Filippo Marcello Maccagni

Curriculum Vitae et Studiorum

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Personal Information

Date of Birth	22–09–1987
City of Birth	Milano, Italy
Nationality	Italian
Address	via Antonio Bazzini 21, 20131, Milano, Italy

Education

Oct 2006 – Mar 2010	**Bachelor's Degree**, *Physics*, Universitá degli Studi di Milano, Milano, Italy, *106/110*.
Thesis	On the separation of astrophysical components in polarization *(Supervisor: Dr. D. Maino)*
Oct 2010 – Mar 2013	**Master's Degreee**, *Astrophysics & Cosmology*, Universitá di Bologna - Alma Mater Studiorum, Bologna, Italy, *110/110 cum laude*.
Thesis	Searching for Missing Baryons in the Cosmological Coronae of Disk Galaxies *(Supervisors: Prof. Dr. A. Cimatti, Prof. Dr. C. Vignali, Prof. Dr. F. Fraternali*)
Jun 2013 – Sep 2017	**PhD Degreee**, *Doctor in Astrophysics and Cosmology*, Kapteyn Institute - Rijksuniversiteit Groningen (University of Groningen), Groningen, the Netherlands.
Thesis	Cold gas in the centre of radio-loud galaxies. New perspectives on triggering and feedback from HI absorption surveys and molecular gas *(Promoter: Prof. Dr. R. Morganti, Co-Promoter: Prof. Dr. T. A. Oosterloo*)

Present Occupation

01 Oct. 2021–	**Postdoctoral researcher** at the Netherlands Institute for Radioastronomy (ASTRON), The Netherlands.

Past Occupation

09 Oct. 2017 – 30 Sept. 2021	**Postdoctoral researcher**, *Ricercatore Tempo Determinato di III livello,* Osservatorio Astronomico di Cagliari, INAF, Italy.
Jun 2013–Sep 2017	**Fixed term research contract** as PhD student at the Netherlands Institute for Radioastronomy (ASTRON), The Netherlands.

Scientific interests

- Gas in radio-galaxies: multi-wavelength observations of the interstellar medium (ISM) in radio active nuclei (radio-AGN) to understand the impact of the radio plasma jets on the surrounding gas, and how this regulates the nuclear activity itself. In particular, interferometric observations of the cold component of the ISM (neutral and molecular hydrogen) and study of their kinematics in relation to the radio activity.
- Gas accretion in nearby galaxies: multi-wavelength observations of the neutral, molecular and ionised gas to understand how star formation (SF) history of a galaxy is regulated by the availability of its cold gas, which in turn is driven by the balance between material accreting from the intergalactic space and gas expelled from the galactic disk.
- Low column density HI in the InterGalactic Medium: characterize the physics of gas accretion and removal in different environments, i.e. isolated galaxies, groups and clusters.
- Triggering of galactic nuclei: understanding how the physical conditions of the circum-nuclear gas may trigger or not an AGN, what causes the gas to lose angular momentum and accrete on the central supermassive black hole of galaxies.
- Understanding the duty-cycle of radio AGN: what causes a radio source to interrupt its activity, what restarts it, how recursive nuclear activity affects the evolution of galaxies.
- Interferometric astronomy: exploit all instruments which provide a spatially resolved spectrum of a galaxy, i.e. Integral Field Unit receivers, millimiter and sub-milllimiter interferometers, phased array feed radio telescopes.

Languages

Italian	mothertongue	
English	fluent	*(TOEFL, 2004)*
French	fluent	*(B2, 2006)*

Computing skills

Programming languages	Python (very good); IDL, C, C++, Fortran, Html
Data reduction software	CARACal, Miriad, CASA, WSCLEAN, AIPS, IRAF, CIAO
Scientific analysis tools	Karma, SAOImage ds9, MAGPHYS, GIPSY, SQL, TOPCAT, VOTools

Teaching experience

2014-2017 Teaching Assistant for the course 'Electrodynamics of Radiation processes in Astrophysics'. Class of the Master program in Astronomy and Physics at the University of Groningen, 30 hours per semester.

Telescope observing runs

2018, Nov VLT Survey Telescope (VST) H_α photometric observations. 6 nights at the ESO Cerro Paranal telescope site.

2018, Aug New Technology Telescope (NTT) single-slit spectroscopic observations, 3 nights at the ESO LaSilla observatory.

2013, Jun Australia Telescope Compact Array (ATCA) 21 cm observations, 36 hours: 12 hours from site + 24 hours of remote observing

Approved Proposals

PI **X-Shooter** Probing feeding and feedback in a newly born radio AGN. Project: 105.20QD, 6.5 hours.

PI **NTT** Powerful radio AGN as probes of neutral hydrogen in the distant Universe. Project: 105.20P4, 6 nights.

PI **MeerKAT** MeerKAT commissioning observations of NGC 1399. Project: 20180270-0031, 8 hours.

PI **ALMA** Studying the physical conditions of molecular clouds fuelling a newly-born radio AGN. Project: 2017.1.01561.S, 5.9 hours.

PI **ALMA** Investigating the feeding of a baby radio galaxy. Project: 2015.1.01359.S, 3.4 hours.

PI **VLA** Probing the gas content of radio galaxies out to redshift z<0.4. Project: VLA/15A-065, 24 hours.

PI **WSRT** HI absorption survey in preparation for Apertif: detailed line profile analysis and stacking experiments of radio-AGN (B). Project: R14B006, 650 hours.

PI **WSRT** HI absorption survey in preparation for Apertif: detailed line profile analysis and stacking experiments of radio-AGN (A). Project: R14A019, 1425 hours.

Co-I **ALMA** *P.I. K. Morokuma-Matsui* CO(J=1-0) mapping observation of NGC1316 at a scale of 50 pc.

Co-I **ALMA** *P.I. K. Morokuma-Matsui* Deep CO(J=1-0) mapping survey of 103 Eridanus supergroup galaxies with Morita array.

Co-I **ALMA** *P.I. D. Kleiner* Galaxy transformation in action, studying the ionized gas in the Fornax A group. Project: 0102.B-0780, 6 nights.

Co-I **VST** *P.I. R. Peletier* Galaxy transformation in action, studying the ionized gas in the Fornax A group. Project: 0102.B-0780, 6 nights.

Co-I **VLA** *P.I. R. Morganti* Tracing the role of HI in the evolution of radio sources: an extension to $z \sim 0.4$. Project: VLA/19A-031, 15.90 hours.

Co-I **XMM-Newton** *P.I. T. Beuchert* A wind-outflow detected in the young AGN PKS 1718-649? Project: 084511, 129 ks.

Co-I **NTT** *P.I. V. Moss* Powerful radio galaxies as probes of neutral hydrogen in the distant Universe. Project 0101.A-0534, 6 nights.

Co-I **VLA** *P.I. R. Morganti* Tracing the location of HI in the central regions of radio AGN. Project: VLA/16B-085, 26.4 hours.

Co-I **ATCA** *P.I. V. Moss* Rocking the cradle: a case study in continuum and spectral variability in young radio AGN. Project: C3019, 132 hours.

Co-I **EVN** *P.I. K. Nyland* Tracing the Evolution of Fast Jet-Driven Outflows Project: G14C001, 14 hours.

Co-I **SINFONI** *P.I. B. Emonts* Fuelling & feedback: piercing into the core of the closest radio-AGN. Project: 093.B-045(A), 2 hours.

Talks

Colloquia & Seminars

2019, Nov. 13 Colloquium at the Leibniz Institute for Astrophysics Potsdam (AIP, Potsdam, Germany). *Cold gas regulating the nuclear activity of Fornax A*.

2018, Dec. 10 Colloquium at the Istituto di Radioastronomia (IRA, Bologna, Italy). *MeerKAT observations of Fornax A*.

2018, Mar. 29 Colloquium at the Nederlandse Instituto for Radioastronomie (ASTRON, Dwingeloo, NL). *Cold gas in the center of radio-loud galaxies: new perspectives on triggering and feedback from HI and molecular gas.*

2017, Oct. 03 Colloquium at the Osservatorio Astronomico di Cagliari (OAC, Italy). *Cold gas in the center of radio-loud galaxies: new perspectives on triggering and feedback from HI and molecular gas.*

2017, Sep. 12 Colloquium at the Rijksuniversiteit of Groningen (NL). *Cold gas in the center of radio-loud galaxies: new perspectives on triggering and feedback from HI and molecular gas.*

2016, Jun. 17 Colloquium at the University of Sydney (AUS). *Understanding the properties of the neutral hydrogen in radio sources from absorption lines*.

2016, Jun. 15 Colloquium at ATNF/CSIRO Syndey (AUS). *Neutral hydrogen properties in radio sources*.

2016, Jun. 2 Colloquium at ICRAR/UWA, Perth (AUS). *Inflows and outflows of cold gas in radio sources traced by HI absorption lines.*

Invited talks

2019, Jun. 24-28 *Cold gas regulating the life-cycle of radio AGN* at the EWASS-Symposium S5: The ALMA view of nearby AGN: lessons learnt and future prospects, Lyon, France.

Contributed Talks

2020, Mar. 02-06 *The flickering nuclear activity of Fornax A* at the IAU Symposium 359: Galaxy Evolution and Feedback Across different Environments, Bento de Gonçalves, Brazil.

2019, Oct. 28-31 *Cold gas regulating the nuclear activity of Fornax A* at the Galaxy Evolution and Environment, Trieste, Italy.

2019, Oct. 14-18 *Cold gas regulating the life-cycle of radio AGN* at ALMA 2019: Science results and cross-facility synergies, Cagliari, Italy.

2019, Sep. 30-02 *Neutral hydrogen science with the SKA pathfinders: planned surveys and recent results* at SKA data challenges workshop Bologna, Italy.

2019, Jul. 29-31 *Cold gas regulating the nuclear activity of Fornax A* at Nine Billion Years of Neutral Gas Evolution, Munich, Germany.

2019, Feb. 11-13 *MeerKAT observations of Fornax A* at the the PHISCC workshop, Perth, Australia.

2018, Dec. 03-05 *First results from MeerKAT commissioning observations* at the II SKA National Workshop of SKA science and technology, INAF, Bologna, Italy.

2018, Sep. 29-31 *Software tools for HI absorption surveys* at the HI absorption workshop, ASTRON, Dwingeloo, the Netherlands.

2018, Jul. 09-13 *ALMA observations of AGN fuelling. The case of PKS 1718-649* at the Multiphase feeding and feedback workshop, Sexten, Italy.

2018, Jun. 10-13 *MeerKAT observations of Fornax A* at the PHISCC workshop, Pingtang, China.

2018, Mar. 26-28 *ALMA observations of AGN fuelling. The case of the young radio source PKS 1718-649* at the Energetics and life-cycle of radio sources, ASTRON, Dwingeloo, the Netherlands.

2017, Nov. 07-10 *ALMA observations of AGN fuelling. The case of PKS 1718-649* at the IV Workshop sull'Astronomia Millimetrica in Italia, Bologna, Italy.

2017, Jun. 14-16 *The Last Survey of the old WSRT: tools and results for the future HI absorption surveys* at the HI absorption workshop, ASTRON, Dwingeloo, the Netherlands.

2017, May. 22-24 *Atomic and molecular absorption lines trace the fuelling of radio AGN* at the Nederlandse Astronomen Conferentie, Nijmegen, The Netherlands.

2017, Mar. 02 *Investigating the feeding of a baby radio galaxy* at Netherlands ALMA Community day, Leiden, the Netherlands.

2017, Feb. 06-11 *The last survey of the WSRT telescope: discovering HI absorption in low-power radio sources* at PHISCC Workshop, NCRA, Pune, India.

2016, May 20-22 *PKSB 1718-649: the triggering of radio AGN* at the Nederlandse Astronomen Conferentie, Nunspeet, The Netherlands.

2016, Feb. 15-19 *Discovering cold gas outflows through HI absorption in low-power radio sources* at Sweeping galaxies clean: cold molecular outflows as drivers of galaxy evolution, Sexten, Italy.

2015, May 27-29 *The intriguing case of GPS source PKSB 1718-649* at the 5th Workshop on Compact Steep Spectrum and GHz-Peaked Spectrum Radio Sources, Rimini, Italy.

2015, Mar. 16-17 *Radio source triggering and evolution with HI absorption surveys*, at PHISCC Workshop: HI Surveys Get Real, Rutgers University, New Jersey, USA.

2014, Nov. 3-6 *Can HI clouds trigger a radio-AGN?*, at The Periphery of Disks, Sydney, Australia.

2014, Mar. 17-19 *HI and the triggering of AGN - the intriguing case of PKSB 1718-649*, at PHISCC Workshop: The Challenges of the Upcoming HI Surveys, ASTRON, Dwingeloo, The Netherlands.

Publications

First author refereed Papers

Maccagni et al. 2020 **The flickering nuclear activity of Fornax A** *MACCAGNI, F. M., Murgia M., Serra P., Govoni F., Morokuma-Matsui K., et al.*, 2020, A&A, 634, A9.

Maccagni et al. 2018 **ALMA observations of AGN fuelling: the case of PKSB 1718-649.** *MACCAGNI F. M., Morganti R., Oosterloo T. A., Oonk J. B. R., Emonts B. H. C.*, 2018, A&A, 614, A42.

Maccagni et al. 2017 **The last survey of the 'old' Westerbork Synthesys Radio Telescope: detecting HI absorption in low-power radio sources.** *MACCAGNI F. M., Morganti R., Oosterloo T. A., Geréb K., Maddox N.*, 2017, A&A, 604, A43.

Maccagni et al. 2016 **The warm molecular hydrogen of PKS B1718-649. Feeding a newly born radio AGN.** *MACCAGNI F. M., Santoro F., Morganti R., Oosterloo T. A., Oonk J. B. R., Emonts B. H. C.*, 2016, A&A, 588, 46

Maccagni et al. 2014 **What triggers a radio AGN?. The intriguing case of PKS B1718-649.** *MACCAGNI F. M., Morganti R., Oosterloo T. A., Mahony E. K.*, 2014, A&A, 571, 67

Second or third author refereed papers

Morokuma-Matsui et al. 2019 **Extended X-ray emission in PKS 1718-649** *Morokuma-Matsui K., Serra P., MACCAGNI F. M., For B.-Q., Wang J., Bekki K., Morokuma T., et al.*, 2019, PASJ, 71, 85

Serra et al. 2019 **Neutral hydrogen gas within and around NGC 1316** *Serra P., MACCAGNI F. M., Kleiner D., et al.*, 2019, A&A, 628, A122

Geréb et al. 2015 **The HI absorption 'Zoo'.** *Geréb K., MACCAGNI F. M., Morganti R., Oosterloo T. A.*, 2015, A&A, 575, 44

Other refereed publications

de Blok et al. 2020 **MeerKAT HI commissioning observations of MHONGOOSE galaxy ESO 302-G014.** *de Blok W. J. G., Athanassoula E., Bosma A., Combes F., English J., Heald G. H., Kamphuis, P., ..., MACCAGNI F. M.,* et al., 2020, arXiv, arXiv:2009.09766

Ianjamasim. et al. 2020 **MeerKAT-16 H I observation of the dIrr galaxy WLM** *Ianjamasimanana R., Namumba B., Ramaila A. J. T., Saburova, A. S., Józsa G. I. G., Myburgh T., Thorat K., ..., MACCAGNI F. M., et al.*, 2020, MNRAS, 497, 4795

Józsa G. I. G., et al. 2020 **MeerKATHI – an end-to-end data reduction pipeline for MeerKAT and other radio telescopes** *Józsa G. I. G., White S. V., Thorat K., Smirnov O. M., Serra P., Ramatsoku M., Ramaila A. J. T., ..., MACCAGNI F. M., et al.*, 2020, arXiv, arXiv:2006.02955

Ramatsoku et al. 2020 **GASP. XXVI. HI gas in jellyfish galaxies: The case of JO201 and JO206** *Ramatsoku M., Serra P., Poggianti B. M., Moretti A., Gullieuszik M., Bettoni D., Deb T., ..., MACCAGNI F. M., et al.*, 2020, A&A, 640, A22

Ramatsoku et al. 2020 **Collimated synchrotron threads linking the radio lobes of ESO 137-006** *Ramatsoku M., Murgia M., Vacca V., Serra P., Makhathini S., Govoni F., Smirnov O., ..., MACCAGNI F. M., et al.*, 2020, A&A, 636, L1

Ramatsoku et al. 2018 **GASP - XVII. H I imaging of the jellyfish galaxy JO206: gas stripping and enhanced star formation** *Ramatsoku M., Serra P., Poggianti B. M., Moretti A., Gullieuszik M., Bettoni D., Deb T., ..., MACCAGNI F. M., et al.*, 2019, MNRAS, 487, 4580

Beuchert et al. 2018 **Extended X-ray emission in PKS 1718-649** *Beuchert T, Rodríguez-Ardila A., Moss V. A., Schulz R., Kadler M., Wilms J., Angioni R., Callingham J. R, Gräfe C., Krauß F., ..., MACCAGNI F. M., et al.*, 2018, A&A, 612L, 4B

PhD Thesis

Maccagni 2017 **Cold gas in the centre of radio-loud galaxies.** New perspectives on triggering and feedback from HI absorption surveys and molecular gas. *MACCAGNI F. M.*, 2017, Rijksuniversiteit Groningen; ISBN: 978-94-034-0005-1

Conference Proceedings

Maccagni et al. 2020 **The recurrent nuclear activity of Fornax A and its interaction with the cold gas** *MACCAGNI F. M., Serra P., Murgia M., Govoni F., Morokuma-Matsui K., Kleiner D.*, 2020, arXiv, arXiv:2006.00897

Serra et al. 2016 **The MeerKAT Fornax Survey.** *Serra P.; de Block W. J. G.; Bryan G. L.; Colafrancesco S., Dettmar R. J., Frank B. S., Govoni F., Josza G. I. G., Kraan-Korteweg R. C., MACCAGNI F. M., et al.*, 2016, Proceedings of MeerKAT Science (PoS), 8, 8

Maccagni et al. 2015 **PKS B1718-649: An H I and H2 perspective on the birth of a compact radio source.** *MACCAGNI F. M., Santoro F., Morganti R., Oosterloo T. A., Oonk J. B. R., Emonts B. H. C.*, 2015, Astron. Nachr., 337, 154

Morganti et al. 2015 **Cold gas and the disruptive effect of a young radio jet.** *Morganti R., Oosterloo, T., MACCAGNI, F. M., Geréb, K., Oonk, J. B. R., Tadhunter, C. N.*, 2015, Astro. Nachr., 337, 199

Posters

2014, May 19-21 *What triggers a radio-AGN? The intriguing case of PKSB 1718-649*, at the Nederlandse Astronomen Conferentie, Leiden, The Netherlands

2013, Jul 22-26 *HI observations of the compact radio galaxy PKSB 1718-649*, at the Lorentz Center workshop 'The triggering mechanisms of Active Galactic Nuclei, Leiden, The Netherlands

Working groups

2017-present MeerKAT Fornax Survey member. The MeerKAT Fornax Survey (MFS) is a dedicated large survey project planned by the MeerKAT telescope. The project aims to study the assembly of new gas-rich galaxies and groups and the physics of gas accretion occurring in the Fornax Cluster environments. I have a leading role in the study of the duty cycle of Fornax A, an Active galactic Nucleus with extended and filamentary radio lobes, belonging to a group that is merging with the Fornax Cluster. I also focus in characterising the kinematics and physical conditions of the multi-phase ISM in the active galaxies of the cluster (Fornax A, NGC 1365, NGC 1368, NGC 1399).

2017-present CARACal working group. CARACal is the new automated pipeline that will be used for the data reduction of MeerKAT observations. As part of the team, I have a leading role in the development of software for the automated production of high dynamic range continuum and spectral images in the L-band. I also organized the weekly meetings to coordinate the group, which has participants both in different European Universities and research centres and at SKA-South Africa.

2016-present Apertif Commissioning member. Apertif is a phased-array feed for the Westerbork Synthesis Radio Telescope (WSRT), that increases its field of view allowing continuum and spectral line images of the radio-sky. As part of the Commissioning Team, I developed two softwares (RFInder and SHARPener) for the assessment of the data quality of radio interferometric observations.

Other diplomas

2005 Essex Junction High School Diploma, USA high school diploma

2012 Sailing instructor (level 1/2) of the Fedération Française de Voile