

Manuel Duarte de Vasconcelos Silva

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Personal profile

For the past four years I have worked as a researcher at CENTRA/SIM (Multidisciplinary Centre for Astrophysics <https://centra.tecnico.ulisboa.pt/>). The focus of my work has been the development of Data Mining/Machine Learning tools, particularly Bayesian inference models, for scientific exploitation of large datasets from the Gaia mission of the European Space Agency (ESA). I have also worked with code for PSF reconstruction in Adaptive Optics in the context of the OPTICON project. Prior to this I was a PhD researcher, modelling the spiral arms of our own Galaxy as traced by runaway stars¹.

Projects

2014 – 2017	Opticon – “Optical Infrared Co-ordination Network for Astronomy” <ul style="list-style-type: none">Development and testing of software for PSF reconstruction in Adaptive Optics (GLAO), in the context of the MUSE-GALACSI instrument
2013 – 2014	Gaia: National Participation in the Data Processing and Analysis Consortium (DPAC) <ul style="list-style-type: none">Development of data mining/machine learning software for estimation of stellar parameters in large databases in the context of the European Space Agency’s (ESA) mission Gaia

Positions

2013 – Present	Researcher CENTRA/SIM (https://centra.tecnico.ulisboa.pt/), Portugal
2012	Researcher University of Hertfordshire, UK
2006	Sales consultant Portugal Telecom, Portugal

Education

2007 – 2011	PhD in Astrophysics – University of Hertfordshire, UK <ul style="list-style-type: none">Thesis: <i>Runaway Stars in the Galactic Halo: Their Origin and Kinematics</i>Supervisor: Dr Ralf Napiwotzki
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¹ <http://www.newscientist.com/article/mg21729044.000>

2004 – 2006

Master degree in Statistics – Universidade do Porto, Portugal

- Thesis: *Um processo de risco perturbado: aproximações numéricas à probabilidade de ruína*
- Supervisor: Dr^a Margarida Brito
- Topics:
 - Stochastic processes
 - Machine learning
 - Multivariate statistics
- Final grade: “Muito Bom” (Very Good)

1998 – 2004

First degree in Astrophysics (Physics/Applied Mathematics) – Universidade do Porto, Portugal

Final grade: 13

Publications

[1] Silva M. D. V. & Napiwotzki R., “High Galactic latitude runaway stars as tracers of the spiral arms”, 2013, MNRAS, 431, 502-510 – Astro-ph: <http://arxiv.org/abs/1302.0761v1>

[2] Napiwotzki R. & Silva M. D. V., “Runaway and hypervelocity stars. The supernova connection”, 2012, MEMORIE della Società Astronomica Italiana – Astro-ph: <http://arxiv.org/abs/1109.4116>

[3] Silva M. D. V. & Napiwotzki R., “Ejection velocities of high Galactic latitude runaway stars”, 2011, MNRAS, 411, 2596 – Astro-ph: <http://arxiv.org/abs/1010.3651>

IT skills

General:

- OS administration/scripting (Linux and Windows)
- Git/Github
- Visual Studio Code
- misc. applications: Tex, Gimp, Photoshop, MS Office (Word, Excel, Access)

Developed packages:

- rpsfpy: software in Python for PSF reconstruction in Adaptive Optics
- Pysysp: Python package for synthetic stellar photometry : <https://pypi.python.org/pypi/pysysp/1.0.1>
- MASS: Massive MCMC sampler (Bayesian inference): <https://github.com/mdusilva/mass>
- Mamuto: Python package for distributed computing in clusters: <https://github.com/mdusilva/mamuto>

Programming:

- Python, R, MATLAB, Fortran 90, C++ (basic level)
- parallel/distributed computing: Spark, MPI

Databases:

- PostgreSQL, SQLite, Python-SQL, PL/SQL

Web:

- HTML, CSS, Jekyll, Apache Web servers (configuration)

Python:

- Data Science: scikit-learn, Pandas, SPAMS (dictionary learning)
- distributed computing: execnet, pyspark
- Bayesian inference (MCMC): pymc

Languages

Fluent: Portuguese, English

Good understanding: French, Spanish

Basic Greek and German (level A1 certificate)

Other interests

I am a qualified Futsal referee. I like to play Football and Futsal, playing chess, Philosophy, travelling. I am also engaged in Science outreach activities directed at the general public.