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## PERSONAL DETAILS

Date of birth: 22 January 1983

Nationality: USA, Italy

<http://home.strw.leidenuniv.nl/~morabito/>

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## EDUCATION

Sep 2012 - present **Leiden University**, Astronomy PhD Researcher Supervisor: Huub Röttgering  
Thesis: ‘Low frequency studies of high redshift radio galaxies’  
Sep 2009 - Apr 2012 **University of Oklahoma**, M.S. Astronomy Supervisor: Xinyu Dai  
Thesis: ‘AGN: From Supermassive Black Holes to Rare FeLoBALs’  
Sep 2001 - Apr 2005 **University of Michigan**, B.S. Physics & B.S. Astrophysics

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## SCIENCE HIGHLIGHTS

- First spatially resolved maps of high redshift radio galaxies, 1'' resolution at 60 MHz with LOFAR
- First extragalactic detection of low frequency carbon radio recombination lines (M82)
- Widest, deepest survey field map to date with low band LOFAR (7.5 mJy bm<sup>-1</sup> rms at 57 MHz)
- Determined intrinsic X-ray properties of broad absorption line quasars with new method

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## RESEARCH EXPERIENCE OVERVIEW

My PhD research has focused on low frequency radio interferometric data calibration and analysis, including commissioning work on the Low Frequency Array (LOFAR). This includes the development of new methods to analyse low frequency data. I also gained theoretical experience working with detailed balance models for level populations in Rydberg atoms. Prior to my PhD, I gained expertise in X-ray photometry with a variety of satellite observatories, as well as building Monte-Carlo simulations for Bayesian analysis of how selection effects impact observational relations. I am adept at working with large catalogues of data, and employing statistical methods on large data cubes.

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## PROFESSIONAL EXPERIENCE

Aug 2015 **LOFAR Long Baseline Workshop**. I am involved in commissioning and developing the LOFAR long baseline (LB) data reduction pipeline. As an experienced member of the LB working group, I helped new users calibrate long baseline data.

Jul 2012 - present **LOFAR Commissioning Busy Weeks**. Participated in multiple busy weeks to commission software for low-frequency, wide-field imaging.

Apr 2015 **Resident Shared Risk Observing, JVLA**. Worked on-site at the National Radio Astronomy Observatory in Socorro, NM, with observatory staff to commission P-band for spectroscopic work.

Jan 2013 **Chair of Local Organising Committee**. LOFAR Busy Week 21. Week long workshop with 40+ international participants, including specialized technical talks, commissioning work, and training for new users.

May 2012 - Aug 2012 **Research Experience for Graduate Students**. 3-month program working with VLA data to detect ammonia transitions in nearby starburst galaxies.

May 2012 **12th Synthesis Imaging Workshop**. 2 weeks of radio interferometry classes at New Mexico Tech, with hands-on data reduction sessions.

Aug 2011 **X-ray Astronomy and CIAO Workshops, CXC**. Week-long workshops on specialized X-ray data reduction techniques, focussed on hands-on data reduction.

Aug 2008 - Aug 2011 **Evaluator/Instructor Electronic Combat Officer (ECO), USAF, Capt.** Operated Passive Detection System on E-3 Airborne Warning And Control System (AWACS). Culminated experience as Chief Evaluator and subject matter expert.

Jun 2005 – Aug 2008 **Air Weapons Officer, USAF, 1Lt**. Controlled tactical aircraft from AWACS. Deployed in support of combat missions in Afghanistan and Iraq. Key controller in large force exercises such as Red Flag.

## SUCCESSFUL OBSERVING PROPOSALS: PI/SELECTED CO-I

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- ‘Long Baseline Studies of High Redshift Radio Galaxies’ – PI, LOFAR Cycle 4, 54 hrs
- ‘Radio Recombination Lines in M82 with P-band’ – PI, JVLA Semester 2015B, 17 hrs
- ‘Commissioning LBA Long Baselines using the HBA’ – PI, Commissioning, 9.75 hrs
- ‘Long Baseline Studies of High Redshift Radio Galaxies’ – Co-I, LOFAR Cycles 2 & 3, 51 hrs
- ‘A large, perfectly matched, Lya-Ha dual narrow-band survey at  $z=2.23$ ’ – Co-I, INT 2013A

## HONOURS AND AWARDS

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Feb 2010	Distinguished Graduate, Instructor Electronic Combat Officer Training
2009	Air Force Achievement Medal (for leading Deployed Electronic Support Team)
2008	Air Medal (for flying combat hours)
2007	Distinguished Graduate, Initial Air Weapons Officer Qualification Training
2006	Top Scope Award, Undergraduate Air Battle Management Training
Apr 2005	College of Literature, Science & the Arts ‘Angell Scholar’
Apr 2005	Member of Sigma Pi Sigma, National Physics Honors Society
Sep 2001 - Apr 2005	Reserve Officer Training Corps Scholarship, approx. 120 000 USD
May 2001	University of Michigan Regents Merit Scholarship, 3000 USD

## OBSERVING EXPERIENCE

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- GMRT radio telescope, Pune, India, 5 nights
- INT 2.5 m optical telescope, Roque de los Muchachos, La Palma, 18 nights
- MDM 2.4 m Hiltner optical telescope, Tucson, AZ, USA, 7+ nights

## COMPUTING SKILLS

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- Operating systems: Linux, Mac, Windows, and standard packages therein
- Programming Languages: R, Python, IDL, Bash, FORTRAN
- Astronomical Software: AIPS, CASA, ParselTongue, LOFAR software, HEASOFT, PIMMS, XSELECT, IRAF, CIAO, SHERPA, XSPEC, FTOOLS

## TEACHING AND OUTREACH

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Jan 2015 – Jul 2015	<b>Teaching Assistant, Radio Astronomy MSc class.</b> Developed tutorials and practical project for 14 students, supervised hands-on sessions, organized and conducted field trip to Dutch radio observatories.
Oct 2012, 2014	<b>Public Outreach, Leiden Old Observatory.</b> Helped with open day for public to view the observatory, visitor’s center, and participate in outreach activities.
Sep 2013 – Aug 2014	<b>Supervision of MSc student.</b> My student worked on LOFAR long baseline data to study the physical processes present in high redshift radio galaxies. The project spanned the basics of radio astronomy to writing of successful MSc thesis.
Feb 2010 – Aug 2011	<b>Instructor Electronic Combat Officer.</b> Instructed students on all technical and tactical aspects of using the Passive Detection System on the E-3 AWACS.
Apr 2005	<b>Physics Girls’ Inreach.</b> Developed content for and organized all logistics for public inreach targeted to 10/11 year old girls with the intent to interest them in science and show them strong female role models.
Sep 2004 - Apr 2005	<b>Co-Founder and Co-President, Society of Women in Physics (SWiP).</b> Program focused on mentorship of younger women undergraduate students, and promoting women in STEM fields.
Jan 2003 - Apr 2005	<b>Angell Hall Public Viewing Nights.</b> Operated 0.6 meter telescope, Celestron 8 telescopes, and planetarium at Angell Hall Observatory for public viewing nights with the Student Astronomical Society.
Aug 2004 - Apr 2005	<b>Physics Public Outreach.</b> Taught multiple hour-long workshops on various physical principles with the Society of Physics Students.

## PEER REVIEWED PUBLICATIONS

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- 2015 Salgado, **Morabito**, et al. *Low Frequency Carbon Radio Recombination Lines I: Calculations of Departure Coefficients*, ApJ accepted
- Heald et al. *The LOFAR Multifrequency Snapshot Sky Survey (MSSS) I. Survey description and first results*, A&A, 582, A123
- Oonk, **Morabito**, et al. *The Physics of the Cold Neutral Medium: Low-frequency Radio Recombination Lines with the Square Kilometre Array*, AASKA14, 139
- Varenius et al. *Subarcsecond international LOFAR radio images of the M82 nucleus at 118 MHz and 154 MHz*, A&A, 574, A114
- Moldón et al. *The LOFAR long baseline snapshot calibrator survey*, A&A, 575, A73
- 2014 **Morabito et al.** *Discovery of Carbon Radio Recombination Lines in M82*, ApJL, 795, L33
- Morabito et al.** *Exact bound-bound Gaunt factor values for quantum levels up to  $n = 2000$* , MNRAS, 441, 2855
- Morabito et al.** *Unveiling the Intrinsic X-Ray Properties of Broad Absorption Line Quasars with a Relatively Unbiased Sample*, ApJ, 786, 58
- Oonk et al. *Discovery of carbon radio recombination lines in absorption towards Cygnus A*, MNRAS, 437, 3506
- 2012 **Morabito & Dai** *A Bayesian Monte Carlo Analysis of the  $M$ - $\sigma$  Relation*, ApJ, 757, 172
- 2011 **Morabito et al.** *Suzaku Observations of Three FeLoBAL Quasi-stellar Objects: SDSS J0943+5417, J1352+4239, and J1723+5553*, ApJ, 737, 46

## SELECTED SCIENTIFIC PRESENTATIONS

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- 2015 • Oxford Galaxy Evolution Seminar, *Low-frequency Views on the Cold Neutral Medium and High Redshift Radio Galaxies*
- The Many Facets of Extragalactic Radio Surveys, *LOFAR Survey of Spatially Resolved Ultra-Steep Spectrum Sources*
- NRAO (Socorro) Lunch Talk, *Carbon Radio Recombination Lines in M82 with P-Band*
- NL/SA Radio Continuum Science Meeting, *Spatially Resolved Studies of High- $z$  Radio Galaxies at 60 MHz*
- 2014 • IAU 313: Extragalactic Jets from Every Angle, *Spatially Resolved Studies of (Extragalactic Jets in) High- $z$  Radio Galaxies at Low Frequencies*
- IAU 309: Galaxies in 3D, *Discovery of Carbon Radio Recombination Lines in M82*
- LOFAR Community Science Workshop, *Discovery of Carbon Radio Recombination Lines in M82*
- 2013 • Invited Seminar, University of Oklahoma, *LOFAR: Radio Recombination Lines and High Redshift Radio Galaxies*
- The Radio Universe at Ger's (wave)-length, *Recombination Line Studies with LOFAR*
- Google Tech Talk, *High Redshift Radio Galaxies and the Advent of LOFAR*
- Astronomy, Radio Sources and Society, *Radio Recombination Lines and Long Baselines on 4C41.17*
- LOFAR Status Meeting, *HBA Tied-Array Observations of Radio Recombination Lines*
- LOFAR Science Community Workshop, *Radio Spectroscopy with LOFAR*
- 2012 • NRAO (Socorro) Lunch Talk, *Ammonia in NGC 6946*
- NRAO (Socorro) Lunch Talk, *Active Galactic Nuclei: from Supermassive Black Holes to Rare FeLoBALs*
- Cosmology Seminar, MPIA, *X-ray Observations of Broad Absorption Line Quasars*
- Observational Cosmology Seminar, University of Oxford, *X-ray Observations of Broad Absorption Line Quasars*