

Amanda Stoffers

EXTRAGALACTIC ASTROPHYSICS & BAYESIAN INFERENCE METHODS

✉ aas208@cam.ac.uk | 🌐 www.amanda-stoffers.de | 🗯 Espe13 | 📄 amanda-stoffers-physics

Research Profile

I work at the interface of galaxy evolution and statistical methodology. My scientific focus is the formation of galaxies in the first billion years and the escape of ionising radiation that drove reionisation; my methodological focus is making the inference behind those measurements fast enough, and honest enough, to apply to whole *JWST* surveys. I pursue the second through the differentiable, GPU-native spectral energy distribution (SED) fitting software described below.

Education

- 2023 – Present **PhD in Physics**, *University of Cambridge*, Cambridge, UK
Kavli Institute for Cosmology and Cavendish Laboratory, Galaxy Formation and Evolution Group. Supervisor: Dr Sandro Tacchella.
- 2023 – 2024 **Graduate Training Programme, Data Intensive Science**, *University of Cambridge*, Cambridge, UK
Advanced coursework in statistics, machine learning and scientific computing.
- 2022 – 2023 **MASt in Physics**, *University of Cambridge*, Cambridge, UK • First Class
Research project on the escape fraction of ionising photons. Graduated in the top ten of the cohort.
- 2018 – 2022 **BSc in Physics**, *Technische Universität Berlin*, Berlin, Germany • 1.3
Thesis: *Quantum theory of electron-phonon interaction in gold nanoparticles* (1.0). German scale, where 1.0 is the highest attainable grade.

Research Software

- 2024 – Present **Ceridwen**, *Author/Lead developer*, github.com/Espe13/ceridwen
A GPU-native, end-to-end differentiable SED-fitting framework in JAX, covering the full forward model from simple stellar populations through nebular emission and dust to the observed frame. Production inference uses a GPU nested slice sampler, with Hamiltonian Monte Carlo and variational inference available for the same model; supports non-parametric star formation histories of order one hundred age bins with jointly sampled chemical enrichment. Roughly thirty times faster than CPU PROSPECTOR on the same JADES galaxies.
- 2025 – Present **sedpy_jax**, *Author*, github.com/Espe13/sedpy_jax
A JAX reimplementation of **sedpy** (B. D. Johnson): GPU-ready, differentiable filter handling and broadband photometric projection – transmission curves, AB and Vega magnitudes, flux-conserving rebinning, air–vacuum conversion, and effective, pivot and zero-point wavelengths across many filters at once. Built to sit underneath CERIDWEN and any gradient-based or simulation-based inference pipeline. MIT licensed.

Publications

First author

- 2026 **The Challenge in Illuminating the Invisible: Constraining LyC Escape with Bayesian Modelling and Symbolic Regression**
Stoffers, A., Tacchella, S., Simmonds, C., Johnson, B. D., & Maiolino, R.
Monthly Notices of the Royal Astronomical Society, accepted May 2026 (*arXiv:2511.02908*)
[\[ADS\]](#)

Co-authored

- 2026 **An (in)complete NIRSpec census of Balmer absorption in Type 1 AGN: radiation-driven outflows in little red dots, quasars and variable stars**
Juodžbalis, I., Ji, X., D'Eugenio, F., Scholtz, J., Maiolino, R., Stoffers, A., et al. (20 authors; 6th)
Submitted (arXiv:2607.19057) [\[ADS\]](#)

- 2025 **Bursting at the seams: the star-forming main sequence and its scatter at $z = 3-9$ using NIRCam photometry from JADES**
 Simmonds, C., Tacchella, S., McClymont, W., Curtis-Lake, E., D'Eugenio, F., et al., incl. **Stoffers, A.** (27 authors; 11th)
Submitted (arXiv:2508.04410) [ADS]
- 2024 **Ionizing properties of galaxies in JADES for a stellar mass complete sample: resolving the cosmic ionizing photon budget crisis at the Epoch of Reionization**
 Simmonds, C., Tacchella, S., Hainline, K., Johnson, B. D., Puskás, D., et al., incl. **Stoffers, A.** (29 authors; 23rd)
Monthly Notices of the Royal Astronomical Society, 535(4), 2998–3019 [ADS]

Invited Talks

- 2026 **Invited seminar**, Friday Late Afternoon Talks, UCL, London, UK
Differentiable Galaxies: What Gradient-Based Inference Changes About SED Fitting
- 2025 **Invited talk**, JADES Science Focus Meeting, Santa Cruz, CA, USA
CERIDWEN: Fitting JADES Star Formation Histories at Survey Scale on GPUs

Contributed Talks and Presentations

- 2026 **Contributed talk**, Simulation Based Inference for Galaxy Evolution, Cambridge, UK
An Explicit-Likelihood Alternative to SBI: Differentiable Stellar Population Synthesis in JAX
- 2025 **Contributed talk**, LyC Escape from Galactic Labyrinths, Crete, Greece
Inferring Lyman Continuum Escape Fractions via SED Modelling
- 2025 **Contributed talk**, Kaba Kada: Exploring the First Billion Years of the Universe, Port Douglas, Australia
The Challenge in Illuminating the Invisible: Constraining LyC Escape with Bayesian Modelling and Symbolic Regression
- 2025 **Workshop presentation**, IAIFI Summer School and Workshop, Harvard University, Boston, MA, USA
Contextual Bandits for Stroke Treatment Analysis
- 2024 **Workshop presentation**, IAIFI Summer School and Workshop, MIT, Boston, MA, USA
Anomaly Detection via Latent Space Evaluations
- 2024 **Contributed talk**, National Astronomy Meeting (NAM), Hull, UK
Lyman Continuum Escape Fractions of High-Redshift Galaxies

Grants, Awards and Scholarships

- 2023 – 2027 **STFC Data Intensive Science / Cavendish Scholarship**, Cambridge, UK
 Full doctoral funding.
- 2025 **ESA-funded research visit**, JADES Science Focus Meeting, Santa Cruz, CA, USA
- 2025 **Postgraduate Research Fund**, Jesus College, Cambridge
 Travel award to present at *Kaba Kada: Exploring the First Billion Years of the Universe*, Port Douglas, Australia.
- 2025 **Research Culture Grant**, Kavli Institute for Cosmology, Cambridge, UK
 Awarded to establish and run the Astro Career Talk Series.
- 2025 **Best Talk and Presentation**, Graduate Research Conference, Jesus College, Cambridge, UK
- 2021 – 2023 **Studienstiftung des deutschen Volkes**, German Academic Scholarship Foundation
 Germany's national academic scholarship, awarded to roughly the top one per cent of students.
- 2021 **Enable AI Scholarship**, Data science and machine learning training

Earlier KMK Scholarship, exchange programme, Trentino, Italy (2017); Mathematics Abitur Award, Deutsche Mathematiker-Vereinigung (2018); 1st place, Berlin regional Mathematics Olympiad (2014).

Teaching and Supervision

- 2023 – 2025 **Supervisor**, *Relativistic Astrophysics and Cosmology*, Cavendish Laboratory, University of Cambridge
Small-group undergraduate supervisions, run in each of the 2023, 2024 and 2025 academic years.
- 2023 **Supervisor**, *Mathematics for Natural Sciences, Part IA*, Trinity Hall, University of Cambridge
First-year small-group supervisions.

Professional Service and Leadership

- 2026 **Local Organising Committee**, *Hubble and Beyond: Morphology and Kinematics of Early Galaxies*, Kavli Institute for Cosmology, Cambridge
- 2024 – 2025 **Founder and Committee Member**, *Astro Career Talk Series*, Kavli Institute for Cosmology, Cambridge
Established and ran a departmental series of interviews with academic and industry researchers; secured a Research Culture Grant to fund it.
- 2024 – 2025 **Committee Member**, *Cambridge University Women in Physics Society*
- 2024 **Local Organising Committee**, *Star Formation 2024*, Kavli Institute for Cosmology, Cambridge
- 2022 – 2023 **Student Representative**, *MASt Physics Programme*, University of Cambridge
- 2021 – 2025 **Board Member**, *In.Ph.A.S.E. Student Association*
Organised the student colloquium programme.
- 2024 – Present **Jesus College Boat Club**, University of Cambridge
W1 Captain (2024–2025), leading and coaching the college's senior women's crew; Committee Member (2026–present).

Outreach and Public Engagement

- 2018 – 2023 **Presenter and Event Host**, *Planetarium Berlin*, Berlin, Germany
Public astronomy talks and show presentation for general audiences.
- 2019 – 2022 **Volunteer Instructor**, *Observatories e.V.*, Berlin, Germany
Ran observing sessions and hands-on experiments for public observatory programmes.
- 2021 – 2022 **Student Laboratory Tutor**, *DESY Zeuthen*, Zeuthen, Germany
Supervised school students running particle-physics experiments.

Other Professional Experience

- 2023 **Quantum Software Engineer**, *Diehl Defence*, Überlingen, Germany
Implemented quantum algorithms and developed the associated mathematical models.
- 2021 – 2022 **Educational Assistant**, *Grunewald Primary School*, Berlin, Germany

Technical Skills

- Inference Nested sampling, Hamiltonian Monte Carlo, variational inference, hierarchical Bayesian modelling, symbolic regression, automatic differentiation
- Computing Python (JAX, NumPyro, PROSPECTOR, Qiskit, QuTiP), C/C++, GPU programming, Git, Linux, high-performance computing, L^AT_EX
- Astronomy *JWST* NIRCam and NIRSpec data, stellar population synthesis, joint photometric–spectroscopic SED modelling
- Collaborations JADES (*JWST* Advanced Deep Extragalactic Survey); LAPIS
- Languages German (native), English (near-native), French (B2), Italian (A2), Spanish (A1)