

Christopher C. Lovell

Curriculum Vitae

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Appointments

- April 2022 - July 2022 **JSPS short-term postdoctoral research fellowship.**
ICRR, University of Tokyo, Japan
- August 2019– Present **Postdoctoral Research Fellow.**
The School of Physics, Astronomy and Mathematics, University of Hertfordshire
- May 2019– August 2019 **Postdoctoral Research Fellow.**
Astronomy Centre, School of Mathematical and Physical Sciences, University of Sussex
- 2013–2015 **Data Scientist.**
Bank of England, London

Education

- September 2015– June 2019 **Ph.D. Astronomy, Modelling Galaxy Formation and Evolution during the Epoch of Reionisation and Beyond.**
Astronomy Centre, School of Mathematical and Physical Sciences, University of Sussex
Advisors: Prof. Peter Thomas & Dr. Stephen Wilkins
- 2009–2013 **MPhys Astrophysics.**
School of Physics and Astronomy, Cardiff University
Advisors: Prof. Peter Coles, Prof. Anthony Whitworth

Grants, Awards & Successful Proposals

- April 2021 **Co-I on JWST General Observer Cycle 1 proposal 1791 (PI: Justin Spilker).**
"The Early Assembly History of the Most Massive Halo in the Reionization Era"
- April 2022 **JSPS short-term postdoctoral research fellowship.**
University of Tokyo, Japan, min. 1086000¥ (approx. £7700)
- November 2016 **Introduction to Astronomy in Python (Online Module Developer).**
University of Sussex, £1000
- Summer 2013 **Cardiff Undergraduate Research Opportunities Programme (CUROP).**
School of Physics and Astronomy, Cardiff University
Advisor: Dr. Ian Harrison

Selected Conferences, Meetings, & Invited Talks

- May 2022 **Osaka University, Osaka, Japan, Invited talk.**
- May 2022 **Kyoto University, Kyoto, Japan, Invited talk.**
- October 2021 **SAZERAC SIP Models and Simulations of High-Redshift Galaxies, SOC.**
- February 2021 **SAZERAC SIP CIDER: The Cold ISM During the Epoch of Reionisation, SOC.**
- January 2021, **VIRGO consortium meetings, Contributed talks, (Lorentz Centre, Leiden, Netherlands), (ICC, Durham, UK), (remote).**
- December 2018,
- December 2016

- June 2020, June 2021 **SAZERAC summer conference**, *Contributed talks, remote.*
- November 2020 **Dust2020 in Marseille**, *Contributed talk, remote.*
- February 2020 **New York University, New York, US**, *Invited talk.*
- February 2020 **Rutgers, New Jersey, US**, *Invited talk.*
- January 2020 **Star Formation across the Universe**, *Co-organiser, Hertfordshire, UK.*
- July 2019 **University of Sussex, Brighton, UK**, *Invited talk, STFC Summer School.*
- March 2018 **University of California, Santa Cruz, US**, *Invited talk.*
- March 2019 **RAS Specialist Discussion Meeting - Machine Learning and Artificial Intelligence applied to Astronomy**, *Contributed talk, RAS, London.*
- September 2018 **Machine Learning Applications for Astronomy**, *Contributed talk, Nottingham.*
- May 2018 **European Week of Astronomy & Space Science**, *Contributed talks, Liverpool.*
- January 2018 **American Astronomical Society Meeting**, *Contributed talks, Washington DC, US.*

Teaching, Communication & Outreach

- 2016–Present **Writing.**
I have written outreach articles on a number of subjects for a wide range of different audiences. Organisations included [Astrobites](#), which provides accessible summaries of the latest research papers in Astronomy for an undergraduate audience; *Significance*, the magazine of the Royal Statistical Society and the American Statistical Association, where I contributed an [article](#) on the Search for ExtraTerrestrial Intelligence (SETI); The Conversation, where I have submitted [articles](#) for the general public on the latest Astronomy news
- 2017–Present **Webb UK.**
I have performed outreach at a number of events around the UK related to the James Webb Space Telescope, including festivals and talks for societies.
- 2017–Present **Outreach Talks.**
I have given a number of outreach talks to the public, school groups of various age groups and astronomy societies on my research, with a particular focus on explaining how and why we run simulations, such as [Building A Universe In A Box](#), and [How to Build a Universe](#)
- 2017–Present **Student mentor**, *University of Sussex, University of Hertfordshire.*
At Sussex I have mentored new PhD students working in our research group for a number of years (Aswin Vijayan, Will Roper, Jussi Kuusisto). I also co-organise our weekly group meetings. At Hertfordshire I am mentoring and co-advising a PhD student (Dyna Ibrahim).
- 2016–Present **Associate Tutor / Lecturer**, *University of Sussex, University of Hertfordshire.*
As a tutor at Sussex I performed marking and workshop supervision for a first year introductory Python course. At Hertfordshire I have hosted lectures and exercise classes for both bachelors and masters level data science courses, as well as an introductory Python course
- 2021 **Certified Software Carpentries Instructor**, [The Carpentries](#).
The Carpentries Instructors are volunteers who teach foundational computational and data skills to researchers. Housed on GitHub, all Carpentries' lessons are open source, with an open contribution model, and lessons are collaboratively created and maintained by volunteers. Lessons are taught by Instructors in two-day workshops.
- 2017–Present **Brilliant Club Tutor**, [Scholars Programme](#).
I taught an intensive 6 week course on galaxy evolution. The scheme required the design from scratch of a course intended for secondary school age students, the delivery of that course, communication with students and teachers, and marking and assessment of submissions.

Technical Skills

- Programming Languages **Python, R, C, C++, Intel MPI, OpenMP, Javascript, Git, HTML, \LaTeX , bash.**
- Software & Packages **Tensorflow, Keras, Scikit-learn, Hyperion, D3, HDF5.**

Publications.

An up to date list of my publications, along with (mostly accurate) citation metrics, is available at [ADS](#) or [Google Scholar](#).

First-Author Publications

- 2022 **Extreme Value Statistics of the Halo and Stellar Mass Distributions at High Redshift: are JWST Results in Tension with Λ CDM?**
Christopher C. Lovell, Ian Harrison, Yuichi Harikane, Sandro Tacchella, Stephen M. Wilkins,
Submitted to MNRAS [arXiv:2208.10479](#)
- 2022 **An orientation bias in observations of submillimetre galaxies.**
C. C. Lovell, J. E. Geach, R. Davé, D. Narayanan, K. E. K. Coppin, Q. Li, M. Franco, G. C. Privon,
MNRAS, 515, 3, 3644 [arXiv:2106.11588](#)
- 2022 **A machine learning approach to mapping baryons onto dark matter halos using the EAGLE and C-EAGLE simulations.**
Christopher C. Lovell, Stephen M. Wilkins, Peter A. Thomas, Matthieu Schaller, Carlton M. Baugh, Giulio Fabbian, Yannick Bahé,
MNRAS, 509, 4, 5046, [arXiv:2106.04980](#)
- 2021 **Reproducing sub-millimetre galaxy number counts with cosmological hydrodynamic simulations.**
Christopher C. Lovell, James E. Geach, Romeel Davé, Desika Narayanan, Qi Li,
MNRAS, 502, 1, 772, [arXiv:2006.15156](#)
- 2021 **First Light And Reionization Epoch Simulations (FLARES) – I. Environmental dependence of high-redshift galaxy evolution .**
Christopher C. Lovell, Aswin P Vijayan, Peter A Thomas, Stephen M Wilkins, David J Barnes, Dimitrios Irodotou, Will Roper,
MNRAS, 500, 2, 2127, [arXiv:2004.07283](#)
- 2021 **Sengi: a small, fast, interactive viewer for spectral outputs from stellar population synthesis models.**
Christopher C. Lovell
Astronomy & Computing, 34, [arXiv:1911.12713](#)
- 2019 **Learning the Relationship between Galaxies Spectra and their Star Formation Histories.**
Christopher C. Lovell, Viviana Acquaviva, Stephen M. Wilkins, Peter A. Thomas
MNRAS, 490, 4, 5503, [arXiv:1903.10457](#)
- 2018 **Characterising and Identifying Galaxy Protoclusters.**
Christopher C. Lovell, Peter A. Thomas, Stephen M. Wilkins
MNRAS 474, 4, 4612, [arXiv:1710.02148](#)

Co-Authored Publications

- 2022 **Seeing sharper and deeper: JWST's first glimpse of the photometric and spectroscopic properties of galaxies in the epoch of reionisation.**
James A. A. Trussler, Nathan J. Adams & others including Christopher C. Lovell
Submitted to MNRAS [arXiv:2207.14265](#)

- 2022 **First Light And Reionisation Epoch Simulations (FLARES) VII: The Star Formation and Metal Enrichment Histories of Galaxies in the early Universe.**
Stephen M. Wilkins, Aswin P. Vijayan, Christopher C. Lovell & others
 Submitted to MNRAS [arXiv:2208.00976](#)
- 2022 **Unveiling the main sequence of galaxies at $z \geq 5$ with the James Webb Space Telescope: predictions from simulations .**
Jordan C. J. D'Silva, Claudia D. P. Lagos, & others including Christopher C. Lovell
 Submitted to MNRAS [arXiv:2208.06180](#)
- 2022 **First Light And Reionisation Epoch Simulations (FLARES) VI: The colour evolution of galaxies $z = 5 - 15$.**
Stephen M. Wilkins, Aswin P. Vijayan, Christopher C. Lovell & others
 Accepted MNRAS [arXiv:2207.10920](#)
- 2022 **First Light And Reionisation Epoch Simulations (FLARES) V: The redshift frontier.**
Stephen M. Wilkins, Aswin P. Vijayan, Christopher C. Lovell & others
 Submitted to MNRAS [arXiv:2204.09431](#)
- 2022 **Chaotic and Clumpy Galaxy Formation in an Extremely Massive Reionization-era Halo.**
Justin S. Spilker, Christopher C. Hayward & others including Christopher C. Lovell
 ApJ Letters, 929, 1, 3 [arXiv:2203.14972](#)
- 2022 **First Light And Reionisation Epoch Simulations (FLARES) - IV. The size evolution of galaxies at $z \geq 5$.**
William J. Roper, Christopher C. Lovell, Aswin P. Vijayan & others
 MNRAS, 514, 2, 1921 [arXiv:2203.12627](#)
- 2022 **The BPT Diagram in Cosmological Galaxy Formation Simulations: Understanding the Physics Driving Offsets at High-Redshift.**
Prerak Garg, Desika Narayanan & others including Christopher C. Lovell
 ApJ, 926, 1, 80 [arXiv:2201.03564](#)
- 2022 **First Light And Reionisation Epoch Simulations (FLARES) III: The properties of massive dusty galaxies at cosmic dawn.**
Aswin P. Vijayan, Stephen M. Wilkins, Christopher C. Lovell & others
 MNRAS, 511, 4, 4999 [arXiv:2108.00830](#)
- 2021 **Cosmic Evolution of the H₂ Mass Density and the Epoch of Molecular Gas.**
T. K. Garratt, K. E. K. Coppin, J. E. Geach, O. Almaini, W. G. Hartley, D. T. Maltby, C. J. Simpson, A. Wilkinson, C. J. Conselice, M. Franco, R. J. Ivison, M. P. Koprowski, C. C. Lovell, A. Pope, D. Scott, P. van der Werf
 ApJ, 912, 1, 62, 14 [arXiv:2103.08613](#)
- 2021 **First Light And Reionisation Epoch Simulations (FLARES) II: The Photometric Properties of High-Redshift Galaxies .**
Aswin P. Vijayan, Christopher C. Lovell, Stephen M. Wilkins & others
 MNRAS, 501, 3, 3289 [arXiv:2011.10584](#)
- 2020 **Debunking Generalization Error or: How I Learned to Stop Worrying and Love My Training Set.**
Viviana Acquaviva, Christopher C. Lovell & Emille Ishida
 Accepted for 2020 NeurIPS workshop "Machine Learning and the Physical Sciences",
[arXiv:2008.06057](#)

- 2020 **The emergence of passive galaxies in the early Universe.**
P. Santini & others including Christopher C. Lovell
A&A, 652, A30, 20 [arXiv:2011.10584](#)
- 2020 **Powderday: Dust Radiative Transfer for Galaxy Simulations.**
Desika Narayanan & others including Christopher C. Lovell
ApJSS, 252, 1, 12, 18, [arXiv:2006.10757](#)
- 2019 **Nebular-line emission during the Epoch of Reionization.**
Stephen M. Wilkins, Christopher C. Lovell, Ciaran Fairhurst & others
MNRAS, 493, 4, 6079 [arXiv:1904.07504](#)
- 2019 **Recalibrating the cosmic star formation history.**
Stephen M. Wilkins, Christopher C. Lovell & Elizabeth Stanway
MNRAS, 490, 4, 5359 [arXiv:1910.05220](#)
- 2017 **Dust-obscured star-forming galaxies in the early universe.**
Stephen M. Wilkins & others including Christopher C. Lovell
MNRAS, 473, 4, 5363, [arXiv:1710.01976](#)
- 2017 **The properties of the first galaxies in the BLUETIDES simulation.**
Stephen M. Wilkins & others including Christopher C. Lovell
MNRAS, 469, 3, 2517 [arXiv:1704.00954](#)
- 2016 **The photometric properties of galaxies in the early universe.**
Stephen M. Wilkins & others including Christopher C. Lovell
MNRAS, 460, 3, 3170, [arXiv:1605.05044](#)

References

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