Tristan Hoellinger

Postdoctoral availability: October 2026.

	Academic Employment		
October 2023 - September 2026	 PhD Candidate, Institut d'Astrophysique de Paris (CNRS – Sorbonne Université), Paris, Fra Topic: Robust cosmological physics with mis-modelled galaxy clustering probes. International collaborations (full member): Aquila Consortium (2023-), Euclid consortium (2023-) Advisors: Florent Leclercq (CR CNRS/INSU & INS2I) and Guilhem Lavaux (DR CNRS INSU; HDF 		
	Research Interests		
	Numerical & Statistical Cosmology,		
	Implicit Inference, Field-level Inference, Robust Machine Learning, Deterministic & Stochastic Optimisation, Bayesian Optimisation.		
	Languages		
English	Fluent — Cambridge Linguaskill Business: C1+ (highest score) French Native		
	Academic Service		
2023 - 2024	Co-organiser of the weekly Friday's pre-colloquium meetings at the IAP Weekly informal meeting between PhD students and invited researchers at the IAP.		
2024	Co-animated a workshop at the Fête de la Science 2024 , <i>Oct 13th, 2024</i> Co-animated a workshop for 11+ years old children, "History of the Universe and CMB".		
2023	Member of the LOC for the Aquila 2024 autumn meeting, Oct 21st - Oct 25th, 2024 Bi-annual meeting of the Aquila consortium, IAP, Paris.		
2023	Member of the IAP LOC for the ML-IAP/CCA conference, Nov 27th - Dec 1st, 2023 Conference on Machine Learning in astronomical surveys, IAP, Paris / Flatiron institute, New York.		
	Teaching		
2024 - 2025	Teaching assistant in Mathematics, 76 hours , <i>3rd yr BSc. in Mathematics</i> , Sorbonne University Differential manifolds, Stokes formulae & PDEs (38 hours), (un)constrained optimisation (38 hours).		
2023 - 2024	Teaching assistant in Mathematics, 64 hours , <i>3rd yr BSc. in Engineering</i> , Sorbonne University Distribution theory & Fourier analysis (16 hours), Fourier analysis & distribution theory (16 hours), ODEs (second year bachelor, 18 hours), numerical methods (14 hours).		
	Education		
2023 - 2026	PhD in Astronomy & Astrophysics, Sorbonne Université, Institut d'Astrophysique de Paris		
2020 - 2022	Dual MSc in Applied Mathematics , <i>INSA Toulouse & N7</i> , Toulouse, France MSc in Mathematics (First-Class) and MSc in Artificial Intelligence & Computer Sciences (First-Class).		
2019 - 2020	Academic Exchange in Fundamental Physics, Paris-Saclay University		
2016 - 2019	BSc in Mathematics and Computer Sciences, INSA Toulouse, First-Class Honours		

	Publications	
2025	Diagnosing systematic effects using the inferred initial power spectrum, Hoellinger and Leclercq, accepted in A&A, arXiv:2412.04443, DOI: 10.1051/0004-6361/202453416.	
2025	A Vorticity Confinement correction for discontinuous Galerkin schemes applied to fluid flow problems, Hoellinger, Manueco and Chapelier, 2025, IJNMHFF, 10.1108/HFF-11-2024-0854.	
2023	Enhancer/gene relationships: need for more reliable genome-wide reference sets, Hoellinger et al., 2023, Front. Bioinform., Insights in Integrative Bioinformatics, PMC9999192	
2020	Data-driven simulation for augmented surgery, Mendizabal et al. (incl. Hoellinger), 2020, Developments and Novel Approaches in Biomechanics and Metamaterials. Springer, hal-02538101	
	Invited Talks	
September 23rd 2025	 r Astrocoffee — Journal club, Observatoire astronomique, Strasbourg, France 5 Accurate Small Scale Dynamics in COLA, 20 minutes. 	
June 27th 2025	Cosmology & Gravitation Seminar , Oskar Klein Centre, Stockholm, Sweden Robustifying cosmological inference against model misspecification, 30 minutes	
March 6th 2025	Cosmology Group Meeting , <i>ICUUB</i> — <i>Institute of Cosmos Science</i> , Barcelona, Catalunya, Spain Diagnosing systematic effects in field-based, implicit likelihood cosmological inference, 40 minutes.	
	Contributed Talks at International Conferences	
July 20th	École de Physique des Houches: The Dark Universe, Les Houches Accurate Small Scale Dynamics in COLA, 20 minutes.	
Oct 17th 2024	X Meeting on Fundamental Cosmology, <i>Universidad de Sevilla</i> , Sevilla, Spain Lightening blackbox models in field-based cosmological inferences, <i>15 minutes</i> .	
Jan 25th 2024	Euclid France 12th Symposium , <i>IP2I</i> , Lyon Implicit likelihood inference in cosmology while checking for survey systematics, <i>12 minutes</i> .	
Nov 6th 2023	Action Dark Energy Colloquium 2023, LAPP, Annecy Implicit likelihood inference in cosmology while checking for survey systematics, 15 minutes.	
	Other Talks	
May 23rd 2025	PhD day , Sorbonne Université, campus Pierre-et-Marie-Curie, Paris, France Diagnosing Systematic Effects Using the Inferred Initial Power Spectrum, <i>5 minutes</i> .	
Apr 10th 2025	The Elbereth Conference 2025, by & for PhD students, Observatoire de Paris, Meudon Diagnosing Systematic Effects Using the Inferred Initial Power Spectrum, 10 minutes.	
August 28th 2024	Rodolphe Clédassou Summer School , <i>by & for PhD students</i> , Azureva, Hendaye Lightening blackbox models to deal with systematic effects, <i>5 minutes</i> .	
June 7th 2024	PhD students Seminar, IAP, Paris, France Lightening blackbox models, 40 minutes.	
March 29th 2024	PhD day , Institut d'Astrophysique de Paris Novel methods for implicit likelihood inference in cosmology, <i>10 minutes</i> .	
Feb 28th 2024	The Elbereth Conference 2024 , by & for PhD students, IAP, Paris Implicit likelihood inference in cosmology while checking for survey systematics, 12 minutes.	
	Leadership and Community engagement	
2025 - 2026	Member of the Committee against harassment and discriminations at the 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	

	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, 1 month
2024	Rodolphe Clédassou School on Cosmology and large-scale surveys, Hendaye, 2 weeks
2024	MaxEnt 2024, <i>Faculty of Economics, Ghent University</i> , Ghent, Belgium, 1 week 43rd International Workshop on Bayesian Inference and Maximum Entropy Methods.
2023	Future Cosmology, Institut d'Études Scientifiques de Cargèse, Corsica, 1 week
2023	Euclid School on Cosmology and large-scale surveys, Ronces-les-Bains, 2 weeks
	Grants
2023	PhD student fellowship "Politique Scientifique" from Sorbonne Université. Value ~100K€. This program aims to support particularly promising thesis projects, backed by high-quality applications. Only one fellowship awarded for Astronomy & Astrophysics in 2023 (8 in total).
2016 - 2020	National scholarship $+$ merit-based grant holder during my undergrad studies (\sim 7k ${f \in}/$ year).
	Traineeships
March 2023 - July 2023	Graduate Trainee , <i>Institut d'Astrophysique de Paris</i> , Paris Trainee in the "Large-scale structure and distant Universe" group at the IAP. Advisors: Florent Leclercq & Guilhem Lavaux
February 2022 - February 2023	Master thesis, <i>ONERA</i> - <i>The French Aerospace Lab</i> , Châtillon Research trainee in the NFLU and MSAT teams. I developed a Vorticity Confinement correction for the direct numerical simulation of Navier-Stokes equations through Discontinuous Galerkin Methods, at arbitrarily high order. I implemented the method in a massively parallel solver of unsteady compressible turbulent flows. Advisors: Jean-Baptiste Chapelier & Lucas Manueco.
Sontombor	Junior Riginformatics Scientist Income Toulouse
2020 - January 2022	In parallel to my Master's degree in Mathematics, I worked as a junior researcher in quantitative epigenomics. I studied statistical methods to predict enhancer-gene interactions in human genomes based on high-throughput data, towards application to the search of variants involved in haemochromatosis or complex genetic disorders. Advisor: Sarah Djebali.
July 2021 - August 2021	Research Trainee — Visiting , <i>Centre for Genomic Regulation</i> , Barcelona Guigó lab. I created a Nextflow pipeline based on surrogate variable analysis for automated identification of genetic variants associated with intron retention estimated from RNA-sequencing in blood cell types from the Blueprint Project. Advisor: Diego Garrido.
luly 2020	Research Trainee Toulouse Mathematics Institute Toulouse
54.9 2020	Stochastic calculus: theoretical study of the convergence rate of quantum non-demolition measurements, under the supervision of Tristan Benoist & Clément Pellegrini.
April 2020 - June 2020	Research Trainee , <i>IRAP - Institut de recherche en astrophysique et planétologie</i> , Toulouse Theoretical study of kinetic scale plasma turbulence in the solar wind. Advisor: Philippe Louarn.
June 2019 -	Research Trainee, Inria, National Institute for Research in Digital Science and Technology
August 2019	I analysed the robustness of a deep learning method for real-time biomechanical simulation, with respect to data sparsity and noise, in the context of intraoperative augmented surgery. Advisor: Andréa Mendizabal.
July 2017	Farm Hand , <i>La Ferme aux 100 Blés</i> , Saint-Broing-les-Moines Agricultural operation. I used various tools (pneumatic hammer, freight elevators, riveting guns), packed flour and oil, made sourdough bread, ran a market stall and delivered farm products to clients.

Education — Details	Ξd	ucation –	– Detail:	s
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2023 - 2026	Ph.D. Candidate, <i>Sorbonne Université (Institut d'Astrophysique de Paris)</i> , Paris, France Title: Robust cosmological physics with mis-modelled galaxy clustering probes.
2020 - 2022	M.Sc. in Mathematics & M.Sc. in Hybrid AI, <i>INSA Toulouse x N7</i> , Toulouse This is a transversal curriculum leading to 2 <i>Diplômes d'ingénieur</i> (2 distinct MS degrees from French leading <i>grandes écoles</i>), built around 3 main axes: numerical mathematical modelling, statistical mathematical modelling, hybrid artificial intelligence. Humanities are part of the curriculum . Major scientific topics:
	$_{ m O}$ deterministic and stochastic optimisation, variational data assimilation, optimal control theory,
	O PDEs, finite volume and Galerkin methods, solving large linear systems, signal / image / wavelets,
	O advanced statistics, reinforcement learning, advanced and physically constrained machine learning.
2019 - 2020	Academic exchange in Physics, <i>Paris-Saclay University</i> , Gif-sur-Yvette I took a full year off with respect to my education in Mathematics at INSA Toulouse, in order to develop my knowledge of fundamental physics. I was enrolled in the <i>Magistère de Physique d'Orsay</i> , where I studied for one successful semester (hamiltonian mechanics, quantum mechanics, general relativity and cosmology, statistical physics). I completed my academic year with 2 traineeships in theoretical physics.
2016 - 2019	B.Sc. in Mathematics and basic sciences , <i>INSA Toulouse</i> , Toulouse First part of a selective public 5-year curriculum leading to a <i>Diplôme d'ingénieur (M.Sc.) in Mathematics</i> . Major: mathematics. Other courses: computer sciences, fundamental and applied physics, engineering.
2016 - 2017	Propaedeutic year, INSA Strasbourg, Strasbourg, Top 10%. Transfer to INSA Toulouse.
2013 - 2016	High school diploma in sciences , <i>Lycée Charles-Emile Freppel</i> , Obernai, France Public high school. Highest Honours — Top 2% countrywide.
	Practical skills in Applied Maths & in Computer Science
Generalities	Signal/image processing, data assimi- lation, optimisation (smooth, convex, stochastic), inverse problems. Numerical Fluid dynamics, finite volume methods, simulation Galerkin methods, particle methods.
Statistics	Tests, stochastic processes, sampling methods, machine learning: kernel methods, neural networks (CNNs, RNNs, PINNs), variational data-assimilation networks, wavelet scattering transforms.
HPC	Solving large, ill-conditioned linear systems, multiprocessing, parallel computing (OpenMP, MPI).
Programming	Python, C/C++, Fortran, Julia, R. Misc Git, SLURM, Docker, AWS.
	Miscellaneous
Hobbies	Portrait photography, sport (running, bouldering, hiking).
	Referees
	Here we set

Upon request.