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PERSONAL INFORMATION

Michele Trabucchi

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Gender Male | Date of birth December 14, 1988

RESEARCH EXPERIENCE

Feb 2020 – Ongoing — Post-doctoral researcher

University of Geneva – Department of Astronomy
Chemin des Maillettes 51, CH-1290 Versoix, Switzerland

Within the SNSF-funded project "Long-Period Variables in the *Gaia* Era", I investigate the properties of AGB stars and related Long-Period Variables in the Magellanic Clouds using data from existing ground-based surveys and space mission, mainly *Gaia* and OGLE. The primary aim of the project is to better constrain the potential of LPVs as standard candles and age indicators, which is achieved by characterizing the connection between their photometric and variability properties (periods and light-curve amplitudes) in multiple pass-bands.

Nov 2017 – Oct 2019 — Post-doctoral researcher

University of Padova – Department of Physics and Astronomy "Galileo Galilei"
Vicolo dell'Osservatorio 3, I-35122 Padova, Italy

Research on theoretical models of stellar pulsation during the Asymptotic Giant Branch evolutionary phase and study of the observed properties of Long-Period Variables in the Magellanic Clouds, in the framework of the ERC funded STARKEY project.

Nov 2014 – Oct 2017 — PhD student

University of Padova – Department of Physics and Astronomy "Galileo Galilei"
Vicolo dell'Osservatorio 3, I-35122 Padova, Italy

Modelling of stellar pulsation targeted at the production of an extended grid of updated models of Long-Period Variables, and its application to the implementation of pulsation properties of evolved red giant stars into stellar evolutionary models and synthetic stellar population models. Application of stellar pulsation models to the interpretation of Long-Period Variables observations from the OGLE-III catalog of variable stars. This PhD project was carried out in the framework of the ERC funded STARKEY project.

TEACHING EXPERIENCE

Oct 2018 – Sep 2020 — Teaching

University of Padova – Department of Physics and Astronomy "Galileo Galilei"
Vicolo dell'Osservatorio 3, I-35122 Padova, Italy

"Stellar Pulsation and Asteroseismology", part of the course "Theoretical Astrophysics" for the Master's Degree in Astronomy.

Oct 2015 – Feb 2016

Teaching assistant

University of Padova – Department of Physics and Astronomy “Galileo Galilei”
Vicolo dell’Osservatorio 3, I-35122 Padova, Italy

Introduction to computation and analysis of stellar oscillation models in red giant stars as part of the course “Theoretical Astrophysics” for the Master’s Degree in Astronomy.

Jun 2015

Tutoring activity

University of Padova – Department of Physics and Astronomy “Galileo Galilei”
Vicolo dell’Osservatorio 3, I-35122 Padova, Italy

Tutor for the ESTAGE project, in which high school students had an experience of academic research activity by carrying out a simple research project, in this case concerning the basics of stellar evolution.

EDUCATION AND TRAINING

Nov 2014 – Oct 2017

PhD in Astronomy

University of Padova – Department of Physics and Astronomy “Galileo Galilei”
Vicolo dell’Osservatorio 3, I-35122 Padova, Italy

New Models of Pulsating Red Giant Stars: Application to Long-Period Variables in the Large Magellanic Cloud

Supervisor: Prof. Paola Marigo
Co-supervisors: Dr. Josefina Montalbán, Dr. Léo Girardi

Jun 2017

1st ASTERICS-OBELICS International School

Advanced Software Programming for Astrophysics and Astroparticle Physics

Laboratoire d’Annecy de Physique des Particules – Annecy, France

indico.in2p3.fr/event/14227

Oct 2015

STEEL International ESO School

Science and Technology with E-ELT

Ettore Majorana Centre for Scientific Culture – Erice, Italy

www.eso.org/sci/meetings/2015/EELT_EriceSchool2015

Sep 2015

6th ERIS International ESO School

European Radio Interferometry School

ESO Headquarters – Garching bei München, Germany

www.eso.org/sci/meetings/2015/eris2015

Jan 2012 – Oct 2014

Master’s Degree in Astronomy

University of Padova – Department of Physics and Astronomy “Galileo Galilei”
Vicolo dell’Osservatorio 3, I-35122 Padova, Italy

Effects of near-surface changes on the oscillation properties of RGB stars

Supervisor: Prof. Paola Marigo
Co-supervisors: Dr. Josefina Montalbán, Dr. Léo Girardi

Part of this thesis work has been carried out at the Université de Liége in the framework of the Erasmus exchange program.

Oct 2008 – Dec 2011

Bachelor’s Degree in Astronomy

University of Padova – Department of Physics and Astronomy “Galileo Galilei”
Vicolo dell’Osservatorio 3, I-35122 Padova, Italy

Low-Mass Stars and Brown Dwarfs

Supervisor: Prof. Cesare Chiosi

CONFERENCES AND SEMINARS

Aug 2019 — Stars and their Variability Observed from Space
Celebrating the birthday of BRITE-Constellation
Universität Wien – Vienna, Austria
Talk: "Modelling Long-Period Variables in the *Gaia* Era"
starsandspace.univie.ac.at

May 2019 — Invited seminar
Uppsala University, Department of Physics and Astronomy – Uppsala, Sweden
Talk: "Long-Period Variables - Pulsating AGB stars in the Gaia era"

Aug 2018 — 30th General Assembly of the International Astronomical Union, Symposium 343
Why Galaxies Care About AGB Stars – A Continuing Challenge through Cosmic Time
Austria Center Vienna – Vienna, Austria
Talk: "Characterization of Long-Period Variables in the Magellanic Clouds"
astronomy2018.univie.ac.at

Jul 2018 — Invited seminar
Observatoire Astronomique de l'Université de Genève – Versoix, Switzerland
Talk: "New Pulsation Models of AGB stars - Exploiting the Potential of Long-Period Variables"

Jun 2018 — LSST@Europe3
Large Synoptic Survey Telescope - Building Science Collaborations
Maison Internationale des Langues et des Cultures – Lyon, France
Talk: "Long-Period Variables as seen by LSST"
indico.in2p3.fr/event/16341

Sep 2017 — Stellar Populations and the Distance Scale
A Conference in Honour of Jeremy Mould
Kavli Institute for Astronomy and Astrophysics, Peking University – Beijing, China
Talk: "Characterization of Long-Period Variables in the Magellanic Clouds"
kiaa.pku.edu.cn/stpop2017

Nov 2016 — 22nd Los Alamos Stellar Pulsation Conference Series Meeting
Whide-field Variability Surveys: a 21st Century Perspective
San Pedro de Atacama, Chile
Poster: "Pulsation Models of O-rich and C-rich Long-Period Variables"
ltapia1.wixsite.com/22nd-pulsation-2016

Jun 2016 — CoolStars19
19th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun
Uppsala University – Uppsala, Sweden
Poster: "Theoretical K-log(P) relations for O-rich and C-rich semi-regular and Miras"
astro.uu.se/~cool19

COLLABORATIONS

Gaia-LPV Collaboration

The second data release (DR2) of the *Gaia* mission produced the largest existing catalog of large-amplitude LPVs to date. In collaboration with Dr. Nami Mowlavi (University of Geneve), Dr. Thomas Lebzelter (University of Vienna), and Prof. Peter Wood (Australian National University), as well as coworkers at Padova University, I am exploiting these observations to study LPVs and enhance their applications in the study of stellar populations. To date, the primary result of this collaboration is the development of diagnostic diagram combining optical and near-infrared observations to discriminate between different mass regimes and chemical types in LPVs.

Vera Rubin Observatory - LSST
I am part of the “Stars, Milky Way & Local Volume Collaboration” (P.I. Dr. Léo Girardi) for the production of extensive synthetic stellar population simulations that will be preparatory for the observing strategy of the upcoming Large Synoptic Survey Telescope. Within the team, I am tasked with the implementation of variability models in the simulations.

PLATO - Stellar Science
Collaboration in the computation of stellar models and adiabatic oscillation models for low-mass stars including late evolutionary stages, and in the computation of synthetic stellar population models.

PROFESSIONAL SERVICE

Current — Referee for the Astrophysical Journal, JAAVSO.

Feb 2019 — University curriculum counsellor for high school students during open days.

Sep 2018 — Collaborator for UniPd outreach activity: “VeneTonight - Researcher’s Night” 2018.

PUBLICATIONS

- *Modelling Long-Period Variables – I. A new grid of O-rich and C-rich pulsation models*
  Trabucchi, M.; Wood, P. R.; Montalbán, J.; Marigo, P.; Pastorelli, G. & Girardi L. • 2019 – MNRAS, 482, 929
- *A New Interpretation of the Period-Luminosity Sequences of Long-Period Variables*
  Trabucchi, M.; Wood, P. R.; Montalbán, J.; Marigo, P.; Pastorelli, G. & Girardi L. • 2017 – ApJ, 847, 139
- *The onset of the AGB wind tied to a transition between sequences in the period-luminosity diagram*
  McDonald, I. & **Trabucchi, M.** • 2019 – MNRAS, 484, 4678
- *Period-luminosity diagram of long period variables in the Magellanic Clouds. New aspects revealed from Gaia Data Release 2*
  Lebzelter, T.; **Trabucchi, M.**; Mowlavi, N.; Wood, P. R.; Marigo, P.; Pastorelli, G. & Lecoeur-Taïbi, I. • 2019 – Accepted for publication in A&A (eprint arXiv:1909.07924)
- *A new method to identify subclasses among AGB stars using Gaia and 2MASS photometry*
  Lebzelter, T.; Mowlavi, N.; Marigo, P.; Pastorelli, G.; **Trabucchi, M.**; Wood, P. R. & Lecoeur-Taïbi, I. • 2018 – A&A, 616, L13
- *Constraining the thermally-pulsing asymptotic giant branch phase with resolved stellar populations in the Lmall Magellanic Cloud*
  Pastorelli, G.; Marigo, P.; Girardi, L.; Aringer, B.; Chen, Y.; Rubele, S.; **Trabucchi, M.**; Bladh, S.; Boyer, M. L.; Bressan, A.; Dalcanton, J. J.; Groenewegen, M. A. T.; Lebzelter, T.; Mowlavi, N, Chubb, K. L.; Cioni, M.-R. L.; de Grijs, R.; Ivanov, V. D.; Nanni, A.; van Loon, J. T.; Zaggia, S. • 2020 – MNRAS
- *Constraining the thermally-pulsing asymptotic giant branch phase with resolved stellar populations in the Small Magellanic Cloud*
  Pastorelli, G.; Marigo, P.; Girardi, L.; Chen, Y.; Rubele, S.; **Trabucchi, M.**; Aringer, B.; Bladh, S.; Bressan, A.; Montalbán, J.; Boyer, M. L.; Dalcanton, J. J.; Eriksson, K.; Groenewegen, M. A. T.; Höfner, S.; Lebzelter, T.; Nanni, A.; Rosenfield, P.; Wood, P. R.; Cioni, M.-R. L. • 2019 – MNRAS, 485, 5666
- *A New Generation of PARSEC-COLIBRI Stellar Isochrones Including the TP-AGB Phase*
  Marigo, P.; Girardi, L.; Bressan, A.; Rosenfield, P.; Aringer, B.; Chen, Y.; Dussin, M.; Nanni, A.; Pastorelli, G.; Rodrigues, T. S.; **Trabucchi, M.**; Bladh, S.; Dalcanton, J.; Groenewegen, M. A. T.; Montalbán, J. & Wood, P. R. • 2017 – ApJ, 835, 77
- *Determining stellar parameters of asteroseismic targets: going beyond the use of scaling relations*
  Rodrigues, T. S.; Bossini, D.; Miglio, A.; Girardi, L.; Montalbán, J.; Noels, A.; **Trabucchi, M.**; Coelho, H. R. & Marigo, P. • 2017 – MNRAS, 467, 1433
- *PARSEC evolutionary tracks and isochrones including seismic properties*
  Montalbán, J.; Bressan, A.; Girardi, L., Rodrigues, T. S.; Bossini, D.; Miglio, A.; Scuflaire, R.; **Trabucchi, M.** & Marigo, P. • 2018 – IAUS, 334, 343
- *Pulsation models of O-rich and C-rich Long-Period Variables*
  Trabucchi, M.; Marigo, P.; Montalbán, J.; Wood, P. R. & Girardi, L. • 2017 – EPJWC, 152, 06009

- *Non-radial modes in AGB stars*

  Montalbán, J.; **Trabucchi, M.**; Marigo, P.; Wood, P. R. & Pastorelli, G. • 2017 – EPJWC, 152, 06008

- *Calibrating the TP-AGB phase through resolved stellar populations in the Small Magellanic Cloud*

  Pastorelli, G.; Marigo, P.; Girardi, L.; Rubele, S.; Nanni, A.; Chen, Y.; Bressan, A.; Aringer, B.; **Trabucchi, M.**; Montalbán, J.; Bladh, S. & Cioni, M. R. L. • 2017 – EPJWC, 152, 06008

PERSONAL SKILLS

Mother tongue Italian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C1	C1	C2
French	B2	B2	A2	A2	A2

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2: Proficient user
Common European Framework of Reference (CEF) level

Research skills Focused and creative, fast learner, results-oriented with care for details. I enjoy working as a team member as well as independently. Experience with numerical computation, data analysis and interpretation, and development of tools to perform such tasks automatically or with limited user supervision.

Communication skills Excellent written and verbal communication skills. Experienced and confident in public speeches and presentations, as well as teaching and tutoring.

Teamwork Strong commitment to team and environment dynamics, with the ability to contribute expertise and follow leadership directives at appropriate times.

Organizational / managerial skills Well developed skills in prioritizing, organization, decision making, time management. Experience in the organization and coordination of workshop and meetings.

Computer skills Good proficiency and overall experience.

Programming Proficiency with Python and Fortran programming languages. Experience with object-oriented programming, version control systems (Git), GUI design (Python Tkinter). Basic knowledge of SQL, Matlab, Wolfram Mathematica, Ruby, Java. Proficiency with mark-up languages LaTeX and Markdown, knowledge of HTML. Experience with web-based interactive computational environments (jupyter project tools).

Operating Systems Proficiency with GNU/Linux systems and Microsoft Windows.

Astronomy Software Experience with TOPCAT, basic usage of IRAF, DS9.

Other Software Proficiency with office suites (LibreOffice, Microsoft Office). General experience with graphics software (GIMP, Adobe Photoshop) including vector graphics (Inkscape, Adobe Illustrator) and data visualization (Python's matplotlib package, gnuplot, SM).