

Giovanni Pierobon

Email: tanogp@protonmail.com ◦ GitHub: github.com/gpierobon ◦ Website: gpierobon.github.io
Sydney/Ballina, NSW, Australia

Languages: English (fluent), Spanish (fluent), Italian (native), German (basic)

PROFESSIONAL EXPERIENCE

Research Associate, The University of New South Wales Sydney, 2024 – Current

- Numerical modeling of nuclear magnetic resonance (NMR) systems and implications for cosmic relics and fundamental physics.
- Enhancing the experimental sensitivity of dark matter searches (e.g., microwave cavities) through more accurate modeling of the underlying spectral signatures.
- Lecturing and presenting at leading international workshops and conferences, as well as invited seminars.

PhD researcher, The University of New South Wales Sydney, 2020 – 2023

- Leading the first in-depth numerical treatment of sub-galactic structure of dark matter (axion) by means of high-resolution hybrid simulations (lattice+particle+Monte Carlo).
- Published 7 papers in high-impact factors journals in theoretical physics.

Teaching Assistant, The University of New South Wales Sydney, 2020 – 2024

- Academic tutoring of advanced course in the Bachelor degree within the School of Physics.
- Marking and moderating first year general physics introductory courses.

TECHNICAL EXPERTISE

- **Quantum modeling and simulation**
 - Open quantum systems: master equations, Lindblad formalism, NMR experimental modeling
 - Time evolution solvers, simulation frameworks (QuTiP), mean-field methods
 - Visualization tools: Bloch spheres, density matrices
- **Data Analysis & Statistical Methods**
 - NumPy, SciPy, Pandas, Scikit-learn, Jupyter
 - Markov Chain Monte Carlo, power spectra & correlation function
 - Signal processing (Fourier transforms, windowing, filtering) and noise modeling
 - Visualisation: Matplotlib, Mathematica, volume rendering (yt)
- **High-performance computing**
 - Particle and lattice simulations (finite difference, spectral methods)
 - Parallelisation and acceleration: MPI, OpenMP, CUDA
 - HDF5 I/O, PBS scheduling (CentOS/RHEL), profiling
- **Core:** Python, C, C++, Bash, Linux, shell scripting
- **Tools:** Git, GitHub workflows, CMake, Make, Docker

SOFT SKILLS

- Confident with public speaking
- Balanced between detail-oriented & big-picture
- Self-motivated, autonomous & team-player
- Adaptable & receptive to change

EDUCATION

Ph.D. The University of New South Wales Sydney, 2020-2023
M.Sc. University of Padua Padua, 2017-2019
M.Sc. University of Heidelberg (exchange year) Heidelberg, 2018-2019
B.Sc. University of Padua Padua, 2014-2017

Certifications

NVIDIA Deep Learning Institute Fundamentals of Accelerated Computing with CUDA Python	2023
National Computational Infrastructure Introduction to OpenMP	2023
Intersect Australia Linear regression, Classification	2023

ACADEMIC PUBLICATIONS

A list of academic works can be found on the inspire database <https://inspirehep.net/authors/1774791>

CODING PROJECTS

I lead various projects and maintain several sizable codebases. My GitHub contains a list of my repositories <https://github.com/gpieroobon>.

INVITED TALKS AND SEMINARS

○ Workshop, Institute for Nuclear Theory	Seattle, Dec. 2025
○ Seminar, Korea Institute for Advanced Study	Seoul, Nov. 2025
○ Seminar, University of Zaragoza	Zaragoza, Sep. 2025
○ Seminar, University of Bielefeld	Bielefeld, Sep. 2025
○ Seminar, Sydney CPPC group	Sydney, Apr. 2025
○ Conference, Cosmic Wispers General Meeting	Istanbul, Sep. 2024
○ Workshop, Advancements in Axion Physics	Shanghai, Oct. 2023
○ Workshop, Galileo Galilei Institute for Theoretical Physics	Florence, May 2023
○ Seminar, University of Zaragoza	Zaragoza, Mar. 2023
○ Conference, Cosmic Wispers kick-off meeting	Rome, Feb. 2023
○ Seminar, UCLA	Los Angeles, Jan. 2023
○ AIP NSW Postgraduate Awards	Sydney, Nov. 2022

TEACHING EXPERIENCE AND SUPERVISION

School of Physics (UNSW Sydney)

○ PHYS3115: Particle physics and the early Universe	2020, 2022
○ PHYS2113: Classical mechanics and special relativity	2021
○ PHYS1160: Introduction to astronomy	2020–2023
○ Special guest for PHYS3116 lecture (Galaxies and Cosmology)	2024

National Computational Infrastructure and Intersect Australia

○ Guest lecture: Running and Analyzing Cosmological Simulations	2024
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I have co-supervised 1 PhD student and 3 Honours (Master) projects:

○ Sean Bryan, Simulations of axion string networks	2021
○ Viraj Ekanayakage Don, Tidal disruption of fuzzy dark matter	2022
○ Juan Minguez-Laguna, Axion simulations with Schrödinger-Poisson	2023
○ Yeray Garcia del Castillo (PhD)	2024 – Current

AWARDS

NCMAS and UNSW compute allocation National Computational Infrastructure	2021–2025
Postgraduate Award Nomination Australian Institute of Physics	2022
University International Postgraduate Award (UIPA) The University of New South Wales	2019

REFERENCES

Available upon request