Nicolas PESCHKEN

site: nicolas-peschken.owlstown.net

Arcetri Observatory, Florence University
Largo Enrico Fermi 5, 50125 Florence
+33 (0)6 35 56 60 38
nicolas.peschken@unifi.it

Education and Research Timeline

- *2023-present* — **Post-Doc** hosted by Prof. E. di Teodoro
  Florence University, Italy
  Research project: Cold nuclear outflows of the Milky Way

- *2022 – 2023* — Planned year away from academic research to travel through Africa.

- *2018-2021* — **Post-Doc** with Prof. M. Hanasz, in collaboration with Prof. T. Naab
  Nicolaus Copernicus University, Torun, Poland, and MPA, Garching
  Research project: Cosmic-driven winds in disk galaxies

- *2016-2018* — **Post-Doc** hosted by Prof. E. Łokas
  Nicolaus Copernicus Astronomical Center, Warsaw, Poland
  Research project: Bars and galaxy mergers in the Illustris simulation

- *2013-2016* — **Ph.D in Astrophysics**
  Laboratoire d'Astrophysique de Marseille, Marseille, France
  Research project : Formation and Evolution of galactic disks
  Supervisor : Dr. E. Athanassoula

- *2011-2013* — **Master in Physics**
  Ecole Normale Supérieure de Lyon, Lyon, France
  2013 : *Thesis* Asteroseismology of binary stars observed by Kepler
  Supervisor : Dr. S. Deheuvels
  IRAP, Toulouse, France
  2012 : *Thesis* Study of bars in simulated galaxies
  Supervisor : Dr. E. Athanassoula
  LAM, Marseille, France

- *2011* — **Bachelor Degree in Physics**
  Ecole Normale Supérieure de Lyon, Lyon, France
  Thesis Electrostatic control of a suspended mirror in a Fabry-Perot cavity
  Supervisor : Dr. O. Chaibi
  Observatoire de la Côte d'Azur, Nice, France

Research Interests

● **Galaxy Evolution and Dynamics***:* galactic winds, galaxy mergers, galactic bars, and the evolution of the interstellar medium (ISM).

● **Galactic Outflows and Stellar Feedback:** multiphase outflows, stellar and AGN feedback, galactic fountains

● **Cosmic Rays (CRs)**: CR transport and CR-driven winds.

● **Computational Astrophysics:** MHD simulations of galaxies, numerical modelling of stellar feedback, and analysis of cosmological simulations (IllustrisTNG).

● **Simulations – Observations Comparisons:** mock HI, UV absorption, and soft X-ray observations, and the effects of observational biases such as beam smearing and noise.

Conferences & Workshops

● *May 2026*	The Olympian Symposium "The Evolution of Interstellar Medium Across Cosmic Times", Greece *Talk:* Modelling outflows above the Milky Way Center
● *June 2025*	European Astronomical Society Annual meeting, Cork, Ireland *Talk:* Nuclear Outflows and Cosmic Rays in the Galactic Center
● *May 2025*	"The content of the Fermi Bubbles", Green Bank, USA. *Talk:* Cosmic Ray driven outflows in Milky Way-like galaxies
● *September 2024*	"Cosmic Rays 3 - the salt of the star formation recipe", Florence, Italy *Talk:* Regulating Star Formation through Cosmic Ray driven winds
● *May 2024*	Aspen Workshop "Cosmic Ray Feedback", Aspen, USA
● *December 2023*	IAP Colloquium "New simulations for new problems in galaxy formation", Paris, France. *Talk:* "The impact of cosmic rays on the outflow production and composition"
● *July 2023*	"New Views on Feedback & the Baryon Cycle in Galaxies", Melbourne, Australia. *Talk:* Cosmic rays injection in stellar feedback and their impact on the outflow production and composition
● *July 2023*	European Astronomical Society Annual meeting, Krakow, Poland *Talk:* The impact of cosmic rays on the outflow production and composition
● *March 2020*	IAU symposium "Galaxy Evolution and Feedback across Different Environments", Bento Goncalves, Brazil. *Talk:* Building disc galaxies by gas accretion after a major merger in Illustris
● *February 2020*	"Magnetic Fields in the Universe 7", Quy Nhon, Vietnam. *Talk:* Cosmic Ray driven winds in galaxies from MHD + Nbody simulations

- *July 2019* IAU symposium "Galactic Dynamics in the Era of Large Surveys", Shanghai, China: *Poster*
- *June 2019* "New Perspectives on Galactic Magnetism, Newcastle", UK: *Poster*
- *August 2018* IAU General Assembly, Vienna, Austria: *Poster*
- *May 2018* "Galactic Rings", Tuscaloosa, Alabama, USA
  Talk: Galactic bars and galaxy interactions in the Illustris simulation
- *April 2018* EWASS Conference, Liverpool, UK : *Poster*
- *November 2017* Meeting of the Cosmology and Galaxies French Program, Lyon, France.
  Talk: Bars and galaxy interactions in Illustris
- *August 2017* "Challenges in Galaxy Evolution", Florence, Italy : *Fast Talk*
- *July 2017* French Astronomy Week (SF2A Annual meeting), Paris, France
  Talk: Forming Milky Way like galaxies in wet major mergers : Linking the surface density profiles of the disc with angular momentum
- *June 2017* "Galaxy Evolution Across Time", Paris, France : *Poster*
- *May 2016* French OSU meeting, Aix-en-Provence, France.
  Talk: Creating spiral galaxies by merging two galaxies: Density distribution
- *December 2015* "Modelling MW type galaxies in the Gaia era", Nice, France
  Talk: Formation of disc galaxies in wet major mergers simulations : Radial density profiles and scalelengths
- *July 2015* "Drifting through the cosmic web : Evolution of Galaxies within the Large Scale Structure" Aix-en-Provence, France : *Poster*.
- *October 2014* Sino-French "LIA-ORIGINS" Workshop in Beijing, China
  Topic : "Dark Matter : Astrophysical and Experimental Constraints"
- *Summer 2014* Workshop "Galaxy formation and evolution in a cosmological context", LAM
  "DAGAL training school: simulations as a tool for observers", LAM

Teaching Experience

- *2012* **Private lessons** in mathematics, physics and chemistry for high school students
- *2015* "**Stages Hippocampe**" at Institut de Recherche pour l'Enseignement des Mathématiques, Marseille : 6 day introduction to research in mathematics for high school students.
- *2019* **Assistant teacher** for master students in Nbody dynamics and galaxy simulations

Academic service

Local Organising Committee for Extra-galactic seminars, Arcetri Observatory, Florence, Italy, (2026 - present)

Awarded Grants

- SONATINA-bis postdoctoral fellowship, Poland, 2019-2022.
- CINECA IsB computational grant, 3.6 million CPU hours, 2024
- CINECA IsB computational grant, 2.5 million CPU hours, 2025

Computer Skills

- **MHD Simulations:** Development and implementation of PIERNIK modules for N-body particles, star formation, stellar feedback, and gas thermal evolution, as well as the AMR setup for simulations of the Milky Way Center.
- **Programming Languages:** Python, Fortran, C, IDL.
- **Scientific Software:** 3D-BAROLO, Trident, BUILDGAL, GALFIT, BUDDA, IRAF, Glnemo2, UNSIO.
- **Operating Systems:** GNU/Linux, Windows, macOS.

Languages

- **French, English, German, Italian :** Fluent
- **Polish :** Beginner