

# CURRICULUM VITAE

January 2017

## Pierluigi Monaco

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### Personal Data

Birthplace and date: Palermo (Italy), May 22nd, 1969.  
Nationality: Italian.  
Civil status: married, two daughters.

### Story

- October 2016: associate professor at the University of Trieste
- October 2014: visiting scientist (one month) at the Institute of Astronomy, Cambridge (UK).
- 2014: qualified for the role of Associate Professor.
- 2008/2009: sabbatical year at the Astronomical Observatory of Trieste to start a project of hydrodynamical simulations of galaxies.
- July 2008: visiting scientist (one month) at the Centre de Physique Teorique, Marseille (France).
- June 2005: visiting scientist (one month) at the Institute of Computational Cosmology, Durham (UK).
- April-May 2002: visiting scientist (one month) at the European Southern Observatory, Garching (Germany).
- January-April 1999: four-month visit at the Institute of Astronomy, Cambridge (UK).
- December 1998: *ricercatore universitario* at the University of Trieste.
- July 1997: two-year Marie Curie Research Training Grant at the Institute of Astronomy, Cambridge (UK).
- July 1997: PhD in astronomy, supervisor: Prof. F. Mardirossian.
- May 1994: 1-year civil service at Trieste.
- January 1993: PhD course in Physics at the University of Trieste.
- July 1992: bachelor in Physics at the University of Trieste with a votation of 110/110 cum laude, supervisor: Prof. G. Giuricin.

### Publications and bibliometry (from NASA Abstract Data Service, 24 January 2017)

- Author of 85 articles in peer-reviewed journals, of which 27 as first author.
- Author of 130 papers, of which 46 as first author.
- 4350 citations, 923 citations of first-authored papers.
- Hirsch's h-index: 34.
- Citations normalized to the number of authors: 936.
- H-index on citations normalized to the number of authors: 17.
- M-index (h divided by the number of years of activity): 1.36.

- All of the six products provided for the last VQR for INAF and Physics Department of Trieste University have been evaluated as excellent. I have provided 17 excellent products for the CVR 2015.

### **Visits, seminars, conferences**

- Visits and seminars on invitation in Cambridge, Durham, Edinburgh, Cardiff, Oxford, Portsmouth (UK), Garching (ESO e MPA), Toronto, Waterloo (Canada), Marseille (France), Trieste, Padova, Bologna, Torino, Firenze, Roma, Milano, Palermo.
- Participation to tens of national and international conferences, most of which with an oral communication.
- Participation to seven conferences and workshops on invitation.
- Invited reviewer in international conferences:
  - European Week of Astronomy and Space Science, Symposium “The co-evolution of Black Holes and Galaxies”, July 2013.
  - "The Many Pathways to Galaxy Growth", Prato, July 2015.
  - European Week of Astronomy and Space Science, Symposium “What happened to the gas? Understanding the evolution of galaxies”, July 2015.
- Invited lecturer at national and international schools:
  - International School on Galaxy Formation, Allahabad (India), December 2003.
  - Novicosmo, Novigrad (Croatia), September 2007.
  - Cosmological Flows, ICTP (Trieste), October 2007.
  - PhD School of Astronomy Francesco Lucchin, Asiago (Italy), July 2013.
- May 2010: member of the LOC of the third workshop of the Italian Astrobiology Society, “When Darwin meet Copernicus”, in Duino.
- September 2012: member of the SOC of the Active Galactic Nuclei 10 conference, in Rome.
- September 2014: chair of the SOC of the Active Galactic Nuclei 11 conference, in Trieste.
- July 2015: member of the SOC of the workshop "Cosmological simulations: from galaxies to large scales" at the Sexten Center for Astrophysics (Sexten, Italy).

### **Fields of interest**

- Non-linear evolution of cosmological perturbations.
- Hierarchical clustering of dark matter halos.
- Galaxy formation with analytic and semi-analytic methods.
- Feedback from star formation.
- Interstellar medium.
- Active Galactic Nuclei.
- Numerical simulations of the formation of galaxies.
- Generation of diffuse light in galaxy clusters.
- The galactic habitable zone.

### **Main scientific activities in this period.**

- Study of the formation of galaxies with hydrodynamical simulations, using the N-body TreePM+SPH code Gadget, with an innovative model for star formation and feedback developed by Giuseppe Murante and myself.
- Study of the formation of galaxies with the semi-analytic model developed by myself in collaboration with Fabio Fontanot, systematic comparison with models of this class (in particular the one by Gabriella De Lucia) and with simulations, predictions for present and future galaxy surveys.
- Generation of simulated catalogs of dark matter halos and galaxies in large cosmological

volumes, in preparation of the Euclid mission, with particular attention to the computation of covariance of 2-point clustering statistics.

### **Main numerical codes produced in my carrier**

- Public code, distributed under a GNU/GPL license, for the fast production of catalogs of dark matter halos: PINpointing Orbit Crossing Collapsed Hierarchical Objects (PINOCCHIO). Present in the Astrophysics Source Code Library.
- Semi-analytic model for the formation of galaxies in a cosmological context: MOdel for the Raise of GALaxies aNd Active nuclei (MORGANA).
- Sub-resolution model of the InterStellar Medium for star formation and stellar feedback: MUlti-Phase Particle Integrator (MUPPI), developed within the N-body+SPH code GADGET.

### **Observational experience**

- Deep imaging of distant Lyman alpha emitters at the Nordic Optical Telescope.
- Participation to two accepted ESO proposals, PI P.A. Duc e V. D'Odorico.
- Participation to an accepted IRAM proposal, PI L. Hunt.

### **Participation to large projects**

- Member of the Euclid Consortium:
  - Leader of the Processing Functions for the computation of covariance of galaxy clustering, within Operational Unit - Level 3 Products.
  - Co-leader of the WP on the computation of covariances within the Cosmological Simulation Working Group.
  - Participation to the Galaxy Clustering Science Working Group.
  - Participation to the Galaxy and AGN Evolution Science Working Group.
- Participation to the Great Observatories Origins Deep Survey (GOODS).

### **Associations**

- Istituto Nazionale di Astrofisica (INAF).
- International Astronomy Union (IAU).

### **Activity of research evaluation**

- Referee for the journals Monthly Notices of the Royal Astronomical Society, The Astrophysical Journal, Astronomy & Astrophysics and others.
- Evaluator of grant proposals for the Georgian National Science Foundation.
- Evaluator of grant proposals for the Austrian Science Fund.
- Participant to the Albo dei Revisori of italian MIUR, evaluator of FIRB and SIR projects.

### **Teaching (for the University of Trieste, unless otherwise noted)**

- 2000-2001: course on Stellar Physics, for the fourth year of the *laurea quadriennale* in Physics.
- 2000-2002: tutoring for Physics course for geology.
- 2001-2015: course on Introduction to Astrophysics, third year of *laurea triennale*, with the exception of the sabbatical year 2008/2009. Course notes are publicly available (<http://adlibitum.oats.inaf.it/monaco/Homepage/Dispense/index.html>).
- 2012/2013: course on Cosmology II, second year of the *laurea magistrale* in Physics.
- 2015-2017: course on Theoretical Astrophysics, first year of the *laurea magistrale* in Physics.
- 2016/2017: course on Cosmology I, first year of the *laurea magistrale* in Physics.
- 2016/2017: contract professor at the Lublijana University, Extragalactic astrophysics.

- 2006-2017: course on The Formation of Galaxies for the PhD program in Physics.
- 2000-2002: course on di Non-linear Evolution of Perturbations for the PhD program in astronomy at SISSA (Trieste).
- Participation to exams for several courses, including basic physics for geology and natural sciences.
- Supervisor or co-supervisor of several theses of *laurea quadriennale*, *laurea magistrale/specialistica*, PhD in physics (four at the University of Trieste, one at SISSA).
- Some of my students that have taken a carrier in astrophysics: Christian Marinoni (co-supervisor of *laurea* thesis), Giuliano Taffoni (PhD supervisor), Fabio Fontanot (*laurea* and PhD supervisor), Gabriele Cescutti, Massimo Viola and Marina Galvagni (*laurea specialistica* supervisor), Barbara Lo Faro, Agnese Fabris and Gisella De Rosa (*laurea triennale* and *specialistica* supervisor). The PhD thesis of Fabio Fontanot has been awarded a Tacchini prize.
- 2012: member of the commission for the final exam of PhD in astronomy at the University of Padova.
- 2013 and 2015: president of the commission for the final exam of PhD in physics at the University of Trieste.

### Outreach activities

- 2003-2015: public lectures, stages and conference at high schools.
- Participation to the *Progetto Lauree Scientifiche* at the University of Trieste.
- Participation to several editions of *Notte dei ricercatori*.
- 2008-2010: organizer and speaker at the *Vagabondi del Cosmo* series of public conferences.
- 2005-2010: collaboration with the online journal *Ulisse* for science outreach.
- June 2009: invited activity for the 10 year anniversary of *Immaginario Scientifico* of Trieste.
- Ottobre 2011: invited public lecture for *ScienzaArteAmbiente - Elementa*, Pordenone.
- Aprile 2012: invited public lecture for *Certamen Lucretianum Naoniense*, Pordenone.
- Gennaio 2014: invited public lecture for *M'illumino di meno*, Monfalcone.
- Maggio 2014: school lecture for the project Flash Forward.
- Maggio 2014: invited public lecture at *Circolo Culturale Astronomico* of Farra d'Isonzo.
- Luglio 2014: invited public lecture for *Udinestate*, Udine.
- November 2014: invited public lecture for *Scienza e Storia dell'Acqua*, Trieste.
- December 2014: press release of INAF-OATs and Trieste University, *Grandi progressi per le galassie in scatola*. Full-page article on *Giornale di Sicilia*.
- July 2015: public lecture at Sexten Center for Astrophysics.
- Author of an outreach article on the journal *L'Astronomia* titled *La Formazione delle Galassie*.

### Main research grants

- 1999, PI of a *Giovani Ricercatori* grant of the University of Trieste.
- Grant ASI 2001, PI A. Cavaliere (Roma Tor Vergata).
- Cofin INAF 2002, PI A. Cavaliere (Roma Tor Vergata).
- Cofin 2003, PI B. Marano (Bologna).
- 2005, cofinancing of *Assegno di ricerca* from University of Trieste.
- ASI grant *Cosmologia e Fisica Fondamentale*, WP 3220, PI P. De Bernardis (Roma La Sapienza).
- PRIN MIUR 2007, PI S. Borgani (Trieste).
- PRIN MIUR 2010/2011, PI A. Cimatti (Bologna).
- COSMOCOMP FP7 Initial Training Network, PI C. Baugh (Durham).
- PI of a *Finanziamento Ricerca d'Ateneo*, 2009.

- PI of a *Finanziamento Ricerca d'Ateneo*, 2012.
- PI of a grant from *Consorzio per la Fisica* of Trieste for hardware upgrade.
- PRIN INAF2005, PI S. Cristiani (Trieste).
- PRIN INAF2006, PI C. Gruppioni (Bologna).
- PRIN INAF 2010, PI M. Viel (Trieste).
- PRIN INAF 2011, PI V. D'Odorico (Trieste).
- PRIN INAF 2012, PI G. Murante (Trieste).
- PI of a research unit for PRIN INAF 2014, PI M. Nonino.
- PI of the Trieste research unit in a Horizon2020-Compet-2015 proposal "Modified Gravity in Clusters of Galaxies: Using Space and Ground Observations to Test Einstein's Gravity", PI David Bacon (Portsmouth, UK). The proposal has been evaluated with 14.5/15.0 and is presently "ranked" for funding.
- Furthermore, I have been national PI of a PRIN-MIUR 2009, approved but not financed.

### **Computational time grants**

- Participant to several computational time grants at CINECA, CASPUR, ISCRA, PRACE.
- PI of one CASPUR, two ISCRA-B, one PRACE Preparatory Access successful grants.
- Resources granted to our group in the last six years:
  - 3,500,000 cpu-h on non Blue-Genie machines;
  - 11,000,000 cpu-h on Fermi;
  - 100,000 cpu-h on the agreement between CINECA and Università di Trieste.