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Christopher C. Lovell

Curriculum Vitae

Appointments

October 2022– Present — **Dennis Sciama Postdoctoral Research Fellow**.
Institute of Cosmology and Gravitation, University of Portsmouth

April 2022 - July 2022 — **JSPS short-term postdoctoral research fellowship**.
ICRR, University of Tokyo, Japan

August 2019– October 2022 — **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

January 2023 — **Kavli Institute, Cambridge, UK**, *Invited talk*.

January 2023 — **KITP program, Building a Physical Understanding of Galaxy Evolution with Data-driven Astronomy**, *Tutorial, invited*.

September 2022 — **Mapping the Invisible Universe, Lorentz Center, Leiden, Netherlands**, *Invited*.

September 2022 — **Learning the Universe Annual Meeting, Flatiron Institute, New York, US**, *Invited*.

May 2022 **Osaka University, Osaka, Japan**, *Invited talk*.

May 2022 **Kyoto University, Kyoto, Japan**, *Invited talk*.

March 2022 **Department of Astronomy, University of Toronto, Canada**, *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, December 2018, December 2016 **VIRGO consortium meetings**, *Contributed talks, (Lorentz Centre, Leiden, Netherlands), (ICC, Durham, UK), (remote)*.

June 2020, 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*.

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 undergrauate 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*.

I have mentored a number of PhD students working in the FLARES team for a number of years (Aswin Vijayan, Will Roper, Jussi Kuusisto, Louise Seeyave). I also co-organise our weekly group meetings. At Hertfordshire and Portsmouth I am mentoring and co-advising a number of masters and PhD students.

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.

9 first author publications since 2018, 25 co-authored publications since 2016. h-index $=$ 16 (according to ADS). An up to date list of my publications, along with (mostly accurate) citation metrics, is available at ADS or Google Scholar.

First-Author Publications

2023 **FLARES VIII. The Emergence of Passive Galaxies in the Early Universe ($z > 5$)**.
Christopher C. Lovell, Will Roper, Aswin P. Vijayan & others,
Submitted to MNRAS arXiv:2211.07540

2023 **Extreme Value Statistics of the Halo and Stellar Mass Distributions at High Redshift: are JWST Results in Tension with ΛCDM?**.
Christopher C. Lovell, Ian Harrison, Yuichi Harikane, Sandro Tacchella, Stephen M. Wilkins,
MNRAS, 518, 2, 2511 arXiv:2208.10479

2022 **An orientation bias in observations of submillimetre galaxies**.
C. C. Lovell, J. E. Geach, R. Davé & others,
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 & others,
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

2023 **First Light And Reionisation Epoch Simulations (FLARES) XI: [OIII] emitting galaxies at $5 < z < 10$.**
Stephen M. Wilkins, Christopher C. Lovell, Aswin P. Vijayan & others
Submitted to MNRAS arXiv:2301.13038

2023 **First Light And Reionisation Epoch Simulations (FLARES) X: Environmental Galaxy Bias and Survey Variance at High Redshift.**
Peter A. Thomas, Christopher C. Lovell, Maxwell G. A. Maltz & others
Submitted to MNRAS arXiv:2301.09510

2023 **FLARES IX: The Physical Mechanisms Driving Compact Galaxy Formation and Evolution.**
William J. Roper, Christopher C. Lovell, Aswin P. Vijayan & others
Submitted to MNRAS arXiv:2301.05228

2023 **Mapping Circumgalactic Medium Observations to Theory Using Machine Learning .**
Sarah Appleby, Romeel Davé & others including Christopher C. Lovell
Submitted to MNRAS arXiv:2301.02001

2023 **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
MNRAS, 518, 3, 3935 arXiv:2208.00976

2023 **First Light And Reionisation Epoch Simulations (FLARES) V: The redshift frontier.**
Stephen M. Wilkins, Aswin P. Vijayan, Christopher C. Lovell & others
MNRAS, 519, 2, 3118 arXiv:2204.09431

2023 **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
MNRAS, 518, 1, 456 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
MNRAS, 517, 3, 3227 arXiv:2207.10920

2022 **MIGHTEE: Deep 1.4 GHz Source Counts and the Sky Temperature Contribution of Star Forming Galaxies and Active Galactic Nuclei.**
C. L. Hale, I. H. Whittam, M. J. Jarvis & others including Christopher C. Lovell
Accepted to MNRAS arXiv:2211.05741

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 **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 $z \geqslant 5$.**
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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