Giovanni **Picogna**

Computational Astrophysicist · Planet Formation & Disc Evolution

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Research Profile

Computational astrophysicist working on the evolution and dispersal of protoplanetary discs and its imprint on planet formation. I built the radiation-hydrodynamic framework for **X-ray photoevaporation** that couples the photoionisation and dust radiative-transfer code MOCASSIN and the thermochemical code PRIZMO to the PLUTO hydrodynamics solver, and I maintain the public model grids that external disc-evolution and planet-population-synthesis codes use as input physics.

My work spans the full modelling chain – governing equations, numerical method, and synthetic observables – which lets me connect theory with observations.

47 refereed publications (9 as first author), **1340 citations**, **h-index 22**. Supervised four doctoral and six master's projects. Teaching at LMU across lecture, tutorial and laboratory formats; Topic Editor for *Frontiers in Astronomy and Space Sciences*, referee for A&A, ApJ and MNRAS, and organiser of international conference sessions.

Academic Appointments

Ludwig-Maximilians-Universität München – Universitäts-Sternwarte *Munich, Germany*

Research Scientist (Postdoctoral Researcher) *Apr. 2016 – present*

- Group of Prof. Barbara Ercolano
- Established and lead the institute's radiation-hydrodynamic photoevaporation modelling effort (PLUTO + MOCASSIN + PRIZMO), from numerical formulation through to public model grids.
- Day-to-day scientific supervision of the group's doctoral and master's researchers – four doctoral and six master's projects, which have so far yielded 16 refereed papers; teaching duties in lecture, tutorial and laboratory courses (see below).
- Coordinated modelling work across an international network.

Eberhard Karls Universität Tübingen – Institut für Astronomie und Astrophysik *Tübingen, Germany*

Research Scientist (Postdoctoral Researcher) *Jun. 2014 – Mar. 2016*

- Group of Prof. Wilhelm Kley. Grid-based and particle-based hydrodynamic modelling of dust and gas in protoplanetary discs (FARGO, PLUTO, PHANTOM).
- First-author modelling of the HL Tau system, one of the first theoretical interpretations of the ALMA long-baseline images (A&A 584, A110; 56 citations).

Education

CISAS – Università degli Studi di Padova *Padova, Italy*

PhD in Science, Technologies and Space Measurements (Curriculum: Astronautics and Satellite-based Science) *Jan. 2011 – Apr. 2014*

- **Thesis:** *Planet formation in binary star systems and its relevance during target selection for extrasolar planet search with the transit method.*
- **Supervisors:** Prof. Francesco Marzari (Univ. Padova); Dr. Silvano Desidera (INAF–Osservatorio Astronomico di Padova).
- SPH modelling of circumstellar disc dynamics in binaries, and a statistical analysis of stellar multiplicity for a putative ESA PLATO target field.

Università degli Studi di Padova *Padova, Italy*

MSc in Astronomy (Laurea Specialistica) – *110/110 summa cum laude* *Jan. 2007 – Sep. 2010*

- **Thesis:** *Orbital evolution of planetesimals using an SPH method.* Supervisor: Prof. Francesco Marzari.

Università degli Studi di Padova *Padova, Italy*

BSc in Astronomy (Laurea Triennale) – *103/110* *Sep. 2003 – Dec. 2006*

- **Thesis:** *Search for extrasolar planets via the transit method in the RATS project.* Supervisors: Prof. Giampaolo Piotto, Dr. Riccardo Claudi.

Research Output

Refereed articles	**47** peer-reviewed papers, of which **9** as first author, spanning 2013–2026; includes one invited review (*Eur. Phys. J. Plus* 137, 1357).
Citations	**1340** total citations; **h-index 22**, g-index 35, i10-index 37. Most-cited: *MNRAS* 487, 691 (161); *MNRAS* 508, 1675 (75); *MNRAS* 508, 3611 (74).
Reach	19,700 + full-text reads on ADS; photoevaporation mass-loss prescriptions adopted as input physics by external disc-evolution and planet-population-synthesis codes.
Source	NASA ADS, retrieved 2 November 2026 – full record. Complete list on NASA ADS.

Teaching Experience

LMU Munich – MSc programme in Astrophysics *Lecturer & tutor*

Introduction to Planetary Science *SS 2024, SS 2026*

- **SS 2024:** delivered the lecture course and the accompanying tutorial – full responsibility for syllabus, lecture delivery, problem sets and assessment.
- **SS 2026:** tutorial classes accompanying the lecture course.

LMU Munich – MSc programme in Astrophysics *Laboratory supervisor*

Exoplanet Laboratory Course *WS 2022/23 – WS 2025/26*

- Supervising laboratory sessions each semester over four consecutive academic years

LMU Munich – BSc programme in Physics/Astronomy *Instructor*

Introduction to Scientific Programming *SS 2026*

- Introductory programming for first-cycle students: Python fundamentals, numerical methods and data handling for physics problems.

LMU Munich – Universitäts-Sternwarte *Tutor*

Tutorial classes, MSc-level lecture courses *2016 – 2022*

- *Planetary Atmospheres and the Search for Life*; *The Formation and Evolution of Planets in Protoplanetary Discs*; *Essentials of Advanced Astrophysics*.

Liceo Statale "Caterina Percoto" *Upper-secondary teacher*

Physics and Mathematics *Jan. – Apr. 2014*

- Full teaching responsibility for physics and mathematics classes at upper-secondary level (Udine, Italy), including curriculum delivery and examination.

Student Supervision

Day-to-day scientific supervision of the group's early-career researchers: defining the project and teaching the numerical methods and the codebase. Three master's theses have so far led to first-author papers, with a fourth in preparation.

Doctoral candidates (co-supervision)

2022	**Kristina Monsch**, X-ray photoevaporation and the orbital distribution of giant planets – 4 refereed papers	*LMU Munich*
2024	**Michael L. Weber**, Wind diagnostics and planet–wind interaction in photoevaporating discs – 4 refereed papers	*LMU Munich*
2022	**Raphael Franz**, Dust entrainment in photoevaporative winds and its observational signatures – 3 refereed papers	*LMU Munich*
2026	**Vincenzo Roatti**, Dust evolution in multi-planet systems and dust torques – 3 refereed papers	*University of Padua*

Master's theses

2019	**Lisa Wölfer**, Photoevaporation in carbon-depleted discs – first-author paper, *MNRAS* 490, 5596	*LMU Munich*
2020	**Enrique Sanchis**, Detectability of embedded protoplanets from hydrodynamical simulations – first-author paper, *MNRAS* 492, 3440 (43 citations)	*LMU Munich*
2020	**Apostolos Zormpas**, Solid accretion onto planetary cores in radiative discs – first-author paper, *A&A* 638, A97	*LMU Munich*
2023	**Carolina Schäfer**, Dust continuum signatures of photoevaporating transition discs – co-author, *MNRAS* 523, 3318	*LMU Munich*
2025	**Sumedh Mane**, Dust spectral index in transition discs - in preparation for submission	*LMU Munich*
2026	**Chenglu Wu**, Disc evolution around intermediate mass stars and its impact on giant planet formation	*LMU Munich*

Supervised students led **16 refereed papers** on which I am a co-author; all are listed on NASA ADS.

Academic Service & Community

Frontiers in Astronomy and Space Sciences – Research Topic

Topic Editor *ongoing*

- *Birthplaces of Planets in Their Earliest Stages: Towards Characterization of Young Protostellar Disks* – with Ł. Tychoniec (Leiden Observatory) and U. Lebreuilly (CEA Paris-Saclay).

Astronomy & Astrophysics; The Astrophysical Journal; Monthly Notices of the RAS

Peer review *ongoing*

- Regular referee for the three principal journals of the field, approximately 3–4 reports per year.

Chandra X-ray Observatory – NASA / Chandra X-ray Center

Time-allocation committee *2019*

- Member of a peer-review panel assessing observing-time proposals for a NASA Great Observatory.

European Astronomical Society; Europlanet / AAS-DPS

Conference session organisation *2024 – 2025*

- **EAS 2024**, Padova – session organiser.
- **EAS 2025**, Cork – session co-organiser.
- **EPSC–DPS Joint Meeting 2025**, Helsinki – session co-organiser.
- Session chair, *Planet Formation Witnesses and Probes: Transition Disks*, Munich, 2020.

Ludwig-Maximilians-Universität München

Institutional service *ongoing*

- Member of the **LMU Open Science Center**, promoting reproducible and openly available research software and data.
- Maintainer of the group's simulation codebase and of the public model grids released alongside the disc-dispersal papers.

Invited Talks & Selected Presentations

Invited talks

Apr. 2026	**Group retreat, Birnstiel group**, invited talk	*Chiemsee, Germany*
May 2026	**MIAPbP programme**, invited participant and speaker, Munich Institute for Astro-, Particle and BioPhysics	*Munich, Germany*
Jan. 2025	**Italian National Conference on Star and Planet Formation**, invited talk	*Sexten, Italy*
Oct. 2023	***Core2Disk III***, invited talk, Université Paris-Saclay	*Paris-Saclay, France*
Mar. 2019	**Star and Planet Formation Seminar**, invited talk, MPE / ESO Garching	*Garching, Germany*
Apr. 2016	**USM Colloquium**, invited talk, Universitäts-Sternwarte München	*Munich, Germany*

Selected recent contributions

Jul. 2026	***Disks on the Exe***, contributed talk and poster, University of Exeter	*Exeter, UK*
Sep. 2025	**EPSC–DPS Joint Meeting**, session organiser and contribution	*Helsinki, Finland*
Jun. 2025	**EAS Annual Meeting**, session co-organiser	*Cork, Ireland*
Jul. 2024	**EAS Annual Meeting**, session organiser and contributed talk	*Padova, Italy*
Jul. 2023	**EAS Annual Meeting**, contributed talk	*Kraków, Poland*
Jul. 2023	***Towards other Earths III***, poster presentation	*Porto, Portugal*

Computational Expertise

Hydrodynamics	Grid-based: PLUTO, FARGO3D, FARGOCPT. Particle-based (SPH): PHANTOM, VINE.
Radiative transfer	MOCASSIN (photoionisation), RADMC-3D (dust continuum and lines), PRIZMO (thermochemistry)
HPC	MPI, OpenMP, SLURM; profiling and scaling analysis.
Programming	C, C++, Fortran, Python (NumPy, SciPy, Pandas, Astropy, Matplotlib, PyTorch), Bash. Git/GitHub, GitHub Actions CI, containerisation (Docker).
Machine learning	Interpretable autoencoders for chemical-network reduction (*A&A* 668, A139); physics-informed neural networks (NVIDIA SciML GPU Bootcamp, 2022); surrogate modelling of simulation output.
Open science	Public release of model grids and simulation codebases; member of the LMU Open Science Center.
Languages	Italian (native); English (C2, language of instruction and publication); German (B1).

Advanced Training

2022	**SciML GPU Bootcamp – Physics-Informed Neural Networks**, NVIDIA / Excellence Cluster ORIGINS	*Munich, Germany*
2022	**Data Science Block Courses**, Excellence Cluster ORIGINS, LMU Munich	*Munich, Germany*
Jan. 2020	**Fundamentals of Deep Learning for Multiple Data Types**, NVIDIA Deep Learning Institute	*Munich, Germany*
2019	**Hybrid Programming in HPC: MPI + OpenMP**, Leibniz Supercomputing Centre (LRZ)	*Garching, Germany*
Mar. 2015	**Saas-Fee Advanced Course: From Protoplanetary Disks to Planet Formation**, Swiss Society for Astrophysics and Astronomy	*Les Diablerets, Switzerland*