

Tristan Hoellinger

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Postdoctoral availability: October 2026

Stage-IV Cosmology · Robust Inference · Fast & Scalable Simulations

Academic Employment

October 2023 – September 2026 **PhD Candidate**, *Institut d'Astrophysique de Paris* (CNRS – Sorbonne Université), Paris, France
Thesis: Implicit likelihood cosmological inference from large-scale galaxy surveys.
International collaborations: *Aquila Consortium* (2023-), *Euclid Consortium* (2023-)
Advisors: *Florent Leclercq* (CR CNRS/INSU & INS2I) and *Guilhem Lavaux* (DR CNRS INSU; HDR).

Teaching

2024 – 2025 **Teaching assistant in Mathematics, 76 hours, 3rd-yr BSc Mathematics**, *Sorbonne University*
Differential manifolds, Stokes formulae & PDEs, Optimisation.
2023 – 2024 **Teaching assistant in Mathematics, 64 hours, 3rd-yr BEng**, *Sorbonne University*
Distribution theory & Fourier analysis, ODEs, Numerical methods.

Academic Service

2024, 2025 **Member of the LOC, Aquila Consortium Meetings, 1 week each**, IAP, Paris
2023 – 2024 **Co-organiser of weekly meetings with invited colloquium speakers**, IAP, Paris
2024 **Co-led a workshop at the Fête de la Science 2024**, IAP, Paris
Outreach workshop "History of the Universe and CMB" for 11+ years old children.
2023 **Member of the LOC, ML-IAP/CCA conference**, IAP, Paris
Conference on Machine learning in astronomical surveys. Hybrid mode IAP / Flatiron, New York.

Leadership and Community Engagement

2025 – 2026 **Member, Committee against harassment and discrimination**, IAP, Paris
2019 **Mentor of high-school students within the Equal Opportunity Program Ô Talents**, Toulouse
2019 **President of the Theatre troupe "La Catin", 6 months**, Toulouse

Education

2023 – 2026 **PhD in Astronomy & Astrophysics**, *Sorbonne Université*, Institut d'Astrophysique de Paris
2020 – 2022 **Dual MSc in Applied Mathematics**, *INSA Toulouse & ENSEEIHT*, Toulouse, France
MSc in Mathematics (First-Class) & MSc in Hybrid Artificial Intelligence (First-Class).
2019 – 2020 **Academic Exchange in Fundamental Physics**, *Paris-Saclay University*
2016 – 2019 **BSc in Mathematics and Computer Sciences**, *INSA Toulouse*
2013 – 2016 **High school diploma in sciences, Top 2% countrywide**, Lycée Freppel, Obernai, France

Grants

2023 PhD fellowship *Politique Scientifique*, Sorbonne Université. Sole award in Astronomy & Astrophysics in 2023 (8 across all fields). Value: ~€100k.
2016 – 2020 Undergraduate scholarships: social criteria (level 6/7) + merit-based grant (~€7k/year).

Publications

- ★ in prep. **P3M revived: fast and accurate particle–particle gravity with COCA**, Hoellinger et al.
- ★ 2025 **Diagnosing systematic effects using the inferred initial power spectrum**, Hoellinger and Leclercq, *A&A* 699, A224 (2025), [arXiv:2412.04443](#).
- 2025 **A Vorticity Confinement correction for DG schemes applied to fluid flow problems**, Hoellinger, Manueco and Chapelier, *IJNMHFF* 2025, [10.1108/HFF-11-2024-0854](#).
- 2023 **Enhancer/gene relationships: need for more reliable genome-wide reference sets**, Hoellinger et al., Vol. 3, *Frontiers in Bioinformatics*, [PMC9999192](#).
- 2020 **Data-driven simulation for augmented surgery**, Mendizabal et al. (incl. Hoellinger), *Advanced Structured Materials*, Vol. 132, Springer, [doi:10.1007978-3-030-50464-9_5](#).

Invited Talks and Seminars

- 23 September **Astrocoffee — Journal club**, *Observatoire astronomique*, Strasbourg, France
- 2025 **Cosmological Simulations & Diagnostics of Systematics for ILI**, 45 min.
- 2025 **Cosmology & Gravitation Seminar**, *Oskar Klein Centre*, Stockholm, Sweden
[Addressing Systematic Effects in Implicit Cosmological Inference](#), 30 min.
- 2025 **Cosmology Group Meeting**, *ICUUB — Institute of Cosmos Science*, Barcelona, Catalunya, Spain
[Diagnosing systematic effects in field-based, implicit likelihood cosmological inference](#), 40 min.

Selected Contributed Talks

- 2025 **École de Physique des Houches: The Dark Universe**, *Les Houches*
[Accurate Small Scale Dynamics in COLA](#), 20 min.
- 2024 **X Meeting on Fundamental Cosmology**, *Universidad de Sevilla*, Sevilla, Spain
[Lightening black-box models in field-based cosmological inference](#), 15 min.
- 2024 **Euclid France 12th Symposium**, *IP2I*, Lyon
Implicit likelihood inference in cosmology while checking for survey systematics, 12 min.
- 2023 **Action Dark Energy Colloquium 2023**, *LAPP*, Annecy
Implicit likelihood inference in cosmology while checking for survey systematics, 15 min.

Other Talks

- 2024, 2025 **PhD day**, 10 min, IAP and Sorbonne Université, campus Pierre-et-Marie-Curie, Paris
- 2024, 2025 **The Elbereth Conference**, 10 min, IAP, Paris / Observatoire de Paris, Meudon
- 2024 **Rodolphe Clédassou Summer School**, 5 min, Hendaye, France
- 2024 **PhD Students' Seminar**, [Lightening black-box models](#), 40 min, IAP, Paris

International Conferences, Schools and Workshops

- 2023 – 2026 **Aquila Consortium Workshops**, Paris, Oxford, Stockholm, 1 week twice a year
- 2025 **École de physique des Houches: The Dark Universe**, Les Houches
- 2023, 2024 **Rodolphe Clédassou School**, *Ronces-les-Bains & Hendaye*, France
- 2024 **MaxEnt 2024**, *Faculty of Economics*, Ghent University, Ghent, Belgium
- 2023 **Future Cosmology**, *Institut d'Études Scientifiques de Cargèse*, Corsica

Practical Skills in CS & Applied Maths

Methods Bayesian inference; sampling; optimisation (deterministic & stochastic); data assimilation; numerical simulation (finite volume, Galerkin & particle methods); ML for scientific computing.

Programming Python (PyTorch, JAX), C++, Fortran, Julia; Git, SLURM; HPC (MPI, OpenMP); Docker, AWS.

Traineeships — Interdisciplinary Experiences

2023 **Graduate Trainee**, *Institut d'Astrophysique de Paris*, Paris

Group: Large-scale Structure and Distant Universe. Advisors: [Florent Leclercq](#) & [Guilhem Lavaux](#).

2022 – 2023 **Master's thesis**, *ONERA - The French Aerospace Lab*, Châtillon

I introduced a Vorticity Confinement correction for discontinuous Galerkin schemes, and implemented it in a massively parallel solver of turbulent flows. Advisors: [Jean-Baptiste Chapelier](#) & [Lucas Manueco](#).

2020 – 2022 **Junior Bioinformatics Scientist**, *Inserm*, Toulouse

I benchmarked statistical methods to map enhancer-gene interactions in human genomes with high-throughput data, towards finding variants involved in complex genetic disorders. Advisor: [Sarah Djebali](#).

2021 **Research Trainee — Visiting**, *Centre for Genomic Regulation*, Barcelona

I created a pipeline to find genetic variants linked to intron retention in blood cells. Advisor: [Diego Garrido](#).

2020 **Research Trainee**, *Toulouse Mathematics Institute*, Toulouse

Stochastic calculus, quantum nondemolition measurements. Advisors: [Tristan Benoist](#) & [Clément Pellegrini](#).

2020 **Research Trainee**, *IRAP - Astrophysics & Planetology*, Toulouse

Theoretical study of kinetic scale plasma turbulence in the solar wind. Advisor: [Philippe Louarn](#).

2019 **Research Trainee**, *Inria*, Strasbourg

MIMESIS team. Deep learning for augmented surgery. Advisors: [Andréa Mendizabal](#) & [Stéphane Cotin](#).

2017 **Agricultural Assistant**, *La Ferme aux 100 Blés*, Saint-Broing-les-Moines

Languages

English Fluent — Cambridge Linguaskill Business C1+ French Native

Open-source Software

SelfiSys **Principal developer and maintainer** of SelfiSys, a Python package to diagnose systematic effects in forward models of galaxy surveys, with [full documentation](#) and [examples](#).

This package is selected to audit the forward model within the [Euclid ILI-GC-DR1](#) project, which aims to infer cosmological parameters using implicit likelihood inference from Euclid GC-DR1 data.

Simbelmynë A hierarchical probabilistic simulator to generate synthetic galaxy survey data. I am **leading the development of a P3M gravity module** (not public yet). Principal developer: [Florent Leclercq](#). I am additionally responsible for integrating this module into the `euclid_forward` pipeline.

Miscellaneous

Hobbies Portrait photography, sport (running, bouldering, hiking).

References

References available upon request.