

Licong Xu

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🔗 licongxu

Education

University of Cambridge **Cambridge, UK**
PhD in Astronomy *Oct. 2024–Jul. 2027 (Expected)*

- Supervisor: Prof. Anthony Challinor, Dr. Boris Bolliet, Dr. Íñigo Zubeldia.
- Thesis: *Cosmological inference from the thermal Sunyaev–Zel’dovich effect and galaxy clusters.*

University of Cambridge **Cambridge, UK**
Master of Natural Sciences in Astrophysics *Oct. 2023–Jun. 2024*

- Class I (90/100).
- Supervisor: Prof. Anthony Challinor, Dr. Emilie Hertig.
- Project: *Impact of the Cosmic Microwave Background shadow on the tensor-to-scalar ratio measurements at the Simons Observatory.*

University of Cambridge **Cambridge, UK**
Bachelor of Arts in Natural Sciences (Astrophysics) *Oct. 2020–Jun. 2023*

- Class I with distinction (89.2/100).

Selected Publications

2026: Impact of non-Gaussian likelihood on cosmological constraints from the thermal Sunyaev–Zel’dovich power spectrum: a simulation-based inference analysis

L. Xu, Í. Zubeldia, J. Alvey, B. Bolliet, A. Challinor
Phys. Rev. D **114**, 043528 (2026)

2025: Open Source Planning & Control System with Language Agents for Autonomous Scientific Discovery

L. Xu, M. Sarkar, A. I. Lonappan, Í. Zubeldia, P. Villanueva-Domingo, S. Casas, et al.
ICML 2025 Workshop on Machine Learning for Astrophysics

2026: Competing with AI Scientists: Agent-Driven Approach to Astrophysics Research

T. Borrett, L. Xu, A. Nilipour, B. Bolliet, S. Pierre, E. Allys, C. Lecat, et al.
Accepted at Communications AI & Computing (Nature Portfolio)

2025: The Denario project: Deep knowledge AI agents for scientific discovery

F. Villaescusa-Navarro, B. Bolliet, P. Villanueva-Domingo, A. E. Bayer, ..., L. Xu, et al.
Accepted at Phys. Rev. X

Open Source Projects

CMBAgent — Multi-agent system for autonomous scientific research, powered by AG2

🔗 github.com/CMBAgents/cmbagent

Denario — Modular multi-agent system for scientific research assistance

🔗 github.com/AstroPilot-AI/Denario

Selected Talks & Presentations

- **Mar. 2026:** “Beyond AI as Assistants: Toward Autonomous Discovery in Cosmology,” *60th Rencontres de Moriond on Cosmology*, La Thuile, Italy
- **Dec. 2025:** “CMBAgent for the Fair Universe Weak Lensing Uncertainty Challenge,” *NeurIPS 2025*, San Diego, USA
- **Nov. 2025:** “Cosmological Constraints from the Thermal Sunyaev–Zel’dovich Power Spectrum — A Simulation-Based Inference Approach,” *Institute of Astronomy Wednesday Seminar*, University of Cambridge, UK
- **Sep. 2025:** “Forward modelling of thermal Sunyaev–Zel’dovich maps,” *Cambridge–LMU Cosmology Meeting*, Munich, Germany

Teaching

Lent 2026: Supervisor for Statistical Physics, University of Cambridge

Michaelmas 2025: Supervisor for General Relativity, University of Cambridge

Lent 2025: Supervisor for Introduction to Cosmology, University of Cambridge

Michaelmas 2024: Supervisor for Principles of Quantum Mechanics, University of Cambridge

Skills

AI & Agents: Multi-agent LLM systems, agent orchestration & planning, RAG, MCP, prompt engineering, LLM evaluation

Programming: Python, JAX, Julia, MATLAB, Mathematica

Machine Learning: PyTorch, TensorFlow, Scikit-learn, Normalizing Flows, Neural Likelihood Estimation

Scientific Computing: Simulation-Based Inference, Bayesian Inference, Monte Carlo Sampling (MCMC)

General Software: Git, Linux (HPC/Slurm), LaTeX, open-source development

Language: Chinese (native), English (proficient)