Dr. Raffaella Capasso

Researcher and Data Scientist

About me

I am passionate about data visualization and problem solving. Through big data processing, I am interested in extracting, understanding, and presenting the meaningful value hidden in data.

- LinkedIn
- GitHub
- Website

Skills & Strengths

Programming

- Data Analysis & Visualization
- Machine learning
- Parallel computing

Python | IDL | C++ | Fortran | Julia

Team Development and Agile Project Management

- Daily stand-up meetings & Project updates
- Regular hack sessions

Keynote | PowerPoint | Trello | SLACK | Github | Bitbucket

EXPERIENCE

- **Project leader** for both small (<5 people) and large (<20 people) teams as part of scientific collaborations, ensuring the completion of milestones and providing regular updates
- **Author and co-author** of 30 publications in peer-reviewed journals
- **Referee** for publications in leading physics journals (MNRAS, ApJ)
- **Speaker** at more than 20 national and international conferences, with full financial support
- **Supervisor** of several Bachelor, Master and PhD students, supporting them to achieve both goal and deadline driven results

10.2021 - today **Researcher** | **Advisor: Prof. Daniel Grün**

Ludwig-Maximilians-Universität, Munich, Germany

As a member of the **astrophysics, cosmology, and artificial intelligence** group at the LMU, I apply precise and accurate machine learning techniques to advance the future of physics research. **Main duties and accomplishments**:

- Leader on a project based on a **VAE-GAN infrastructure**, aiming at creating a physical model of clusters of galaxies
- Organizer of the **"Generative Models Seminar"**
- Teaching assistant for python-based labs and astrophysical lectures

Statistics

- Monte Carlo methods and numerical statistics
- Bayesian statistical analysis

Operating systems

MacOS | Linux | Windows

Soft skills

- Team work Communication
- Problem solving (persistence, observation)
- Creativity (divergent thinking, inspiration, imagination)
- Time management (prioritizing, planning, organizing)

Languages

Italian	●●●●●
English	●●●●●
German	●●●○○
Swedish	●●○○○

Interests & Activities

Traveling | Photography | Reading | Music | Violin | Yoga | Good Food

10.2019 - 09.2021 **Researcher |** **Advisor: Prof. Jens Jasche**

University of Stockholm, Sweden

Application of advanced statistical methods, such as **machine learning**, to big astrophysical datasets to compare models with the observed Universe. **Main duties and accomplishments**:

- Improved the accuracy of standard contamination removal codes by 30% by means of **supervised machine learning tools**
- Built a **Generative Adversarial Network** for fast generation of realistic galaxy images
- Active member of the **Aquila Consortium**, focusing on using information theory and artificial intelligence to optimally extract physical information from data
- Organizer of the **"Stockholm Data Science Forum"** and of the "Cosmology and Gravity" seminar series

06 - 09.2019 **Researcher |** **Advisor: Prof. Alexandro Saro**

INAF - Osservatorio Astronomico di Trieste, Italy

Main duties: Large scale data analysis and modelling, using more than **one million** simulated galaxies to assess the systematics associated to cluster mass measurements

05.2019 **Research visit |1 month, with Prof. Katherine Freese**

Leinweber Center for Theoretical Physics (LCTP, University of Michigan), Ann Arbor, USA

02.2019 **Data Science ZEISS Hackathon**

ZEISS Digital Innovation Partners, Munich, Germany

12.2017 **Observer for the Dark Energy Survey |** **5 nights**

Blanco Telescope (4m), Cerro Tololo Inter-American Observatory, Chile

Main duties: On-site monitoring of data taking for the Dark Energy Survey and optical imaging

SPECIALIZATION COURSES

02 - 04.2020 **Machine Learning course | by Andrew Ng**

Coursera

An introduction to **machine learning and datamining**. Topics: supervised and unsupervised learning, best practices in machine learning, and **numerous case studies and applications**, including text recognition, computer vision, medical informatics, audio and database mining.

EDUCATION

02.2015 - 04.2019 **PhD | magna cum laude, Advisor: Prof. Joseph Mohr**

Ludwig-Maximilians-Universität, Munich, Germany

Main duties and accomplishments:

- Exploitation of **analytical and numerical tools** to analyze the phase-space distribution of gravitationally interacting N-body systems
- Development of a **fully (MPI-) parallel Python code**, employing a self-consistent **Bayesian model averaging procedure**

10.2012 - 12.2014 **Master Degree in Astrophysics and Cosmology | Advisor: Prof. Lauro Moscardini**

University of Bologna "Alma Mater Studiorum", Bologna, Italy

09.2009 - 09.2012 **Bachelor Degree in Astronomy | Advisor: Prof. Daniele Dallacasa**

University of Bologna "Alma Mater Studiorum", Bologna, Italy