galactic Nuclei in galaxy evolution using high-resolution radio observations. Such observations provided one of widest and deepest, high resolution observational studies of the distant universe. Techniques developed as part of this work, such as MSSC, have been influential in developing VLBI curvey capabilities, the decadal planning of VLBI, and implications for future SKA and MeerKAT VLBI surveys.

M.Sci. Honours in Physics

IMPERIAL COLLEGE LONDON

2010 – 2014

United Kingdom

- First Class Honours (74.6%) & ARCS
- Masters Thesis – *'Proof of concept for a new optical method of performing oscillatory rheology'*.

A-levels & GCSEs

SIR JOHN TALBOT'S TECHNOLOGY COLLEGE

2003 – 2010

United Kingdom

- 4 A-levels and 12 GCSEs, all of which achieved a grade of A or A*

Grants, Honours & Awards

2022	**SARAO undergraduate Scholarship**, scholarship to support three undergraduate students over the course of their degree.	*1.5 M ZAR*
	Research seed funding, funding to support research and teaching activities at the University of Pretoria.	*85 k ZAR*
Est. 2019–	**Dr Jack Radcliffe award for Physics**, award given each year to the student with the best attainment in the Physics GCSE at Sir John Talbot's Technology College.	
2019–	**Honorary Research Fellow**, prestigious accolade given by the University of Manchester to promote further collaboration between the researcher and the University.	
2019–2022	**SARAO postdoctoral fellowship**, awarded by the South Africa Radio Astronomy Observatory to perform independent research.	$\sim$ *1.45 M ZAR / 74k GBP*
	RadioNet TNA, awarded to give invited talk at the 2019 SKA-VLBI workshop.	$\sim$ *1k EUR / 830 GBP*
2016–2019	**Ubbo Emmius Scholarship**, awarded by the University of Groningen for students to pursue a Ph.D.	$\sim$ *43k EUR / 36k GBP*
2014–2016	**STFC Ph.D. Scholarship**, awarded by the Science and Technologies Facilities council to conduct a Ph.D. at the University of Manchester.	$\sim$ *26k GBP*
2010–2014	**Imperial College Bursary**, awarded by Imperial College London to support undergraduate study.	$\sim$ *20k GBP*

Teaching Experience

Summary – Lectured astronomy for over 6 years and taught and assessed students for over 6 years. Founded, developed, gave and assesses the radio astronomy postgraduate course at the University of Pretoria and redesigned the Observational Astronomy undergraduate course. Currently supervising 8 students (as both primary and co-supervisor), with one student project successfully completed to date.

2021–	**Lecturer**, for the Observational Astronomy 3rd year undergraduate course (PHY 300). - Course designed to teach students about observational astrophysics with a focus on the optical and radio regime in alignment with South Africa's astronomy direction. - Re-designed and taught this course. The course comprises of 40 lectures, 8 workshops, and is assessed through a combination of assignments and exams.	*University of Pretoria*
2019–21	**Founder & lecturer**, for the Radio Astronomy postgraduate Honours course. Course designed to teach Honours students single-dish and interferometric radio astronomy. This provides an ideal introduction to postgraduate research. - Founded, designed, developed, and gave the postgraduate lecture course. The course comprises of 12×2hr lectures, workshops and is assessed through a combination of assignments and exams.	*University of Pretoria*

2016–21	**Lecturer & course coordinator,** for the Development in Africa with Radio Astronomy (DARA) project *(link)*. - Designed and developed the Unit 4 (data reduction) lectures and workshops on interferometric data reduction and analysis. - Taught interferometric data reduction in Zambia and Botswana over the last 4 years and scheduled to lecture for Unit 2 at HartRAO in South Africa this year. - Built the DARA repository website and curated all materials - Built VLBI tutorials that are now the official VLBI CASA data reduction guide for the National Radio Astronomy Observatory (USA).	
2017	**Teaching assistant,** Observational astronomy undergraduate course - Helped students take data using the 1 m optical telescope at the University of Groningen, for their observational astronomy practical assessments.	*University of Groningen*
2014–16	**Demonstrator,** First year undergraduate laboratory - Taught and assessed undergraduate students in the first year Physics laboratory.	*University of Manchester*

ACADEMIC SUPERVISION

* denotes students that have submitted or will submit within the next 28 days.

PH.D.

| 2022– | **Kelvin Wandia,** Project: '*Deep, wide-field VLBI of faint cosmic radio sources*'
Co-supervisor w/ M. A. Garrett, J. McKean | *University of Manchester* |
| 2018–2022 | **Ann Njeri,** Project: '*High resolution observations of faint radio sources*'
Co-supervisor w/ R. P. Deane, R. Beswick | *University of Manchester* |

MASTERS

2022–	**Anneke van der Dussen,** Project: '*Searching for binary supermassive black holes in wide-field VLBI data*' Primary supervisor	*University of Pretoria*
2021–	**Thephilus Matsepane,** Project: '*Resolving AGN feedback in high redshift starbursts*' Primary supervisor	*University of Pretoria*
2020–	**Paul Wilsenach***, Project – '*The helical radio jet structure in the blazar PKS 1502+106*' Co-supervisor w/ R. P. Deane	*University of Pretoria*
2020–	**Stefro Millard***, Project – '*The parsec-scale radio emission in binary supermassive black hole candidate J1502SE/W*' Co-supervisor w/ R. P. Deane	*University of Pretoria*
2019–	**Nkululeko Qwabe,** Project – '*MeerKAT VLBI capabilities and sub-arraying strategies*' Co-supervisor w/ R. P. Deane	*University of Pretoria*
2021–2022	**Kelvin Wandia,** Project: '*SETI using wide-field VLBI*' Co-supervisor w/ M. Garrett, A. Siemion	*University of Manchester*

HONOURS

2022–	**Titan Harth,** Project: '*Finding the faintest supermassive black holes through advanced calibration*' Primary supervisor	*University of Pretoria*
2022–	**Jayde Bhana,** Project: '*A first look at sub-kiloparsec relativistic jets in distant, high redshift galaxies*' Primary supervisor	*University of Pretoria*
2022–	**Llewellyn Coetzer,** Project: '*Determining the true sensitivity of radio telescopes through beam-mapping*' Primary supervisor	*University of Pretoria*
2021–22	**Anneke van der Dussen,** Project: '*A binary supermassive black hole in GOODS-N*' Primary supervisor	*University of Pretoria*
2021	**Zane Lentz,** Project: '*Analysis of a serendipitous supernovae candidate identified in the GOODS-N field*' Primary supervisor	*University of Cape Town*

Colloquia, Conferences & Workshops ────────────────

Summary – 34 national and international colloquia, conference, and seminar talks of which 12 were invited. Lecturer for three workshops to date and part of the science organising committee for a further two workshops.

COLLOQUIA

2020	**Netherlands Institute for Radio Astronomy (ASTRON),** '*Identifying AGN in the faint radio sky*'.	*Dwingeloo, the Netherlands*
2019	**Hartebeeshoek Radio Astronomy Observatory (HartRAO),** '*Finding AGN in the faint radio sky: A high-resolution perspective*'.	*Gauteng, South Africa*
	Kapteyn Thesis Colloquium, University of Groningen, '*The faint radio population in GOODS-N*.	*Groningen, the Netherlands*
	Jodrell Bank Centre for Astrophysics, University of Manchester, '*Finding AGN in the faint radio sky: A high-resolution perspective*'.	*Manchester, UK*
	University of Cape Town, '*Finding AGN in the faint radio sky: A high-resolution perspective*'.	*Cape Town, South Africa*

CONFERENCES

(O) - oral presentation, (P) - poster presentation, (C) - session chair, (LOC) - local organiser, (SOC) - scientific organiser, (A) - attended

2022	**Inter-university Institute for Data Intensive Astronomy retreat 2022**, *'Wide-field VLBI at the Univeristy of Pretoria'* (O).	*Cape Town, SA*
	Annual conference of the African Astronomical Society, *'Teaching interferometry to the next generation of African astronomers'* (O).	*Virtual*
	VLBI in the SKA-era, *'Wide-field VLBI surveys in the SKA-era'* (O).	*Virtual*
2021	**SARAO postgraduate scholarship conference 2021**, *(C).*	*Virtual*
	SKA Pathfinders Radio Continuum Surveys X, *'The challenges associated with the beams of interferometers - a warning to the SKA-era'* (O).	*Virtual*
	High Energy Astrophysics in Southern Africa 2021, *'Active galactic nuclei in the faint radio sky'* (O).	*Virtual*
	National Astronomy Meeting 2021, *'Square pegs in round holes. - Accurate photometry for the SKA-era'* (invited, O).	*Virtual*
	European VLBI Network Symposium 2021, *(A)*	*Virtual*
2020	**SARAO postgraduate scholarship conference 2020**, *'Preparing for MIGHTEE-VLBI wide-field surveys'* (P, link).	*Virtual*
2019	**SARAO postgraduate scholarship conference 2019**, *'Identifying AGN in the faint radio sky'* (O).	*Durban, South Africa*
	SKA-VLBI key science projects and operations workshop, *'Wide-field VLBI in the SKA era'* (invited, O, fully funded).	*Manchester, UK*
2018	**European Week of Astronomy and Space Science 2018**, *'Nowhere to Hide: Wide-field VLBI with the EVN'* (P, link).	*Liverpool, UK*
2016	**SKA2016: Continuum Science Working Group Meeting**, *'Lessons learned: An EVN & e-MERLIN perspective'* (invited, O).	*Goa, India*
	SKA2016: Science for the SKA Generation, *'There's Nowhere to Run, Nowhere to Hide'* (O).	*Goa, India*
	SKA Pathfinders Radio Continuum Surveys 2016, *'Isolating AGN Using Wide-field VLBI & e-MERLIN Observations'* (invited, O).	*Goa, India*
	e-MERLIN and Jodrell Bank Observatory: A radio astronomy facility for the SKA era, *'Isolating AGN using wide-field VLBI and e-MERLIN'* (invited, O).	*Manchster, UK*
	European Week of Astronomy and Space Science 2016, *'There's Nowhere to Run, Nowhere to Hide… Hunting for AGN Using Wide-field VLBI'* (invited, O).	*Athens, Greece*
	National Astronomy Meeting (NAM) 2016, *'The e-MERGE Legacy Survey - an e-MERLIN+JVLA Ultra-Deep Survey'* (O).	*Nottingham, UK*
2015	**UK SKA Science Meeting**, *'Towards the nJy Regime at the Highest of Resolutions'* (O).	*Manchester, UK*
	Bonn-Dwingeloo Neighbourhood Meeting, ASTRON, *'Wide-field VLBI with the EVN'* (O).	*Dwingeloo, the Netherlands*
	The many facets of extragalactic radio surveys, *'Nowhere to Hide - Wide-field VLBI of GOODS-N'* (O).	*Bologna, Italy*
	NAM 2015, *'Wide-field VLBI - Finding Radio Weak AGN'* (O).	*Llandudno, Wales*
	Back at the Edge of the Universe, (A).	*Sintra, Portugal*

SEMINARS

2022	**COIL-COP, University of Pretoria**, *'Teaching the next generation of African radio astronomers through the DARA programme'* (invited).	*Pretoria, South Africa*
2021	**PSANA seminar, University of Pretoria**, *'You are not alone. An astronomer's guide to good mental health during your postgraduate degree'* (invited).	*Pretoria, South Africa*
2020	**Kapteyn Wednesday Lunch Talk, University of Groningen**, *'Development in Africa with Radio Astronomy'* (invited).	*Groningen, the Netherlands*
2018	**National Radio Astronomy Observatory (NRAO) Lunch Talk**, *'The faint radio population in GOODS-N'* (invited).	*Socorro, USA*
2017	**Kapteyn Monday Lunch Seminar**, *'The AVN, EVN and the next generation of radio astronomers'*.	*Groningen, the Netherlands*
2016	**JBCA Internal Seminar, University of Manchester**, *'Nowhere to Hide - Wide-field VLBI of GOODS-N'*.	*Manchester, UK*

WORKSHOPS

2022	**European Radio Interferometry School 2022**, *(O, SOC)*	*Dwingeloo, the Netherlands*
2020	**CASA VLBI workshop 2020**, *'Wide-field imaging'* (O, SOC)	*Virtual*
2019	**European Radio Interferometry School 2019**, *'Self-calibration'* & *'Wide-field VLBI'* (O)	*Gothenberg, Sweden*
2015	**European Radio Interferometry School 2015**, *(A)*	*Munich, Germany*

Competitively Awarded Observing Proposals

Summary – Radcliffe has obtained time on multiple major radio astronomy instruments across the world totalling 100s of hours. Radcliffe currently/is involved in the three largest projects on the European VLBI Network.

PRINCIPAL INVESTIGATOR

2020   **The Final Frontier in Wide-field Surveys – Mapping the primary beam of the EVN,** Instrument: *EVN*. Time awarded: 12 hr

2017   **The nature of the microJy variable source population in GOODS-N,** Instrument: *VLA*. Time awarded: 10 hr

DDT: Precise astrometry of the phase calibrator source J1234+6158, Instrument: *e-MERLIN*. Time awarded: 24 hr

EVN-COSMOS: Taming AGN & star-formation across cosmic time, Instrument: *EVN*. Time awarded: 72 hr

2016   **DDT: Source Identification around VLBI-detected Gravitational Lenses,** Instrument: *e-MERLIN*. Time awarded: 12 hr

SIGNIFICANT CONTRIBUTING INVESTIGATOR

2022   **Testing AGN evolution and feedback by combining the ILT and e-MERLIN/EVN,** PI: McKean. Instrument: *EVN*. Time awarded: 200 hr

Monitoring the old, discovering the new; mas-scale radio emission in M82, PI: Williams. Instrument: *EVN*. Time awarded: 48 hr

2020   **Unravelling the role of faint radio AGN across the infrared-radio correlation,** PI: Delvecchio. Instrument: *VLBA*. Time awarded: 90 hr

2019   **Resolving the Core/Jet Structure of the Giant Radio Galaxy ESO422-G028,** PI: Riseley. Instrument: *EVN & LBA*. Time awarded: 16 hr

Exploring the resolved microJy radio source population with EVN+eMERLIN, PI: Njeri. Instrument: *EVN*. Time awarded: 24 hr

2018   **What drives outflows and negative feedback? - High resolution imaging of molecular gas in the SMBH-binary merger NGC6240,** PI: Beswick. Instrument: *e-MERLIN*. Time awarded: 24 hr

The sizes and spectral indices of $\sim$800 radio-detected galaxies in GOODS-N, PI: Thomson. Instrument: *VLA*. Time awarded: 42.5 hr

An Ultradeep Multi-frequency Survey of Galaxy Evolution, PI: Algera. Instrument: *VLA*. Time awarded: 180 hr

Filler time VLBA survey of the UDS field: a VLBI pilot for MeerKAT-MIGHTEE, PI: Deane. Instrument: *VLBA*. Time awarded: 47.5 hr

Morphological Identification of Sources in the Northern SPARCS field, PI: Wrigley. Instrument: *e-MERLIN*. Time awarded: 144 hr

Spatially-resolved star formation in two bright (S$>$100 μJy) radio-detected sub-mm galaxies in ELAIS-N2, PI: Thomson. Instrument: *e-MERLIN*. Time awarded: 64 hr

2017   **Pilot study: Morphological Identification of Sources in the Northern SPARCS field,** PI: Wrigley. Instrument: *e-MERLIN*. Time awarded: 28 hr

Deep field classification of galaxies within the Lockman Hole, PI: Wrigley. Instrument: *e-MERLIN*. Time awarded: 72 hr

Low Frequency Insights into the Radio Continuum - Star Formation Rate Relation, PI: Hindson. Instrument: *LOFAR*. Time awarded: 16 hr

2016   **41.95+57.5 An Enigmatic Compact Radio Source in M82 Revisited,** PI: Muxlow, Instrument: *e-MERLIN*, Time awarded: 12 hr

Professional Responsibilities

Summary – Radcliffe is an active, senior member of multiple major research collaborations and has founded multiple projects. His leading international research profile means he is regularly invited to join and play a senior role in multiple collaborations.

2022–   **Founder & Chair,** SKA-VLBI simulations task force
- Multi-national working group investigating SKA-VLBI operational capabilities to influence SKA observing modes and infrastructure

2020–   **Scientific referee,** for the e-MERLIN Time Allocation Committee (TAC)

2019–   **Referee,** for leading high-impact, peer-reviewed journals (MNRAS, A&A & Nature)

2019–21   **Organiser,** of the University of Pretoria group meetings & colloquia

2019–   **Core member,** of the MeerKAT (SKA pathfinder) VLBI working group (Chair: Deane [UP] & Agudo [IAA-CSIC])

2019–	**Co-investigator**, of the MeerKAT (SKA pathfinder) deep field survey (MIGHTEE, PI: Jarvis [Oxford] & Taylor [Cape Town])	
2018–	**Core member**, SKA-VLBI Science Working Group	
2016–	**Co-investigator**, of the SKA Extragalactic Continuum Science Working Group investigating galaxy evolution through deep radio continuum imaging (PI Sargent [Sussex])	
2016–	**Co-investigator**, of SPARCS (SKA Pathfinders Radio Continuum Surveys) (PI Norris [ANU])	
2014–	**Core member**, of the e-MERGE Survey – the e-MERLIN Galaxy Evolution Survey - Allocated 918 hrs of e-MERLIN time as the largest e-MERLIN legacy projects. e-MERGE consortia comprises >100 international investigators, and the project is producing the deepest radio images of the sky with e-MERLIN probing star-formation and AGN activity back to redshift 5 and beyond	
2016–18	**Co-organiser**, Wednesday lunch talk series	*University of Groningen*
2015–16	**Co-organiser**, Jodrell Autumn Computing Seminar series (JACS) - Designed, organised and delivered seminars for new arrivals to the astronomy group in Manchester. The JACS seminars exist to this day	*University of Manchester*
2015–16	**Chair**, Postgraduate Committee at Jodrell Bank Centre for Astrophysics - Represented postgraduates of the astronomy group at the University of Manchester, helping influence policy changes	*University of Manchester*

Skills

Astronomical Software	AIPS (expert), Parseltongue (expert), CASA (expert), ds9 (intermediate), IRAF (basic) & GALFIT (basic)
Programming Languages	Python (expert), HTML/CSS (expert), LaTeX (expert), Bash/Cshell (expert), C++ (intermediate), Fortran (intermediate) & Java (basic)
Operating Systems	Linux/UNIX (expert), macOS (expert), Windows (intermediate)
Software	Microsoft Office, git, docker, singularity, slack
Statistical Modelling	Multivariate modelling (through Bayesian Monte-Carlo Markov Chain samplers & standard lst. square)
Machine Learning	CNNs, encoders and k-means clustering analysis through TensorFlow and scikit-learn

Outreach

Summary: JFR has conducted a range of outreach activities ranging from public lectures & Q&As to public demonstrations.

- Astronomy talks for Sir John Talbot's Technology college
- Delivered workshops on UCAS University applications to secondary schools
- Invited talks & activities for Rodeheath Primary School & Elworth Hall for the *Out of this World* project
- Outreach for ALMA at the Manchester Festival of Light
- Science Busking as a volunteer for UoM Physics Outreach.
- Participated at the ScienceX outreach event in Manchester.

References

References available upon request