

## Section A: Overview of the Research Project

**TITLE:** MeerKAT(+) and Euclid Team up: Exploring the galaxy-halo connection at cosmic noon

**AREA OF RESEARCH:** Science

**ACADEMIC LEVEL:** Doctoral

**ABSTRACT:** Galaxies are thought to emerge at the centre of dark matter (DM) halos (Silk & Mamon 2012) forming stars in a way connected to the growth of such halos (so-called galaxy–halo connection). On the micro-scale, supermassive black holes (SMBH) accrete gas and grow tightly connected to the properties of the host galaxies (Kormendy & Ho 2013). Feedback processes within galaxies may impact their surroundings, influencing future gas accretion and star formation (SF). Feedback from radio-loud AGN, in particular, is often invoked to explain the observed properties of massive galaxies in the local Universe. Less clear is the role of jet-induced feedback at higher redshifts ( $z \gtrsim 1$ ), where radio-AGN activity shifts towards lower-mass, mostly star-forming galaxies (SFG; Smolcic+17). Shedding light on the interplay between SMBHs, galaxies and DM halos at the peak epoch of cosmic assembly ( $1 < z < 3$ ; the ‘cosmic noon’), requires observations over large cosmological volumes to probe all environments and include the rarest galaxy/AGN populations, while also being gas/dust-insensitive to unveil the dominant contribution of obscured AGN and SF activity (Dunlop+2017; Vito+2018). Deep radio–continuum surveys provide a unique tool to reach an unbiased census of SFG and radio AGN (Prandoni & Seymour 2015). Euclid, on the other hand, will provide an unprecedented view of the large-scale structure up to cosmic noon and beyond, as well as a direct estimate of the DM halo mass and distribution around galaxies. In this project, we aim to combine MeerKAT and Euclid observations to study these processes.

**PRIMARY SUPERVISOR:** Dr Lucia Marchetti, [lucia.marchetti@uct.ac.za](mailto:lucia.marchetti@uct.ac.za), University of Cape Town

### CO-SUPERVISORS:

Dr Isabella Prandoni, [prandoni@ira.inaf.it](mailto:prandoni@ira.inaf.it), INAF – Institute of Radio Astronomy (Italy)

Prof Mattia Vaccari, [mattia.vaccari@uct.ac.za](mailto:mattia.vaccari@uct.ac.za), University of Cape Town

Please note that all supervisors here indicated will be responsible for supervising the student’s research.

## Section B: Details of Research Project

**SCIENTIFIC MERIT:** Galaxies are thought to emerge at the centre of dark matter (DM) halos (Silk & Mamon 2012) forming stars in a way connected to the growth of such halos (so-called galaxy–halo connection). On the micro-scale, supermassive black holes (SMBH) accrete gas and grow tightly connected to the properties of the host galaxies (Kormendy & Ho 2013). Feedback processes within galaxies may impact their surroundings, influencing future gas accretion and star formation (SF). Feedback from radio-loud AGN, in particular, is often invoked to explain the observed properties of massive galaxies in the local Universe. Less clear is the role of jet-induced feedback at higher redshifts ( $z \gtrsim 1$ ), where radio-AGN activity shifts towards lower-mass, mostly star-forming galaxies (SFG; Smolcic+17). Shedding light on the interplay between SMBHs, galaxies and DM halos at the peak epoch of cosmic assembly ( $1 < z < 3$ ; the ‘cosmic noon’), requires observations over large cosmological volumes to probe all environments and include the rarest galaxy/AGN populations, while also being gas/dust-insensitive to unveil the dominant contribution of obscured AGN and SF activity (Dunlop+2017; Vito+2018). Deep radio–continuum surveys provide a unique tool to reach an unbiased census of SFG and radio AGN (Prandoni & Seymour 2015). Euclid, on the other hand, will provide an unprecedented view of the large-scale structure up to cosmic noon and beyond, as well as a direct estimate of the DM halo mass and distribution around galaxies.

Euclid Deep Fields will represent the premiere extra-galactic deep fields for the next decade and beyond, and MeerKAT(+) is the only current radio telescope that can conduct deep surveys of the Euclid Deep Field South (EDFS). Our long-term plan is to exploit MeerKAT+ (MK+) to carry out an ultra-deep radio survey of this area. Joint MeerKAT(+)/Euclid analysis of the EDFs will shed light on the complex interplay between SMBHs, galaxies and DM halos at cosmic noon, by enabling statistically robust, multi-variate studies of the various galaxy/AGN populations. The EDFs survey will probe enough cosmological volume to maintain the effect of sample variance  $\lesssim 10\text{--}20\%$  up to stellar masses  $\sim 10^{11\text{--}12} M_{\odot}$  (Jarvis+2015) or DM halo masses ( $\lesssim 10^{14} M_{\odot}$ ). In preparation for the MK+ survey ( $\geq 2025$ ), we have obtained 118h of observing time at MeerKAT (MK) to provide a first shallower (rms  $\sim 6 \mu\text{Jy/b}$ ) coverage of the entire EDFs at L-band. The MK observations were carried out over the period December 2023 – February 2024, and a first set of Euclid data will become available around late 2024. The PhD student will become part of the EDFs team and will have the opportunity to exploit the MK and Euclid data to work on one (or more) of the following scientific topics, based on his/her skills and interests:

- Assessing the role of the environment in driving jet-induced feedback - We will explore the debated issue of the role of the environment in triggering radio AGN activity. Comparing radio AGN properties with the ones of the underlying galaxy population traced by Euclid, over a wide range of environments, will enable us to explore the connection between DM halo, galaxy mass, morphology and occurrence of radio-AGN activity, and how it has evolved since cosmic noon (Magliocchetti 2022). Particularly relevant is the study of jet-induced feedback in proto-clusters around high- $z$  radio galaxies, as proto-clusters are key signposts of galaxy assembly in the early universe.
- Cosmic SFR history from a radio perspective - We will infer the role of dust-enshrouded SF in galaxy assembly and evolution, by quantifying the (currently poorly constrained) contribution of dusty star-forming galaxies to the star formation rate (SFR) density and to the massive end of the stellar mass function at  $z > 2\text{--}3$  (Davidzon+17; Talia+21; Enia+22).
- Assessing the role of HI in galaxy evolution - We will include HI diagnostics in radio-based galaxy/evolution studies. The large area covered by the EDFs will enable direct studies of scaling relations between e.g. stellar mass, SFR and HI content in galaxies in different environments (filaments, clusters, voids, etc.; see Sinigaglia+24 for preliminary results).

**FEASIBILITY:** The project relies on the exploitation of MeerKAT data that have already been collected (observations completed in February 2024 and the data reduction will follow shortly) and that will be made available to the student at the start of this project in 2025. The student will also have access to a first set of Euclid data that will become available around late 2024 (all supervisors are member of Euclid as either full members or as external collaborators). Moreover the student will have access to the IDIA/ilifu cloud computing where we expect that most of the analysis will be carried out. The student will be based at UCT and will thus have access to the direct technical and scientific support provided by (the supervisors and) the IDIA researchers and the student will also be able to visit Dr Isabella Prandoni in Italy. Travel funding will be available to the student to travel to INAF-IRA through the grant ISARP RADIOMAP Joint Research Scheme (DSI-NRF Grant Number 150551).

**RELEVANCE TO SARAO RESEARCH PRIORITY AREAS:** This project falls under the highest priority area for science (exploiting MeerKAT).

# Dr Lucia Marchetti

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## Education & Professional Qualifications

### Academic Qualifications

- 2006 **BSc in Astronomy**, University of Padova, Italy.
- 2008 **MSc in Astronomy**, University of Padova, Italy, 110/110 Cum Laude.
- 2012 **PhD in Astronomy**, University of Padova, Italy.

### Professional Qualifications

- 2016 **Postgraduate Course in Science Communication - Science Communication: an introduction to theory, best practice and practical skills**, Centre for Research on Evaluation, Science and Technology (CREST), University of Stellenbosch, South Africa, NQF level 8, Credits 15.
- 2022 **NRF Rating**, SA National Research Foundation, C Rated.

## Research & Academic Experience

- Extensive knowledge of multi-wavelength astronomy observing principles and of the scientific applications and exploitations of multi-wavelength observations.
- Extensive knowledge of studies of the statistical probes for Observational Cosmology Studies such as luminosity/mass functions, star formation rate estimators and strong lensing search and multi-wavelength characterisation.
- Extensive experience as PI or co-PI of observing proposals with a number of international observing facilities
- Extensive experience in image processing and source extraction techniques.
- Extensive experience with 2D and 3D visualisation software (VR and digital planetaria) for astronomical and multi-disciplinary research.
- Extensive experience in creating and managing large astronomical databases, including the the production and public release of multi-wavelength source catalogues and related documentation
- Extensive experience interfacing with Community Support Groups, Mission Planning and Data Processing Teams.
- Experience designing and working with both ESA-led space missions (Herschel, Euclid) and international space missions (Hubble, Spitzer, Akari).
- Extensive experience supervising PhD students, Masters, Honours and Bachelor students (6 Honours, 1 Bachelors, 4 MSc, 3 PhD students (co)supervised in the period 2017-2023).
- Extensive experience in undergraduate teaching, tutoring and mentoring.
- Extensive experience in giving contributed and invited talks at scientific conferences/meetings and technical workshops.
- Extensive experience liaising with academic and University management boards at the highest levels.

## Project Management & Engagement Experience

- Extensive project management experience within both academic research projects, international scientific collaboration and University/public facilities (e.g. laboratory and Planetaria)
- Extensive experience in managing big collaborations and working as part of a team either as a team member or as (an elected) board/exec member, working group chair of international consortia/professional bodies
- Broad experience in writing funding requests to National and European funding agencies (e.g., the *European Commission*, the *Science and Technology Facilities Council - STFC* in the UK, the *DSI/NRF* in SA and the *Italian Ministry of Foreign Affairs and International Cooperation* ).
- Project management experience within both academic projects and National (SA, UK, IT) or International science communication & education projects.
- Experience in administrative and financial management of national/international projects.
- Experience in creating and maintaining a website as well as in creating contents for media releases.
- Experience liaising with policymakers and stakeholders at the National (SA and UK) and International level.
- Knowledge of impact evaluation strategies for both National (SA, UK and Italy) and International projects.
- Extensive experience in transferring and filtering my technical and scientific knowledge for educational and communication purposes

- Extensive experience in public speaking and in liaising with the media including video/audio interview recording
- Experience in planning, organising and hosting international workshops and conferences.

## Employment History

### Academic & Research appointments

- Nov 2012 – **STFC Post-Doctoral Research Associate in Astronomy, the Open University, Milton Keynes, UK.**
- March 2017 – • Develop statistical studies of galaxy formation and evolution processes combining multi-wavelength observations  
• Leadership within the Herschel/ATLAS and Herschel/HerMES Consortia in the identification, follow-up observations and physical classification of strong gravitational lensing candidates exploiting all the Herschel Extragalactic Surveys ( $\sim 1000 \text{ deg}^2$ ) and multi-wavelength observing programs.
- April 2017 – **SARChI Post-Doctoral Research Fellow in Astronomy, the University of Cape Town & the University of the Western Cape (joint position), Cape Town, SA.**  
Feb 2020 – • Galaxy formation and evolution research from a multi-wavelength perspective • Teaching Assistant and Course Coordinator for the course *Introduction to Galaxies and Cosmology* (PHY327) • PI of the multi-cycle (cycle-25, cycle-26) HST snapshot proposal: "SNAPshot observations of the largest sample of lensed candidates in the Equatorial and Southern Sky identified with Herschel". • PI of 2 observing programs with the South African Large Telescope (SALT) • Student supervision
- Jan 2019 – **IDIA Visualisation Lab Project scientist/Deputy Director, University of Cape Town, Cape Town, SA.**  
present – • Managing the development of the VR software iDaVIE • Manage the operations of the lab and of the developers team (2.5 people) • Develop the new strategy of the lab integrating multi-disciplinary aspects and collaborations • Manage the international collaborations of the lab • Supervise students working on data visualisation projects
- March 2020 – **Senior Lecturer in Astronomy, University of Cape Town, SA.**  
present – • Lecturer of the second year undergraduate course *Astrophysics* (AST2002H) <http://www.ast.uct.ac.za/ast/undergraduate/ast2002h> • Galaxy formation and evolution research from a multi-wavelength perspective • SA co-I in the EU funded project *SKilled, Innovative & Entrepreneurial Scientists*, SKIES (Call: EC-H2020-SwafS-2020-1; Grant Agreement: 101006212), devoted to create and deliver training for astronomy PhD students and early career researchers on innovation and entrepreneurship • Co-PI of the NRF ISARP 2023-2025 Italy-SA Bilateral program RADIOMAP+ aimed at foster the collaboration of the two countries in the SKA era • 4MOST Hemisphere Survey of the Nearby Universe (4HS) Survey exec member as Data Management Unit/Catalogue/Database Manager. • Students supervision at different academic levels. • Board member of the UCT Science Faculty Research Committee, a committee that oversee the faculty's research strategy, postgraduate and funding matters. • Exec member of the International Astronomical Union (IAU) Division J *Galaxies & Cosmology*, the international representative body for professional astronomers.

### Vocational - Science Communication, Public engagement and Project Manager Roles

- Jan 2014 – **Chair of the Education & Outreach UK National working group for the *International Year of Light 2015* (IYL2015) UNESCO initiative.**  
March 2016
- Jan 2014 – **Project manager of the Open University participation as gold international sponsor in the *International Year of Light 2015* (IYL2015) UNESCO initiative.**  
Oct 2016
- Jan 2017 – **Project Manager & Scientific Advisor of the "Hemelligaam, or the Attempt to be here now" art project., <https://www.hemelligaam.com>.**  
2020
- Jan 2019 – **Coordinator of the Soapbox Science Cape Town initiative, <http://soapboxscience.org>, An outreach project to promote women in science.**  
present
- Jan 2019 – **Past president/advisor of the African Planetarium Association, <https://africanplanetarium.org/>.**  
present

### Student supervision

Starting from 2016 to date I have supervised **6 honours** NASSP (National Astrophysics and Space Science Programme) students all affiliated at the University of Cape Town

All NASSP students successfully completed their honours and continued with their Masters at the University of Cape Town and at the University of the Western Cape. Between 2018 and 2021 I have served as advisor for **PhD student Mr Marc Yao Fortune Harris at the University of Cape Town**, who was under the supervision of Prof. Tom Jarrett, Dr Michelle Cluver and Prof. Mario Santos. His thesis aimed to study the statistical properties of WISE selected galaxies in the GAMA-23 survey.

In 2020, when my position changed to academic, I have co-supervised a **Masters student (Mr Edoardo Borsato) and a Bachelor student (Miss Cecilia Giorgi) at the University of Padova** in collaboration with Prof. Enrico Maria Corsini (University of Padua, IT) and Dr Mattia Negrello (University of Cardiff, UK). Mr Borsato successfully obtained his

Masters with distinction in October 2020 and Miss Giorgi successfully completed her Bachelor degree in Astronomy both at the University of Padua. Mr Borsato has then started a **PhD under my co-supervision** continuing with the analysis he started in his Master. He should complete his PhD in 2023. The analysis conducted by Mr Borsato has already contributed to works published in 2021 (e.g., Berta et al. 2021), others published in 2022 (e.g., Dye et al. 2022 and Liu et al. 2022) and more to come in 2023.

In 2020 I have also supervised **Miss Valentine Nyirahafashimana**, a **Master's student at the University of Rwanda**, East African Institute for Fundamental Research (ICTP- EAI FR). She obtained her degree in February 2021. In 2020 I have also started to serve as co-supervisor for **Mr Alex Sivitilli**, a **PhD student at the University of Cape Town** who successfully graduated in 2023.

In 2021 I have started to supervise **Miss Malebo Ella Moloko**, a **PhD student at the University of Cape Town**, together with Prof. T. H. Jarrett. She is due to complete her PhD in 2024. Between 2021 and 2023 I have supervised (together with Prof. Julien Larena and Dr Pierre Fleury), **MSc students Mr Daniel Johnson**, who has conducted a thesis focused on the analysis of the line-of-sight effect in strong gravitational lensing events. Mr Johnson has graduated with Distinction in 2023.

Finally, starting in 2023, I have started supervising **Mr Boaz Keren Gil in his MSc in Computer Science at the University of Cape Town**. Mr Keren Gil has developed a prototype software for the extension of the VR software iDaVIE-p under development in the IDIA visualisation lab. He has submitted his thesis and is due to graduate in 2024.

## Publications, Talks and Grants

### Publications

2010 - present Published **155 publications of which 109 are papers on refereed journals** (the rest are proceedings and other publications/products), 18 of which have received more than 100 citations each. The number of citations generated by refereed papers is 6001, leading to an Hirsch impact factor with an **h index of 40**. A complete list of my publications is attached, but it is also available online through the SAO/NASA Astrophysics Data System (<https://bit.ly/30vTgKa>) or Scopus.

### Talks

2009 - present >20 Astronomical public conferences/discourses/posters and workshop with general public, students, teachers and amateur astronomers. An **average of 2 public talks a year**.

2009 - present >30 scientific talks at international conferences/workshops. An **average of 3 contributed talks a year** at international conferences/workshops.

2012 - present **12 invited contributions at international conferences, workshops or events**.

### Grants

2014 - 2015 Open University internal grant to manage the Open University IYL2015 initiatives (10 kGBP).

2015 Royal Astronomical Society grant to co-produce an animation for the International Year of Light 2015 (1.5 kGBP).

2015 SEPnet grant to co-produce an animation for IYL2015 (1.5 kGBP).

2015 SEPnet grant sponsorship to participate to "Soapbox Science 2015 - Bringing science to the public" ([soapboxscience.org](http://soapboxscience.org)).

2015 Royal Astronomical Society travel grant to attend the International Astronomical Union General Assembly (1 kGBP).

2015 International Astronomical Union travel grant to attend the International Astronomical Union General Assembly (1.5 kUSD).

2015 Merit Award from the Faculty of Science and the Open University in recognition of the work done for the International Year of Light 2015 (1.5 kGBP).

2016 South African DST-NRF visiting fellowship for young researchers from the UK (220 kZAR).

2017-2020 3-years long SA National Research Foundation grant to develop/manage the *Hemelligaam* project as part of the NRF History of Astronomy Roadmap (1 MZAR), <https://www.hemelligaam.com>.

2019 SA National Research Foundation and Department of Innovation grant to coordinate the Soapbox Science project in Cape Town (60 kZAR), <http://soapboxscience.org>

2019 ADASS2019 travel grant to attend the ADASS2019 conference (15 kZAR)

2020-2021 SA National Research Foundation and Department of Innovation grant to coordinate the Soapbox Science project in Cape Town (40 kZAR), <http://soapboxscience.org>

2021-2022 EU Horizon Grant - EC-H2020-SwafS-2020-1 - in support of the 2 years SKIES project (20 kEUR were given to UCT, of the 300 kEUR granted to the entire consortium made of 7 partner Institutions)

2021 UCT Enabling Grant Seeker Excellence Awards to support the SKIES project (20 kZAR)

2022 UCT Seed Research Grant in support of Rated Researcher (20 kZAR)

- 2022 NRF grant in support of Rated Researcher (50 kZAR)
- 2023-2025 NRF Incentive Research Grant in support of rated researchers (720kZAR over three years)
- 2023-2025 NRF ISARP 2023-2025 Italy-SA Bilateral program RADIOMAP+ (co-PI; 1.5 MZAR over 3 years)
- 2021-present An average of 6kZAR a year of UCT block grant for publication records and student supervision.

## Experience in Organisation meetings & Public Events - some highlights

- 2014 LOC member of the International Workshop: “Workshop on LM-band spectroscopy with the E-ELT”, held at the Open University, Department of Physical Sciences, Milton Keynes (UK).
- 2015 Co-organiser of the UK IYL2015 Opening Ceremony at Saint James Palace, London (UK).
- 2015 Co-organiser of the IYL2015 dedicated “Lates” event at the Science Museum, London, UK ([http://www.sciencemuseum.org.uk/visitmuseum/plan\\_your\\_visit/lates](http://www.sciencemuseum.org.uk/visitmuseum/plan_your_visit/lates)).
- 2018 Organiser of the Hemelligaam art exhibition at the Iziko Museum, Cape Town.
- 2019 Co-organiser of the Data2Dome workshop at Colgate University <http://www.datatodomecolgate.org>, October 18,20, 2019.
- 2019 – Project coordinator & event organiser of the Soapbox Science Cape Town project. <http://soapboxscience.org/cape-town-local-organising-team/>
- 2020 LOC member for the conference *Cosmic flow, large scale structure & Visualisation*, 17 - 21 February, 2020, Stias, Stellenbosch <https://www.idia.ac.za/cosflow2020/>.
- 2022 Organiser of the SKIES training workshop and mentorship program for postgraduate and early career researchers, 4 - 8 April 2022, UCT Graduate School of Business Conference Center, Cape Town, SA, <https://www.groundstation.space/skies-training-and-mentorship-programme-south-africa/>.
- 2022 LOC member of the conference "SPARCS XI: The Rise of Sky Surveys", November 21 – 25 2022, Pretoria, <https://www.idia.ac.za/sparcs-2022/>
- 2023/2024 SOC member of the Focus meeting "All-Inclusive AGN" that will take place during the IAU GA in Cape Town, August 2024



# CV of Dr. I. Prandoni

(updated 2024)

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## Education

1997: Ph.D. in Astronomy, University of Bologna (Italy); thesis title: *A Deep Radio Survey in the Southern Hemisphere*  
1992: *Laurea* degree (M.Sc. equivalent) in Physics, University of Milan (Italy); thesis title: *Automatic Search for Compact Groups of Galaxies in the Southern Hemisphere*

## Languages

Italian: native - English: fluent - French: good - German: poor

## Current and Past Positions

2024–today: Science Director (*Dirigente di Ricerca*), Radioastronomy Institute (INAF), Bologna, Italy  
2017–2023: Senior Staff Researcher (*Primo Ricercatore*), Radioastronomy Institute (INAF), Bologna, Italy  
2001–2017: Staff Researcher, Radioastronomy Institute (INAF), Bologna, Italy  
1999–2001: Postdoc Fellowships, University of Bologna, Italy  
1998–1999: CNR Fellowship, Radioastronomy Institute, Bologna, Italy  
1997–1998: *Research Associate*, European Southern Observatory, Garching (Germany)  
1997: CNR Fellowship, Radioastronomy Institute, Bologna (Italy).  
1993–1996: PhD Fellowship, University of Bologna, Bologna (Italy)

## Most Relevant National and International Appointments

2020–today: chair of the *Italian SKA Science Working Group*  
2020–today: member of the *European SKA Forum (ESKAF)*  
2019–today: member of INAF Radioastronomy Office (UTG-II) *mid-frequency SKA Pathfinders and Precursors WG*  
2018–today: member of the Science Advisory Committee (SAC) of LOFAR-IT  
2017–today: Chair of the Italian SKA Board  
2017–today: SKA Advisor for INAF Radioastronomy Office (UTG-II)  
2017–today: Co-Chair of the *Science Focus Group "AGN and their Role in Galaxy Evolution"*, established as part of the *SKA Continuum Science Working Group*  
2016–today: Core member of the *SKA Continuum Science Working Group*  
2013–2018: Member of the *European ALMA Science Advisory Committee (ESAC)*  
2006–2016: Project Scientist of the INAF *Sardinia Radio Telescope* project  
2014–2015: Member of the *Sardinia Radio Telescope Management Board*  
2013–2015: Co-Chair of the *SKA Continuum Science Working Group*  
2012–2015: Chair of the *WSRT Programme Committee*

2012–2015: Member of the *LOFAR Time Assignment Committee*  
2014–2015: Member of the *SKA Science Review Panel* responsible for selecting science priorities for SKA1  
2012–2014: Member of the *Italian SKA Working Group*, responsible for delivering the Italian SKA White Book  
2008–2012: Member of the *ASTRON Programme Committee for WSRT*  
2005–2012: Member of INAF *ALMA Regional Center Working Group*  
2008–2011: Member of INAF *Scientific Council*

### **Referee Activity and Selection Committees**

Referee for the Italian Ministry of University and Research (MIUR)  
Referee for the Netherland Organization for Scientific Research (NWO)  
Referee for the Deutsche Forschungsgemeinschaft (German Research Foundation)  
Referee for the French National Research Agency (ANR)  
Referee for the Israel Science Foundation (ISF)  
Referee for the National Research Foundation (NRF, South Africa)  
Referee for the *PISCOPIA Fellowship Program*, co-funded by EU, Marie Curie Actions  
Referee for major international astrophysical journals (A&A, MNRAS, ApJ)  
External Referee of Ph.D. theses for the Australian National University, the University of Sydney, the Tasmania University, the University of Western Cape (Cape Town), the Leiden University, the University of Bologna, the University of Cagliari, the International School for Advanced Studies (SISSA-ISAS, Trieste), the Scuola Normale Superiore (SNS, Pisa)  
Member of the ESO Selection Committee for the recruitment of the European ALMA Programme Scientist (2018)  
Member of the INAF National Committee for recruitment of permanent research staff (2018)  
Member of the INAF Selection Committees for the appointment of INAF structure Directors: Obs. Trieste, Obs. Cagliari, IASF-Milano (2010)

### **Recent Research Grants (PIships/coordinating roles only) and Awards**

2023-2025 Member of the Editorial Board and deputy PI of the project *STILES: Strengthening the Italian Leadership in ELT and SKA*, PNRR Call for Research Infrastructures: 70 MEu. In this framework also coordinates two activities (1.2 MEu).  
2022–2023: PI of the project *LOFAR and MeerKAT Team Up: A Unique Radio Window on Galaxy/AGN co-Evolution*: INAF Large Grant 2022, 178 kEu  
2019–2021: PI (National Scientific Coordinator) of the project *SimulATING the RadiO Sky (SAuROS)*: PRIN INAF MAIN STREAM 2018, 31.5 kEu for research activity support (traveling, HW, etc.)  
2019: CSIRO Distinguished Visitor Award Grant, 7500 AUD  
2017–2019: PI (National Scientific Coordinator) of the project *FORmation and Evolution of Cosmic STructures (FORECaST) with Future Radio Surveys*: PRIN INAF SKA/CTA 2016, 320 kEu  
2015–2017: PI of the National Significant Bilateral Project Italia - South Africa *Mapping the Universe on the pathway to SKA. From black holes to large cosmic structures: a multi-scale approach to next-generation radio surveys* funded by the MAECI (Italian Ministry of Foreign Affairs and International Cooperation), 80 kEu  
2015: Budget as Project Scientist of the Sardinia Radio Telescope in the framework of the MIUR extraordinary programme for Radioastronomy: MIUR, 80 kEu



2014: Budget as Project Scientist of the Sardinia Radio Telescope in the framework of the MIUR extraordinary programme for Radioastronomy: MIUR, 90 kEu

2012–2013: Funding as Project Scientist of the Sardinia Radio Telescope in the framework of the ASI Radioastronomy Programme: ASI, 90 kEu

2010–2012: PI (National Scientific Coordinator) of the project *The e-MERLIN Galaxy Evolution (e-MERGE) Survey*: PRIN INAF 2009, 113 kEu

### **Leadership in ongoing Large/Key International Programs**

Member of the Council of the LOFAR Key Project '*Magnetism*' and co-chair of the Magnetism *Deep Fields* Working Group.

Leader of the ASKAP EMU Key Science Project *RQ-AGNs: physical and evolutionary properties*

Member of Management Team and Working Group Leader of the Legacy Project *The e-MERLIN Galaxy Evolution (e-MERGE) Survey*

Member of the deep fields core group of the *LOFAR Surveys Key Project*

### **Educational Activity and Outreach**

(Co-)supervisor of several ( $\sim 18$ ) M.Sc. and Ph.D. students at the University of Bologna, Macquarie University (Sydney), University of Western Cape (South Africa)

Lecturer for the Astronomy M.Sc and Ph.D. Courses at the University of Bologna and for International Radioastronomy Schools

Outreach activity/lectures at the Radioastronomy Institute Visitor Centre (Medicina, Italy)

2017–2019: Promoter (co-funder) of an outreach virtual reality project for SKA and CTA

2003–2006: Coordinator of outreach activity at the Radioastronomy Institute Visitor Centre (Medicina, Italy)

### **Publications, Invited Reviews and Lectures**

Author of  $\sim 170$  refereed publications, Editor of 5 books

$\sim 80$  invited talks and lectures

(Co-)organizer (SOC) of  $\sim 30$  national/international conferences/workshops

### **Main Research Interests/Expertise**

The role of AGN in galaxy evolution, through deep radio surveys (involved telescopes: e-MERLIN, JVLA, ATCA, LOFAR; ASKAP, MeerKAT, in future SKA)

Accretion and feedback processes in radio galaxies: the role of cold gas and its relation with other gas phases (involved telescopes: IRAM 30m, APEX, VLT IFU; ALMA, ATCA, MeerKAT)

### **Science-driven Technology Projects/Activity**

Science cases and technical requirements for the Sardinia Radio telescope (SRT); Astronomical Validation of the SRT and prioritisation of its new-generation receivers and backends (as SRT Project Scientist)

Science cases and technical requirements for SKA (as part of the SKA Continuum Science WG and of the SKA Science Review Panel), LOFT, XIPE, ALMA (mm-VLBI and Band 2 + 3)