

FILIPPO FRATERNALI

CURRICULUM VITAE

PERSONAL DETAILS

Name Filippo Fraternali
Born 15th March 1973, Sant'Angelo in Vado, PU, Italy
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EDUCATION

1998–2002 PhD in Astronomy, “*Hot and cold gas in the disk and halo of the spiral galaxy NGC 2403*”, University of Bologna (I), Supervisors: R. Sancisi, T. Oosterloo, R. Fanti.
1992–1998 Master in Astronomy *cum laude* “*Study of Radio Galaxies with the Hubble Space Telescope*” (in Italian), University of Bologna, Supervisors: R. Fanti, H. de Ruiter.

EMPLOYMENT

Sep 2019 – present **Full Professor**, Kapteyn Astronomical Institute, University of Groningen, The Netherlands.
Nov 2017– Aug 2019 Associate Professor, Kapteyn Astronomical Institute, University of Groningen, The Netherlands.
Nov 2006 – Oct 2017 Assistant Professor, Astronomy Department, University of Bologna, Italy.
Mar 2004 – Mar 2006 **Marie-Curie Fellow**, Department of Theoretical Physics, Oxford University, UK.
Feb 2003 – Mar 2004 Post-doc, ASTRON, Dwingeloo (NL).
Feb 2002 – Jan 2003 Post-doc, Kapteyn Astronomical Institute, Groningen.
Oct 1998 – Feb 2002 PhD research grant, Astronomy Department, University of Bologna.

AWARDS AND DISTINCTIONS

2023 **ERC Advanced Grant** – Project FLOWS to study the gas flows in and out of galaxies.
2022 Astronomy teacher of the year, education prize, University of Groningen.

- 2021 **George Darwin Lecturship** Award of the Royal Astronomical Society, for "his work in developing our understanding of how galaxies evolve by accreting material from the intergalactic medium."
- 2020 **Friedrich Wilhelm Bessel** Research Prize of the Alexander von Humboldt Foundation, "for past accomplishments in research and teaching".
- 2020 **Best PhD supervisor** prize of the Faculty of Science and Engineering of the University of Groningen.
- 2019 Astronomy teacher of the year, education prize, University of Groningen.
- 2019 Second place in the Best PhD supervisor prize of the Faculty of Science and Engineering of the University of Groningen.
- 2017 *Abilitazione Scientifica Nazionale* di Prima e Seconda fascia per Settore Concorsuale 02/C1: Astronomia, Astrofisica, Fisica della Terra e dei Pianeti. This qualification is granted by a national committee and certifies that the holder of it is at the level of Full Professor.
- 2015 Honorary professorship of Evolution of gas in galaxies - Faculty of Mathematics and Natural Sciences, University of Groningen, The Netherlands
- 2004 Marie-Curie Post-doctoral Fellowship, FP6

FUNDING

- 2023 **ERC Advanced Grant**, PI, € 2.5M.
- 2022 **EWN XS** grant, PI, € 50K.
- 2020 Friedrich Wilhelm Bessel Prize, Alexander von Humboldt Foundation, PI, € 45K.
- 2019 **NWO Klein-1** grant, PI, € 300K.
- 2018 **NOVA Postdoc Grant**, PI, € 220K.
- 2017 **NOVA PhD Grant** co-funded by ASTRON, PI, € 220K total.
- 2017 PhD startup Grant from the University of Groningen, PI.
- 2016 ESO Garching scientific visitor grant.
- 2008-2016 6 PhD grants from the University of Bologna, assigned by departmental competitions between the students (typically 2-3 positions a year), total of € ~300K.
- 2012 PRIN, Italian Ministry of University & Research, co-I, € 800K, 3-year research funding.
- 2008 PRIN, Italian Ministry of University & Research, co-I, € 100K, 2-year research funding.
- 2004 Marie-Curie , 2-year personal fellowship, PI, € ~100K
- 2002 Ubbo Emmius scholarship, University of Groningen.

SUPERVISION OF PHD STUDENTS

- Nov 2022–present Yi (Linn) He, “*Radial motions in galaxies as evidence for gas accretion*”, University of Groningen.
- Sept 2021–present Barbara Silijeg, “*Dwarf galaxies with Apertif*”, University of Groningen.
- Sept 2020–present Fernanda Roman de Oliveira, “*Accurate gas dynamics of distant galaxies*”, University of Groningen.
- 2018 – 2023 Anqi Li, “*WEAVE-Apertif: mapping extraplanar gas in nearby galaxies*”, University of Groningen.
- 2018 – 2022 Pavel Mancera-Piña, “*Dynamics and angular momentum of dwarf galaxies*”, University of Groningen.
- 2017 – 2021 Andrea Afruni, “*Gas flows from and to galaxies: understanding the circumgalactic medium*”, University of Groningen.
- 2016 – 2020 Cecilia Bacchini, “*Gas cycle in spiral galaxies: from accretion to star formation and back*”, University of Bologna/Groningen, double PhD, now post-doc at the INAF/Padova observatory, Italy. This thesis won the **2020 IAU PhD prize** for best thesis in Interstellar Matter and Local Universe.
- 2014 – 2018 Giuliano Iorio, “*Dynamics and evolution of Local Group dwarf galaxies*”, University of Bologna, co-advisor, now post-doc at the INAF/Padova observatory, Italy.
- 2013 – 2016 Lucia Armillotta, “*The origin and fate of the multiphase circumgalactic medium of galaxies via high-resolution hydrodynamical simulations*”, University of Bologna. Currently Postdoctoral Research Associate at Princeton University, USA.
- 2012 – 2015 Gabriele Pezzulli, “*Accretion and evolution of galaxy discs*”, University of Bologna, defended in December 2015. Now NOVA fellow at the Kapteyn Institute. This thesis won the biannual **Lions Prize** for the best thesis of the University of Bologna.
- 2012 – 2015 Enrico Di Teodoro, “*Dynamics of galaxies through the modelling of emission-line datacubes*”, University of Bologna, defended in December 2015. Now post-doc at the STScI, USA.
- 2010 – 2014 Federico Lelli, “*Starbursts and gas dynamics in low mass galaxies*”, University of Groningen, defended in December 2013 **cum laude** (conferred on the top 5% of the students). Now staff at INAF/Arcetri, Firenze, Italy.
- 2010 – 2013 Antonino Marasco, “*The gaseous halo of the Milky Way*”, University of Bologna, defended in February 2013. Now Post-doc at INAF/Arcetri, Italy. This thesis won the **Gratton Prize** for the best Italian thesis of the years 2013-2014 and the Lions Prize for the best thesis of the University of Bologna.
- 2008 – 2011 Federico Marinacci, “*Dynamics of the halo gas in disc galaxies*”, University of Bologna, co-advisor, defended April 2011. Now assistant professor at the Physics and Astronomy Department of the University of Bologna.

SUPERVISION OF MASTER STUDENTS

1. Thijs Luggenhorst, graduated in July 2021.
2. Richard Kooij, graduated in July 2020.
3. Andrea Afruni, graduated *cum laude* in March 2017, currently my PhD student.
4. Marco Canducci, graduated in March 2017, continued with a PhD in machine learning for astronomy at the University of Birmingham.
5. Federica Loiacono, first advisor: Andrea Cimatti, graduated *cum laude* in March 2017, continued with a PhD the University of Bologna.
6. Cecilia Bacchini, graduated *cum laude* in September 2016, continued as my PhD student.
7. Francesca Rizzo, graduated *cum laude* in July 2016, continued with a PhD at the Max Planck Institute for Astrophysics, Munich, Germany.
8. Francesco Bringoli, in collaboration with ASTRON (NL), graduated in March 2016.
9. Robin Gopala Treß, in collaboration with Heidelberg University, graduated in March 2016, continued with a PhD at the University of Heidelberg, Germany.
10. Giuliano Iorio, graduated *cum laude* in September 2014, continued as my PhD student.
11. Lucia Armillotta, graduated in March 2013, continued as my PhD student.
12. Filippo Marcello Maccagni, first advisor: Andrea Cimatti, graduated *cum laude* in March 2013, continued with a PhD at the University of Groningen.
13. Martina Valleri, University of Bologna, graduated in March 2013.
14. Gabriele Pezzulli, graduated *cum laude* in July 2012, continued as my PhD student.
15. Andrea Gatto, graduated *cum laude* in March 2012, continued with a PhD at the University of Munich, Germany.
16. Enrico Di Teodoro, graduated *cum laude* in March 2012, continued as my PhD student.
17. Antonio Garufi, in collaboration with Groningen University, graduated in December 2011, continued with a PhD.
18. Debora Pelliccia, graduated in March 2011, continued with a PhD at the University of Marseille, France.
19. Matteo Tomassetti, graduated *cum laude* December 2010, continued with a PhD at the University of Heidelberg, Germany.
20. Nicola Clementel, in collaboration with Leiden University, graduated in December 2009, continued with a PhD at the University of Leiden.
21. Antonino Marasco, graduated *cum laude* in October 2009, continued as my PhD student.
22. Federico Lelli, graduated *cum laude* in October 2009, continued as my PhD student.
23. Matteo Barnabè, first advisor: Luca Ciotti, graduated *cum laude* in 2004, continued with a PhD at the University of Groningen.
24. Claudia Barbieri, Univ. of Milano, first advisor: Giuseppe Bertin, graduated in February 2004.
25. Giuseppina Battaglia, first advisor: Renzo Sancisi, graduated *cum laude* in March 2003, continued with a PhD at the University of Groningen.

I have also supervised 20 Bachelor theses between the University of Bologna and Groningen.

UNIVERSITY LECTURES AND TEACHING CONTRIBUTIONS

- 2018–present **Bachelor course *Astrophysical Hydrodynamics***, University of Groningen (32+16 hrs). Taught every year, a course that I re-designed. It deals with Hydrodynamics and MHD of ideal and non-ideal fluids.
- 2012–present **Master course *Gas flows in galaxies***, University of Groningen, 3ETCs (16 hrs). Taught every second year, a course based on literature readings that changes every year.
- 2008–2017 **Master course *Gas dynamics in galaxies***, University of Bologna (48 hrs). Taught every year, a new course that I designed from scratch made of three parts: 1) Hydrodynamics and MHD of ideal and non-ideal fluids, 2) Star formation, 3) Stellar feedback.
- Sept. 2008 Lectures for graduate students *Disc galaxies and their ISM*, Astronomy Department, University of Bologna.
- 2007–2017 Contributed lectures for the following courses at the University of Bologna: Formation and Evolution of Galaxies (Master), Diffuse Matter (Master), Clusters of galaxies (Master) Elements of Programming (Bachelor) and Calculus for Astronomy (Bachelor).
- March 2005 Lectures for graduate students *Structure and dynamics of disc galaxies*, Astrophysics Department, Oxford University.

I am co-author of the (Master-level) textbook

“Introduction to Galaxy Formation and Evolution: from primordial gas to present-day galaxies”, Cimatti, A., Fraternali, F. & Nipoti, C., Cambridge University Press, 2020, ISBN: 9781107134768

INSTITUTIONAL RESPONSIBILITIES AND OTHER ACTIVITIES

- 2020–present **Chair of Board of Admissions**, Master in Astronomy (University of Groningen).
- 2019–present **Coordinator of the Astronomy Master project** (University of Groningen).
- 2017–present Member of the Astronomy Programme Committee (University of Groningen).
- 2017–2020 Member of Board of Admissions, Master in Astronomy (University of Groningen).
- 2017–2019 Organizer astrophysical colloquia (University of Groningen).
- 2010–2017 Member of the Master thesis committee (University of Bologna).
- 2010–2017 Responsible for professionalization activities for Master students (University of Bologna).
- 2008–2010 Bachelor thesis committee (University of Bologna).
- 2007–2009 Organizer of astrophysics talks (University of Bologna).

COMMISSIONS OF TRUST AND REFEREEING

- 2021 Panel member of the Observing Programmes Committee (OPC) of the European Southern Observatory (ESO).
- 2021 Reviewer for the Deutsche Forschungsgemeinschaft (DFG).
- 2021 PhD Thesis reading committee, Valentina Cesare, Physics Department, University of Turin, Italy.
- 2020-present Member of the Netherlands Radio Astronomy Advisory Committee (NRAAC).
- 2020 Reviewer for the University of Western Australia.
- 2020 PhD Thesis reading committee, Helmer Koppelman, University of Groningen.
- 2019 Panel member of the Observing Programmes Committee (OPC) of the European Southern Observatory (ESO).
- 2019 PhD Thesis reading committee, Jorrit Hagen, University of Groningen.
- 2018-2020 Member of the LOFAR Netherlands Astronomy Consortium (NL-LAC), committee that advises the Board of the International Lofar Telescope.
- 2017-present Committee member, selections of PhD students for the Kapteyn Institute. Committee member, selections of postdocs and fellows at University of Groningen.
- 2017 PhD Thesis reading committee, Jingjing Shi, SISSA, Trieste, Italy.
- 2016 PhD Thesis reading committee, Anastasia Ponomareva, University of Groningen.
- 2015 Reviewer for the Austrian Science Fund (FWF).
- 2015 Reviewer for the South Africa's National Research Foundation (NRF).
- 2015 Reviews requested for ERC Starting-Grant, Natural Sciences and Engineering Research Council of Canada and Swiss National Science Foundation. I had to decline due to other commitments.
- 2013 Committee member, selection of PhD students for the University of Bologna, Italy.
- 2012 Reviewer for the Deutsche Forschungsgemeinschaft (DFG).
- 2012 Reviewer for the Anglo-Australian Telescope.
- 2012 Committee member, Postdoc selection for the ALMA regional centre, Italy.

I regularly referee papers for all major Astrophysical Journals: ApJ, MNRAS, A&A and AJ. I have also refereed papers for Science and the Journal of Plasma Physics.

ACCEPTED PROPOSALS AND OBSERVATIONAL EXPERIENCE

I have obtained a large amount of data at the **VLA**, **VLT** (Flames, FORS, MUSE), **Chandra**, **WHT**, **GMRT**, **Spitzer**, **HST**, **INT**, **ALMA**, **WEAVE** data both as PI and co-I (several times with my PhD students as PI) and I have been observing at the WHT.

I have been co-I of numerous successful proposals at the Westerbork Synthesis Radio Telescope (**WSRT**) including the deep survey of NGC891 (200 hrs) and the HALOGAS international team.

Short selection of successful proposals:

- VLA: *Dynamics of ultra-diffuse galaxies* (PI: P. Mancera Piña, my PhD student), VLA/20A-095, VLA/21B-163, 100 hrs.
Gas dynamics and star formation in Blue Compact Dwarfs (PI: F. Lelli, my PhD student), VLA/10C-200, R11A007, VLA/11B-075, VLA/12A-246, 50 hrs.
- VLТ-FLAMES: *Halo gas and gas accretion in intermediate-redshift disk galaxies* (PI: Fraternali), 086.B-0427(A), 26 hrs.
- WSRT: *The WSRT Hydrogen Accretion in Local GALaxieS (HALOGAS) Survey* (PI: G. Heald), R09A014, 455 hrs.
- GMRT: *A gift from Nature* (PI: Fraternali), 34_012, 73 hrs.
- ALMA: *Dynamics of galaxies at $z > 4$* (PI: Lelli), 2017.1.01471.S, 2019.1.01587.S, 41 hrs.

My group has been awarded several million CPU hours of computing time at national and international supercomputers:

- 2021 4.6 million CPU hours at the **PRACE-ICEI** supercomputer, European facility.
- 2020 0.5 million CPU hours at the SURFsara **Cartesius** supercomputer, The Netherlands.
- 2011-2019 3.6 million CPU hours at the **CINECA** supercomputers, Italy.

LARGE COLLABORATIONS AND MEMBERSHIPS

- TRICEPS (**ALMA**): [CII] distribution and kinematics in galaxies at $z = 4 - 5$, co-I.
- Square Kilometre Array (**SKA**) HI science group (www.skatelescope.org/), member.
- WEAVE-Apertif (**WHT**), member.
- HALOGAS: search for gas in the halos of nearby galaxies with WSRT (www.astron.nl/halogas/).
- MHONGOOSE: Large Survey Project with **MeerKAT** (South African SKA Precursor), co-I.
- medium-deep HI survey with **Apertif** (focal-plane array at the WSRT, a SKA-pathfinder), co-I.
- **EUCLID** consortium (www.euclid-ec.org/), member.
- Member of the International Astronomical Union (IAU).
- Member of the European Astronomical Society (EAS).

INVITED TALKS AT MAJOR INTERNATIONAL MEETINGS

1. *What does the Milky Way tell us about the CGM?* keynote talk at the “Fundamentals of gaseous halos”, Kavli Institute for Theoretical Physics, Virtual Meeting, 11 Jan-3 Mar 2021.
2. *Gas dynamics across cosmic time* at Symposium S6 “Stellar & gas kinematics in galaxies across cosmic time, connecting observations with theory” of the European Astronomical Society Virtual Meeting 2020, 29 June-3 July (**review**).
3. *Fountain circulations as a source of sustaining star formation in nearby galaxies* at “Cosmic Baryon Cycle: impact on galaxy evolution”, The Seventh Annual GMT Community Science Meeting, Carlsbad, California, USA, 19-21 Sept 2019.

4. *Structures and dynamics of the ISM in galaxies* at “Probing the Activities and Power Engines from Local to Distant Universe”, the Second Forum on Gas in Galaxies, Multiple-phase Interstellar medium, China, 9-13 Sept 2019.
5. *The other side of feedback* at “Feedback and its Role in Galaxy Formation”, Spetses, Greece, 25-29 June 2019.
6. *How the CGM accretes onto galaxies* at “What matter(s) between galaxies: Unraveling the knots in the Cosmic Web”, Abbazia di Spineto, Italy 3-7 June 2019.
7. *The theoretical perspective of HI in galaxies* at “The HI/Story of the Nearby Universe”, 10-12 September 2018, Groningen and Dwingeloo, The Netherlands.
8. *Accretion physics and scaling laws of AM in galaxies* at “Galactic Angular Momentum”, XXX IAU General Assembly, Vienna, Austria, 20-22 August 2018.
9. *Understanding the fountain-corona interaction* at “The role of feedback in galaxy formation: from small-scale winds to large-scale outflows”, Leibniz Institute for Astrophysics Potsdam, Germany, 3-7 September 2018 (**plenary talk**).
10. *Theoretical and observational aspects of gas circulation in galaxies* at “The Role of Gas in Galaxy Dynamics”, Valletta, Malta, 2-6 October 2017 (**review**).
11. In & Out. What rules the Baryon Cycle? - MIAPP Programme, Munich, Germany, 3-14 July 2017.
12. *Physical processes that shape the CGM* at “What Matter(s) Around Galaxies”, Durham, UK, 19-23 June 2017.
13. *Rotation curves across the Hubble time* at “Bright and dark Universe”, Napoli, Italy, 29 Jan - 2 Feb 2017.
14. *Indirect and direct inflow evidence of gas accretion into galaxies* at “The galaxy life-cycle”, Venezia, Italy, 24-28 October 2016 (**review**).
15. *Gas accretion and its impact on the evolution of the Milky Way* at “The Milky Way and its environment: gaining insights into the drivers of galaxy formation and evolution”, Institut d'Astrophysique de Paris, France, 5-9 September 2016.
16. *Accretion from feedback* at “Feedback and reaccretion in galaxy formation”, Observatoire de Paris, Paris, France, 5-6 November 2015.
17. *Will we ever see gas accretion?* Talk & discussion lead at “Life-cycle of gas in galaxies: A Local Perspective”, ASTRON, Dwingeloo, NL, 31 Aug – 4 Sept 2015.
18. *Gas flows at the interface between galaxies and the IGM* at “IGM@50: Is the InterGalactic Medium Driving Star Formation?”, Abbazia di Spineto, Italy, 8-12 June 2015.
19. *Fountain driven accretion* at “The formation and evolution of exponential disks in galaxies”, Flagstaff, Arizona, USA, 5-9 October 2014.
20. *Gas accretion and extraplanar gas in galaxies* at “The Role of Hydrogen in the Evolution of Galaxies”, Kuching, Malaysia, 15-19 September 2014.
21. *How does the Milky Way accrete gas?* at “Good Sense and Dominant Ideology in Galaxy and Planet Formation and Evolution”, Ascona, CH, 6-11 July 2014.
22. *Supernova feedback and gas accretion in galaxies* at the European Week of Astronomy and Space Science, “Star formation in galaxies: from small to large scales”, Geneva, CH, 30 June – 2 July 2014.

23. *Disk-halo connection and gas accretion into galaxies* at "HI studies with SKA Pathfinders: simulations and visualisation", Dwingeloo, NL, 17-19 March 2014 (**review**).
24. *The angular momentum of the accreting gas* at "Multi-spin galaxies", Napoli, Italy, Sept-Oct 2013.
25. *The origin of the gas component* at "Dynamics of disk galaxies", Seoul, South Korea, 21-24 October 2013.
26. *Gaseous galactic halos in the context of galaxy evolution* at the Astronomische Gesellschaft, Tuebingen, Germany, 24-27 September 2013.
27. *How can star formation be sustained* at "Setting the scene for Gaia and LAMOST", IAU Symposium 298, Lijiang, China, 20-24 May 2013 (**review**).
28. *Supernova driven gas accretion* at "Magnetic fields of galaxies", workshop, Bonn, Germany, Mar 2013.
29. *The fate of the gas: The connection between star formation and gas accretion* at the European Week of Astronomy and Space Science, Roma, Italy, 2-6 July 2012.
30. *Disk-halo connection and gas accretion* at "Global Properties of HI in Galaxies: a Workshop in honor of the 35th anniversary of the discovery of the Tully-Fisher relationship", Greenbank, WV, USA, 1-3 April 2012.
31. *Impact of the Galactic fountain on the HI datacube* at "The Interstellar medium in three dimensions with Gaia", Leiden, NL, 11–14 July 2011.
32. *Missing baryons in the Local Group* at "Problematik", Oxford, UK, 8-14 August 2010 (**review**)
33. *Galaxy Formation and Gas Circulation* at "Hunting for the dark: the hidden side of galaxy formation", Malta, 19-23 October 2009 (**review**).
34. *Gas accretion onto galaxies: models vs past and future observations* at "Panromatic Radio Astronomy", Groningen, NL, 2-5 June 2009.
35. *Modelling the gas kinematics* at "The Role of Disk-halo Interaction in Galaxy Evolution: Outflow vs Inflow?", Espinho, Portugal, 18-22 August 2008.
36. *Extra-planar gas at low and high redshifts* at "Gas and stars in galaxies: a multi-wavelength 3D perspective", Garching, Germany, 10-13 June 2008.
37. *Halo gas accretion onto disk galaxies* at "The Galaxy Disk in a Cosmological Context", IAU Symposium 254, Copenhagen, Denmark, 9-13 June 2008.
38. *Extra-planar gas in spiral galaxies* at "Gas accretion and Star Formation in Galaxies", Garching, Germany, 10-14 September 2007.

CONTRIBUTED TALKS AT MAJOR INTERNATIONAL MEETINGS

1. *The impact of galactic fountains on the global evolution of galaxy disks* at "The interplay between local and global processes in galaxies", Cozumel, México, April 2016
2. *Gas cooling at the interface between galactic disks and coronae* at EWASS, S8, Tenerife, Spain, June 2015
3. *The impact of galactic fountains on the growth of galaxy disks* at EWASS, Sp18, Tenerife, Spain, June 2015
4. *Supernova driven accretion: how disc galaxies grow* at "The Origin of the Hubble Sequence", Paris, France, June 2013

5. *Supernova feedback and gas accretion* at “The Physical Link between Galaxies and their Halos”, Garching, Germany, June 2013
6. *Infall of baryons into galaxy discs* at “Whereabouts, physical state and metallicity of the missing baryons”, Cervia, Italy, May 2012
7. *Bringing missing baryons into galaxy discs* at The Cosmic Odyssey of Baryons: accreting, outflowing and hiding, Marseille, France, June 2011
8. *Bulge dominated galaxies, a challenge for MOND?* at Modified Gravity Approaches to the Dark Sector, Strasbourg, France, June 2010
9. *The gaseous halos of disc galaxies* at HI Survival through Cosmic Times, Abbazia Spineto, Saertano, Italy, June 2007
10. *Gaseous halos: linking galaxies to the IGM* at Galaxy Evolution across the Hubble Time, IAU General Assembly, Symp. 235, Prague, Czech Republic, August 2006
11. *Gaseous halos: linking galaxies to the IGM* at The Fate of Gas in Galaxies, Dwingeloo, NL, July 2006
12. *The vertical edges of disc galaxies* at The edges of disk galaxies, Leiden, NL, October 2005
13. *The gaseous halos of spiral galaxies* at Island Universes, Terschelling, NL, July 2005
14. *The gaseous halos of spiral galaxies* at The formation of disk galaxies, Ascona, CH, June 2005
15. *Gas in the halos of spiral galaxies* at The Environments of Galaxies: from Kiloparsecs to Megaparsecs, Chania, Crete, Greece, August, 2004
16. *Extra-planar gas in NGC891: observations and modeling* at Extra-planar gas, Dwingeloo, NL, June, 2004
17. *High velocity gas in the halos of spiral galaxies* at Recycling intergalactic & interstellar matter, IAU General Assembly, Symp. 217, Sydney, AU, July 2003
18. *The HI halos of spiral galaxies* at From Observations to Self-Consistent Modelling of the ISM in Galaxies, JENAM 2002, Porto, Portugal, Sept. 2002
19. *Anomalous HI in spiral galaxies* at Seeing Through the Dust, Penticton, British Columbia, Canada, October 2001

COLLOQUIA

1. Heidelberg Joint Astronomical Colloquium, Heidelberg (D), 2021, online.
2. University of Leiden, Leiden (NL), 2019
3. University of Surrey, Guilford (UK), 2019
4. International School for Advanced Studies, SISSA, Trieste (I), 2017
5. Trieste Astrophysical Observatory, Trieste (I), 2017
6. Institute of Astronomy, ETH-Zurich (CH), 2016
7. University of Surrey, Guilford (UK), 2015
8. University of Zurich, Zurich (CH), 2014
9. Strasbourg University-Astronomical Observatory, Strasbourg (F), 2014
10. Arcetri Astrophysical Observatory, Firenze (I), 2014
11. Institute of Astronomy, ETH-Zurich (CH), 2012
12. Columbia University, New York (USA), 2012
13. Munich Joint Astronomy Colloquium, ESO-MPA-MPE-USM, Garching (D), 2010

14. GEPI, Observatoire de Paris, Meudon (F), 2009
15. Brera Observatory, Merate, Milano (I)
16. ASTRON, Dwingeloo (NL), 2008
17. Observatory of Paris, Paris (F), 2007
18. Institute of Radio Astronomy, Bologna (I), 2006
19. Astronomical Observatory, INAF, Bologna (I), 2006
20. Kapteyn Astronomical Institute of Groningen (NL), 2006
21. Institute of Astronomy, ETH-Zurich (CH), 2005
22. Department of Physics, University of Milano (I), 2004
23. ESTEC, Noordwijk (NL), 2003
24. Institute for Astronomy, University of Bonn (D), 2002
25. ASTRON, Dwingeloo (NL), 2002

ORGANIZATION OF CONFERENCES AND SCHOOLS

- SOC member, *Linking gas and star formation throughout cosmic time*, EWASS 2020 Symposium S3, Leiden, The Netherlands, June 29 - July 3 2020.
- SOC member, *Galactic and extragalactic high velocity clouds*, Athens, Georgia, USA, May 18 - 20, 2020 (Meeting postponed to 2022 due to the Covid-19 emergency).
- **SOC co-chair**, *Crossing the Rubicon: the fate of gas flows in galaxies*, September 2016, Santarcangelo di Romagna, Italy.
- SOC member, *The Periphery of Disks*, Sydney, Australia, October 2014.
- School for graduate students, *Baryons in the Universe*, Bologna, Italy, October 2011.
- SOC member, *Dark matter in galaxies & clusters of galaxies* (workshop), Bologna, June 2007.
- SOC member, *A man for all galaxies*, one day meeting in honour of Prof. R. Sancisi, Bologna, June 2007.
- LOC member, *Extra-planar Gas*, Dwingeloo, The Netherlands, 7-11 June 2004.

POPULAR LECTURES AND OUTREACH

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| Apr 2021 | Lecture on "From gas to galaxies: a 14 billion year journey" at the Koninklijk Natuurkundig Genootschap, online. |
| Nov 2019 | Lecture on "La Nostra Galassia" (Our Galaxy) at the Zuccari theatre, Sant'Angelo in Vado, Italy. |
| 2019 | Author of the outreach book "La Nostra Galassia" (in Italian), edited by RCS MediaGroup – Corriere della Sera, one of the major Italian newspapers |
| 2010–2013 | A tourist guide to the Milky Way (in Italian), Specola conferences and Piazza G. Verdi, Bologna |
| 2009 | Realization of the documentary: "Tutto è fatto di atomi" (Everything is made of atoms), 10'. Shown daily at the one-month exhibition of the Year of Astronomy. |
| 2009 | Realization of the biographical short film: "Curious Giorgio" 8', script writer, director and editor. Shown for the retirement celebration of Prof. Giorgio Palumbo, head of the Astronomy Department of the Univ. of Bologna. |

2009 I organized a film festival on “Cinema and Astronomy” in collaboration with the Cineteca di Bologna.

Several interviews by magazines, TV and radio, including physicsworld.com, Sky & Telescope and New Scientist.