

## Curriculum Vitae Raffaella Morganti

Graduated in Astronomy (Cum Laude) at the University of Bologna (1982): *Observations of compact radiosources with VLBI* (Supervisors: Prof. R. Fanti & Prof. L. Padrielli)

Ph.D. in Astronomy at the University of Bologna (1987): *Morphology and Physics of Radiogalaxies* (Promotor: Prof. R. Fanti)

### Employment

- February 1988 - June 1989: ESO Fellow, Garching
- Dec 1988 - September 1999: Staff astronomer - Istituto di Radioastronomia, CNR, Bologna (I)
- June 1993: September 1997: Long Term Visitor & Honorary Fellow at the Australia Telescope National Facility (ATNF, Sydney)
- September 1999 – present: Staff Astronomer at ASTRON (Netherlands Institute for Radio Astronomy), Dwingeloo, NL
- 2005 - 2011: UHD Kapteyn Institute Groningen
- 2007 – 2014: Head of the Astronomy Group at ASTRON
- **2007 - present: Senior Astronomer at ASTRON**
- **2011 - present: Full Professor** by special appointment for “*Structure and evolution of radio galaxies*” at the Kapteyn Astronomical Institute, University of Groningen
- **2013 - present: Principal Investigator of “RadioLife”**, project financed by an Advanced Grant of the European Research Council (ERC)

### Awards and Honours

- 2012 - Advanced Grant from the European Research Council (2. 5M€) for the project “*Exploiting new radio telescopes to understand the role of AGN in galaxy evolution*”
- 2013 - Mondo Italia! Award (Utrecht, May 2013)
- 2014 - Knighthood "*Commander in the Order of the Star of Italy*" (Commendatore dell'Ordine della Stella di Italia). Decoration given to recognize those expatriates and foreigners who made an outstanding contribution in the promotion of links/collaborations between Italy and other countries and/or promotion of national prestige abroad. Bestowed by decree of the President of the Italian Republic.

### Research Experience

- Author of more than 580 publications, 260 are refereed papers (including paper in Nature and Science), with more than 10100 citations corresponding to a Hersh index (*h-index*) of 54.
- Internationally recognised leading expert on radio AGN and, in particular, on the gas content and properties of these objects in relation to their evolution. Expert radio astronomer, making use of the top radio facilities (e.g. VLA, WSRT, LOFAR, ATCA, ALMA).
- One of the main WSRT users, obtaining key discoveries that had major impact in the field of AGN, AGN-driven outflows and galaxy evolution.
- Her recent work has involved the use of the LOFAR telescope, exploiting its unique capabilities (i.e. high spatial resolution at low frequencies) to study radio galaxies.

Her research has recently concentrated on three main topics.

- The effects of radio-loud AGN on the surrounding interstellar medium. This has been done through observations of HI. Highlight is the discovery, using the WSRT, of fast (>1000 km/s) HI outflows. This work has recently expanded to the molecular gas (using VLT and ALMA).
- Understanding the life-cycle of radio galaxies, what regulates the onset, the switch off and (sometimes) the restarting of their nuclear activity. This work makes mainly used of the LOFAR telescope.
- Structure of early-type galaxies. This work has been done as part of the Atlas3D project (see <http://www-astro.physics.ox.ac.uk/atlas3d/>, Cappellari et al. 2011, MNRAS 413,813). She is using

these data to study the presence of gas in early-type galaxies and the triggering mechanism(s) of low luminosity AGN.

## Management Experience

- Head of the Astronomy Group at ASTRON for about 8 years (Feb 2007 – Nov 2014) and member of the ASTRON Management Team.
- The Astronomy Group was created in 2007, and it has been the task of the PI to expand and revitalize the group, to shape its role in relation to the other ASTRON Departments (Radio Observatory and Research & Development). She has taken on board enthusiastic young staff and postdoc. She has successfully embedded the group in the commissioning and exploitation of the radio facilities at ASTRON, and has fully engaged the group with the other astronomy departments in the Netherlands.
- She has worked with the Management Team in defining ASTRON's strategy, securing internal resources for the Department and to support members of the group in their bids for external funding. This has been very successful: the group has more than doubled in size in the last 5 years, has obtained 4 ERC grants (as well as other NWO grants). It also plays an important role in the Dutch astronomy landscape.

## International committees (selection of the main)

- Astronomy & Astrophysics Review Board of Editors (2008 – present)
- Member of the Board of the Dutch ALMA regional center, *Allegro*
- Member of the Australia Telescope National Facility Steering Committee (until 2015)
- Member of the NWO Task-force “*Talent naar de Top*”
- Member of a number of NWO grant Selection Committee (VENI, “Free Competition”, TOP1, TOP2)
- Member of selection committee ERC Advanced and Starting Grants (2013, 2015)
- Astronomy Advisory Board of the Lorentz Center - International Center for workshops in the Sciences (2010 – 2012)
- Organizing committee for the triennial International Astronomical Union (IAU) Division X/Commission 40 – Radio Astronomy member (2009-2012)
- ASTRONET “*Panel B: UVOIR and radio/mm*” - Contributing to the Roadmap “*Toward a strategic plan for European astronomy*” (2008)
- Training and Networking Activity WG of the European RadioNet project (2004-present)
- SKADS *Marie Curie Conference and Training Network* (2008-2010)
- Node PI for the *ESTRELA Marie Curie - Early-stage training site for European long-wavelength astronomy* (2006-2010)
- Member of the Science Advisory Committee of EURO-Virtual Observatory (until 200

## Telescopes working groups and time allocation committees

- Member of the Square Kilometre Array (SKA) Science Working Group on HI Surveys for Galaxy Evolution, first author contribution to the SKA science book (2006-present)
- Member of the LOFAR NL-LAC (NL LOFAR Astronomy Consortium), (2010–2015)
- Member of the LOFAR Survey Key Project Core Team and PI of the working group on Nearby AGN (2008-present)
- Member of the Apertif Survey Team and participating in the definition of the Apertif surveys
  
- Member of the ESO Working Group on Public Surveys (2002 – 2003)
- Time allocation committees: Science Assessor of the Atacama Large Millimeter Array (ALMA) Cycle 0, Cycle 1 and Cycle 2; Australia Telescope Compact Array (2009-12), Effelsberg Radio Telescope (2005-6), European Southern Observatory (2003-5), Hubble Space Telescope (Cycle 12), Westerbork Synthesis Radio Telescope (2002-6), ING Dutch time (La Palma telescopes and JCMT), ASKAP *Expression of Interest* Evaluation Committee (2009)

## Member of the following surveys planned with SKA precursors:

- PI of the Apertif SHARP (Search for HI Absorption with Apertif) survey
- Member of the ASKAP FLASH: *The First Large Absorption Survey in HI*; PI Sadler
- Member of the MeerKAT HI absorption line survey; PI N. Gupta & R. Srianand
- *LADUMA! Looking At the Distant Universe with the MeerKAT Array*. (PI: Andrew Baker)
- ASKAP survey *WALLABY* (PI: Baerbel Koribalski)

## Ongoing main Observational Projects (selection)

- **Leading the RadioLife project** (supported by an European Research Council Advanced Grant)
- focused on the study of the life-cycle of radio sources via LOFAR observations of “relic” radio structures and Apertif (wide-field upgrade of the WSRT radio telescope) observations of the gas content.
- Member of **ATLAS<sup>3D</sup> Project team** ([Cappellari et al. 2011](#), MNRAS 413, 813-836): multi-wavelength survey of a complete sample of 260 early-type galaxies within the local (42Mpc) volume combined with numerical simulations and semi-analytic modeling of galaxy formation
- Member of **LOFAR core team** Surveys Key Science Project
- Leading the LOFAR survey sub-project “*Exploitation of LOFAR surveys for detailed studies of AGN, and AGN Physics*”
- Leading the Apertif project “*Blind search for 21-cm absorbers using Apertif*”

## Teaching and Supervision of Students

Supervisor (or co-supervisor) of nine PhD students, three still on going (Filippo Maccagni, Marisa Brienza, Francesco Santoro). *Two of the* PhD thesis (A.Shulevski PhD, RuG 2015, M.Brienza PhD, RuG on going) are focus on early results from LOFAR. Two thesis are focus on preparatory work for Apertif (K.Gereb 2014 and F.Maccagni, PhD RuG ongoing, expected completion June 2017).

Relevant mentoring role in other cases (e.g. N. Shafi (Univ. of Witwatersrand, ZA), J. Holt (Univ. Sheffield, UK), M. Orienti (Univ. Bologna, I)).

Supervisor of Master and Summer Students at the University of Bologna, ATNF and ASTRON - the majority of these now have a career in astronomy.

2012 and 2014: Teaching the Master course Active Galactic Nuclei (Kapteyn Institute, University of Groningen)

2015: Capita Selected course on Active Galactic Nuclei (Kapteyn Institute, University of Groningen)

## Selection of invited talks

The PI is regularly giving colloquia and invited/review talks at conferences on results obtained from her research and on radio facilities. Below a selection of some of the recent:

- “*From LOFAR to SKA: the new era of radio astronomy*”; Plenary Talk at the SPIE meeting on Astronomical Telescopes and Instrumentation, Edinburgh, June 2016
- “*LOFAR Studies of Radio Galaxies*” invited talk at the 41st COSPAR Scientific Assembly “Radio Galaxies: resolving the AGN phenomenon”, Istanbul, July 2016
- “*Synergy with new radio facilities: from LOFAR to SKA*” Solicited talk at the “XMM-Newton: The Next Decade” workshop, 9 - 11 May 2016 at ESAC (Madrid)
- “*HI outflows in radio galaxies*” invited review at the “Stellar and AGN feedback in galaxies: a multi-wavelength perspective of outflows” meeting EWASS 2016 Athens, July 2016
- “*Tracing AGN-driven gas outflows in radio sources*” invited talk at the workshop “Sweeping galaxies clean: cold molecular outflows as drivers of galaxy evolution”; Sesto (I), Feb 2016
- “*Using LOFAR for detailed studies of AGN and AGN physics*”; invited talk at the LOFAR Survey KSP meeting, Leiden, Sep 2015
- “*AGN-driven cold outflows and feedback: latest news and future plans*”; invited talk conference

- Transformational Science with the SKA, Stellenbosch (SA), Feb 2014
- “*Outflows of cold gas from radio-loud AGN*” invited talk at the workshop “Galactic Winds Near and Far”; Ringberg (D), June 2013
- “The role of radio jets in gas outflows and negative feedback”; invited talk at the Special Session SP6, EWASS 2013 *AGN, galaxy mergers, supermassive binary black holes and gravitational waves*, Turku, July 2013
- “*Exploiting new radio telescopes to understand the role of AGN in galaxy evolution*”. Annual meeting of the Nederlandse Astronomenclub, Utrecht, 2013
- “*Radio jets and outflows of cold gas*”; invited talk at the workshop *Black Hole Feedback*, Dartmouth (US), July 2012
- “*Radio surveys: an overview*” invited review at the IAU GA Special Session 15 “*Data Intensive Astronomy*” Beijing, Aug 2012
- “*Outflows, feedback, jets Nuclei of Seyfert Galaxies and QSOs*” invited review at the conference *Central Engine and Conditions of Star Formation*, MPIfR Bonn, Nov 2012

## Selection of organized Conferences/Workshop

The PI has been leading (or part of) the Scientific Organizing Committee in many conferences and workshop. Some of the most recent in which she had a leading role are:

- “The many facets of extragalactic radio surveys: towards new scientific challenges” Bologna Oct. 2015 (co-chair SOC) – Editor of the proceedings <http://pos.sissa.it/cgi-bin/reader/conf.cgi?confid=267>
- Dutch-RSA Radio Continuum Science Workshop in Cape Town, April 2015 (co-chair SOC)
- “Exploring the Low-frequency Radio Sky in the SKA Era” Genève 2014, part of the EWASS (co-chair SOC) 2015 (co-chair SOC)
- The Radio Universe @ Ger’s (wave)-length, Groningen, the Netherlands, Nov 4-7, 2013 (co-chair of SOC)
- “The triggering mechanisms for Active Galactic Nuclei”, 2013 Lorentz Center
- “Gas for cosmology in the nearby universe” Rome 2012, part of the EWASS (co-chair SOC)
- A New Golden Age for Radio Astronomy – Symposium part of the International SKA Forum (ISKAF) and LOFAR opening; Assen (NL), Editor of the Proceedings, <http://pos.sissa.it/cgi-bin/reader/conf.cgi?confid=112>, 2010.
- Fate of the Gas in galaxies, ASTRON, Dwingeloo, Editor of the Proceedings, <http://adsabs.harvard.edu/abs/2007NewAR..51....1M>, 2007.

## Selection of papers representing key results

The PI is author of more than 580 publications, 260 are refereed papers (including in Nature and Science), with more than 10000 citations corresponding to a Hersh index (*h-index*) of 54. (full list available on ADS [http://adsabs.harvard.edu/abstract\\_service.html](http://adsabs.harvard.edu/abstract_service.html))

- *The fast molecular outflow in the Seyfert galaxy IC5063 as seen by ALMA* Morganti, R., Oosterloo, T., Oonk, J.B.R., Frieswijk, W., Tadhunter, C. 2015. A&A 580, 1
- *The HI absorption "Zoo"* Gereb, K., Maccagni, F.M., Morganti, R., Oosterloo, T.A. 2015. Astronomy and Astrophysics 575, A44.
- Morganti, R., Oosterloo, T., Oonk, J.B.R., Frieswijk, W., Tadhunter, C. 2015. The fast molecular outflow in the Seyfert galaxy IC 5063 as seen by ALMA. Astronomy and Astrophysics 580, A1.
- *Direct evidence for a fast, jet-accelerated molecular outflow in the radio-loud Seyfert galaxy IC5063*, Tadhunter C., Morganti R., Rose M., Oonk R., Oosterloo T., 2014, Nature, 511, 440
- *Radio Jets Clearing the Way Through a Galaxy: Watching Feedback in Action*, Morganti R., Fogasy J., Paragi Z., Oosterloo T., Orienti M., 2013, Science, 341, 1082
- *Neutral hydrogen in nearby elliptical and lenticular galaxies: the continuing formation of early-type galaxies* Morganti, R., de Zeeuw, P.T., Oosterloo, T.A., McDermid, R.M., Krajnovi, D., Cappellari, M., Kenn, F., Weijmans, A., Sarzi, M. 2006, MNRAS 371, 157-169 (113 citations)

- *Extended, regular HI structures around early-type galaxies.* Oosterloo, T.A., Morganti, R., Sadler, E.M., van der Hulst, T., Serra, P. 2007. A&A 465, 787-798
- *Fast neutral outflows in powerful radio galaxies: a major source of feedback in massive galaxies.* Morganti, R., Tadhunter, C.N., Oosterloo, T.A. 2005. Astronomy and Astrophysics 444, L9-L13.
- *Fast Outflow of Neutral Hydrogen in the Radio Galaxy 3C 293* Morganti, R., Oosterloo, T.A., Emonts, B.H.C., van der Hulst, J.M., Tadhunter, C.N. 2003. The Astrophysical Journal 593, L69-L72.
- *HI absorption in radio galaxies: effect of orientation or interstellar medium?* Morganti, R., Oosterloo, T.A., Tadhunter, C.N., van Moorsel, G., Killeen, N., Wills, K.A. 2001. MNRAS 323, 331-342.
- *Highly extinguished emission line outflows in the young radio source PKS 1345+12.* Holt, J., Tadhunter, C.N., Morganti, R. 2003. MNRAS 342, 227-238.
- *Timescales of merger, starburst and AGN activity in radio galaxy B2 0648+27,* Emonts, B.H.C., Morganti, R., Tadhunter, C.N., Holt, J., Oosterloo, T.A., van der Hulst, J.M., Wills, K.A. 2006. A&A 454, 125-135.
- *The location of the broad HI absorption in 3C 305: clear evidence for a jet-accelerated neutral outflow* Morganti, R., Oosterloo, T.A., Tadhunter, C.N., van Moorsel, G., Emonts, B. 2005. A&A 439, 521-526.
- *A dark jet dominates the power output of the stellar black hole Cygnus X-1.* Gallo, E., Fender, R., Kaiser, C., Russell, D., Morganti, R., Oosterloo, T., Heinz, S. 2005. Nature 436, 819-821.

Two of the papers resulting from *the ATLAS3D collaboration*:

- *A systematic variation of the stellar initial mass function in early-type galaxies* Cappellari M., ... [Morganti R.] et al. 2012, Nature 484, 485 (<http://arxiv.org/abs/1202.3308>)
- *The Atlas3D project -- XIII. Mass and morphology of HI in early-type galaxies as a function of environment.* Serra P., Oosterloo T., Morganti R.; and 23 colleagues 2012. MNRAS 422, 1835

**Contribution to the AGN book - *Fifty Years of Quasars: Questions About the Observations and Ideas* - D'Onofrio, Sulentic, Marziani, Springer in press**