

# Curriculum Vitæ of Massimo Marengo

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## RESEARCH INTERESTS

- **Stellar Astrophysics:** physics and calibration of stellar distance indicators (Cepheids, RR Lyrae); stellar populations, mass loss processes; extrasolar planetary systems and debris disks.
- **Observational Techniques:** ground- and space-based (NASA's Spitzer, Hubble, Webb) astronomy; high contrast imaging; commissioning and calibration of NASA's Spitzer Space telescope IRAC camera.

## EMPLOYMENT

August 2018 - Professor, Department of Physics, Florida State University  
2022 - Affiliate Professor, Department of Physics and Astronomy, Iowa State University  
2018 - 2022 Professor, Department of Physics and Astronomy, Iowa State University  
2013 - 2018 Associate Professor, Department of Physics and Astronomy, Iowa State University  
2009 - 2013 Assistant Professor, Department of Physics and Astronomy, Iowa State University  
2003 - 2009 Astrophysicist at the Harvard-Smithsonian Center for Astrophysics,  
Optical and Infrared Division, Spitzer/IRAC Instrument Team  
2000 - 2003 Postdoctoral Research Associate at the Harvard-Smithsonian Center  
for Astrophysics, High Energy Division w/ M. Karovska and D. Sasselov  
1997 - 2000 Smithsonian Predoctoral Fellow at the Harvard-Smithsonian Center  
for Astrophysics, Optical and Infrared Division, w/ Giovanni Fazio  
1996 - 1997 Astrophysics Sector Computer System Administrator, SISSA/ISAS, Italy

## EDUCATION

Jun 2000 Ph.D. in Astrophysics, Int. School for Advanced Studies (SISSA/ISAS), Trieste, Italy  
Advisers: Prof. Dennis W. Sciama, Dr. Giovanni G. Fazio and Prof. John C. Miller  
Dissertation: *Mid-IR Observations and Modeling of Astrophysical Dust*  
Nov 1993 Laurea cum Laude (M. Sc.) in Physics, Univ. of Torino, Italy  
Advisers: Prof. Giovanni Silvestro and Prof. Maurizio Busso  
Dissertation: *Imaging and Photometry of AGB Circumstellar Envelopes  
with the mid-IR camera TIRCAM*  
Jul 1987 Technical Degree in Computer Science, Inst. A. Avogadro, Torino, Italy

## AWARDS

2022 Iowa State LAS Award for Outstanding Achievement in Teaching  
2016 - 2018 Iowa State LAS Dean's Emergent Faculty Leaders Fund  
2015 Iowa State University Award for Mid-Career Achievement in Research  
2004 NASA Group Achievement Award for the Spitzer Space Telescope Payload Team  
2003 Smithsonian Institution Certificate of Award for Spitzer/IRAC support  
2001 American Astronomical Society Small Research Grant  
1997 - 2000 Smithsonian Institution Predoctoral Fellowship  
1994 - 1997 Int. School for Advanced Studies (SISSA/ISAS), full Graduate Fellowship  
1987 - 1988 Scuola Normale Superiore (SNS) of Pisa (Italy), full Undergraduate Fellowship

## RESEARCH PROGRAM AND FUNDING

My research focuses on the study of stellar astrophysics and its applications to stellar populations, galaxy evolution, cosmology (stellar distance indicators) and the origin of planetary systems. My program is supported by NASA and NSF and based on competitively awarded observing time I obtained at large space-based facility such as NASA's Spitzer Space Telescope, Hubble Space Telescope (HST), James Webb Space Telescope (JWST), the Stratospheric Observatory for Infrared Astronomy (SOFIA), and ground-based telescopes such as NASA's Infrared Telescope Facility, and the facilities of the NSF National Optical-Infrared Astronomy Research Laboratory (NSF NOIRLab), National Radio Astronomy Observatory (NRAO) and European Southern Observatory (ESO).

My main research effort is directed to establish RR Lyræ variables as precision probes for the structure and composition of galaxies. This is motivated by the need for an independent calibration of the cosmological distance scale using old stellar populations in the Milky Way and dwarf galaxies in the Local Group. Based on our observations of RR Lyræ at visible and infrared wavelengths we have developed a new technique, using Period-Luminosity-Metallicity and Period-Wesenheit-Metallicity relations, combined with Fourier decomposition of their light curves, that provides high precision (1-2%) distances for these stars and their environments. The accuracy of this method, applied to the cosmological distance scale, will aid in resolving the tension existing in the measurement of cosmological parameters (including the Hubble constant  $H_0$ ) between current stellar distance indicators (Cepheids and Supernovæ Type Ia) and methods based on Cosmic Microwave Background radiation and Barionic Oscillations. This tension can be attributed to missing physics in the current  $\Lambda$ CDM cosmology. Our RR Lyræ-based distance scale is particularly suited to be applied to the revolutionary datasets that will be produced by the latest generation of public-access observatories, including NASA's JWST and Nancy Roman telescope, and the NSF-funded Legacy Survey of Space and Time (LSST) at the Vera Rubin observatory.

Another focus of my research is the physics of the circumstellar environment, including the study of mass loss in advanced stages of stellar evolution, and the dynamics of young planetary systems. In particular my research focuses on the study of debris disks around systems like  $\epsilon$  Eridani,  $\eta$  Corvi and the recently discovered KIC 8462852 system, currently undergoing the dramatic processes that happened in the Solar System at the time of its Late Heavy Bombardment ( $\sim 3.8$  billion years ago), that are responsible for delivering the water and other life-bearing volatiles to Earth.

## PROFESSIONAL ASSOCIATIONS, COMMITTEES AND SERVICE

2019	NASA SAG-10 (Great Observatories), Galactic Processes & Stellar Evolution co-chair
2016 - 2022	Iowa State Representative to AURA
Since 2009	Research Associate, Smithsonian Astrophysical Observatory
Since 2006	Member of the International Astronomical Union
Since 2006	NSF AST and Mid-Scale Innovations in Astronomical Sciences Proposal Review
Since 2002	Referee for Astronomy & Astrophysics, The Astrophysical Journal, The Astronomical Journal, Monthly Notices of the Royal Astron. Soc., Journal of AAVSO
Since 2001	NASA SOFIA, Spitzer Space Telescope, Postdoctoral Program, Hubble Space Telescope, Solar System Origins, NESSF, ADP and LTSA Proposal Reviewer
Since 2000	Member of the American Astronomical Society
2013 - 2015	Elected to the Astronomical Society Nominating Committee
2000 - 2009	Affiliate to the Harvard College Observatory

## TEACHING

2014 - 2022	Astro 342: Introduction to Solar Systems Astrophysics
2013 - 2022	Astro 510: Graduate Astronomy Lab
2010 - 2022	Astro 346: Introduction to Astrophysics
2010 - 2013	Astro 344L: Astronomy Lab

## GRADUATE STUDENTS AND POSTDOCS

2021 - Irina Plaks: Ph.D. student, Iowa State University  
2018 - Joseph Mullen: Ph.D. student, Iowa State University  
2013 - 2017 Jillian Neeley: Ph.D. student, Iowa State University (now at Stryker)  
2009 - 2016 Alan Huselbus: Ph.D. student, Iowa State University (now at Iowa State IT Services)  
2009 - 2013 Sarah Willis: Ph. D. student, Iowa State University (now at MIT Lincoln Labs)  
2009 - 2011 Valsamo Antoniou: Postdoc, Iowa State University (now faculty at Texas Tech University)  
2004 - 2008 Michael Schuster: SAO Predoctoral Fellow (now at MIT Lincoln Labs)

## UNDERGRADUATE RESEARCH STUDENTS

2019 - 2022 Page Leeseberg: Iowa State University  
2022 Ola Carnahan: Iowa State University (now at Collins Aerospace)  
2019 - 2020 Theophilus Kinyea: Iowa State University  
2017 - 2019 Miles Lucas: Iowa State University (now Ph.D. student University of Hawaii)  
2015 - 2016 Nicolas Trueba: Iowa State University (now Postdoc at Harvard-Smithsonian CfA)  
2013 - 2014 Elizabeth Polsdofer: Iowa State University (now Ph.D. student, U Texas - Southwestern)  
2013 Mikaela Leners: Iowa State University (now U.S. Dept. of the Interior, Park Ranger)  
2012 - 2013 Jacob Smith: Iowa State University  
2010 - 2013 Rebecca Park: Iowa State University  
2010 - 2012 Samantha Glick: Iowa State University (now Science Museum of Minnesota)  
2010 - 2011 Denise Wood: Iowa State University  
2010 - 2011 Justin Spilker: Iowa State University (now Hubble Postdoctoral Fellow, U. Texas, Austin)  
2010 Peter Dimpfl: Iowa State University  
2010 Kimberly Booe: Iowa State University  
2009 Derek Huelsman: SAO REU student (M.S. Stanford U, now Data Analyst, Addepar)  
2007 Megan Reiter: SAO REU student (now Marie Curie Fellow, Royal Obs. Edinburgh)  
2005 Sarah Sonnett: SAO REU student (now at Planetary Science Institute)  
2004 Linda Watson: SAO REU student (now postdoctoral fellow, ESO)

## SELECTED PUBLIC TALKS AND PRESS RELEASES

1. **Space dust, a new telescope and what it can tell us about our cosmic origins**, featured on Iowa Public Radio “River to River”, April 1, 2022
2. **Iowa State’s Massimo Marengo is Ready to Use the Newly Launched Webb Space telescope**, Iowa State University Press Release, February 18, 2022
3. **Live interview at the ”Talk of Iowa”**, on Iowa Public Radio, December 17, 2020
4. **Mysterious Dimming of Tabby’s Star May be Caused by Dust**, NASA/ISU Rel., 10/2017
5. **SOFIA Confirms Nearby Planetary System Similar to Our Own**, NASA/ISU Rel., 5/2017
6. **Interview for the program “Cosmic Front”, National Television of Japan, NHK**, 4/2016
7. **Strange Star Likely Swarmed by Comets**, NASA/ISU Press Release, 12/2015
8. **NGC 6334: A Mini Starburst Region?**, NOAO/CfA/AAS Press Conference, 6/2013
9. **“Cepheid Variables” Podcast of the series “Radio Stars”**, MIT Haystack Observatory, 2013
10. **Featured article on “Tähdet ja avarus”**, popular astronomy magazine in Finland, 4/2011 issue
11. **Live Interview for Radio Program “Soundings”**, KVMR-FM, Nevada City, CA, 1/2011
12. **Cosmology Standard Candles Not So Standard After All**, NASA/AAS Press Conf., 1/2011
13. **Pulverized Planet Dust May Lie Around Double Stars**, NASA Press Release, 8/2010
14. **Solar System’s Young Twin Has Two Asteroid Belts**, NASA/CfA Press Release, 10/2008

## SELECTED INVITED TALKS AND COLLOQUIA

1. **Galactic Processes and Stellar Evolution**, 235th American Astronomical Society Meeting special session on "NASA COPAG/SAG-10", January 5, 2020
2. **How to do PSF-Fitting Photometry with JWST**, SAGE Meeting, Keele Univ., UK, May 31, 2017
3. **Cepheids and RR Lyræ with Spitzer**, International Science Institute Beijing, China, May 24, 2016
4. **Sizing-Up the Cosmos with the Help of Variable Stars:**
  - Dept. of Physics Colloquium, University of Cincinnati, November 19, 2015
  - Dept. of Physics and Astronomy Seminar, University of North Carolina, October 27, 2015
5. **Mass Loss and Variability in Evolved Stars**, in Symposium "Why Galaxies Like AGB Stars III", Vienna, Austria, July 28, 2014
6. **Exo-Planetary Phoenix: Rebirth of Planetary Systems Beyond the Main Sequence**, Space Telescope Science Institute Spring Symposium Baltimore, MD, April 30, 2014
7. **Mass Loss in Advanced Evolutionary Phases**, Symposium "Stellar Population 55 Years After the Vatican Conference", Rome, Italy, July 3-4, 2012
8. **Mass Loss in Cepheids: Observational Evidence from IR and Radio Data**, 220th American Astronomical Society Meeting special session on "Polaris: Mysteries of the North Star", June 14, 2012
9. **Blowing a Standard Candle: the Disappearing Mass of  $\delta$  Cephei:**
  - Kavli Institute for the Physics and Mathematics of the Universe, Tokyo, Japan, May 28, 2012
  - Astronomy Colloquium, University of Minnesota, October 3, 2011

## PUBLICATIONS AND CITATION METRIC

Based on the NASA/ADS database I have an *h-index* of **41**, with a total of over **9,000 citations**. My complete list of publications (**~ 130 refereed** and **170 contributed** papers) is available on ORCID (see <https://ui.adsabs.harvard.edu/search/q=orcid%3A0000-0001-9910-9230>), and also attached at the end of this document.