

Jason D. McEwen

Curriculum Vitae

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Professional History

Oct 2020 – present **Professor**, Mullard Space Science Laboratory (MSSL), Department of Space and Climate Physics, **University College London (UCL)**
 Sep 2021 – present **Director of Research**, Centre for Data Intensive Science & Industry (DISI), **UCL**
 Sep 2016 – present **Director of Research**, Centre for Doctoral Training (CDT) in Data Intensive Science (DIS), **UCL**
 Apr 2017 – present **Founder and CEO**, Kagenova/CopernicAI
 Oct 2017 – Sep 2020 **University Reader** (Associate Professor), Mullard Space Science Laboratory (MSSL), Department of Space and Climate Physics, **UCL**
 Jul 2013 – Sep 2017 **University Lecturer** (Assistant Professor), Mullard Space Science Laboratory (MSSL), Department of Space and Climate Physics, **UCL**
 Jan 2012 – Jun 2013 **Royal Society Newton International Fellowship**, held at **UCL**
 Sep 2011 – Jan 2012 **Leverhulme Early Career Fellowship**, held at **UCL**
 Jul 2011 – Aug 2011 Visiting Researcher, Victoria University, New Zealand (awaiting UK visa)
 Oct 2010 – Apr 2015 Consultant, Saxon Cambridge Algorithm Research, Cambridge
 Jun 2010 – May 2011 Scientist, Ecole Polytechnique Fédérale de Lausanne (**EPFL**)
 Oct 2008 – May 2010 Quantitative Analyst, Credit Suisse, London
 Oct 2007 – Sep 2008 **Junior Research Fellowship**, Clare College, **University of Cambridge**
 Oct 2006 – Sep 2007 Postdoctoral Research Associate, Cavendish Laboratory, **University of Cambridge**
 Oct 2006 – Sep 2007 Postdoctoral Teaching Associate, King's College, **University of Cambridge**
 Feb 2006 – Mar 2006 Consultant, Geomerics, Cambridge
 Dec 2001 – Jul 2002 Industry Fellow, Applied Research Associates NZ

Education

2007 Doctor of Philosophy (**PhD**), *Astrophysics*, **University of Cambridge**
 Title: Analysis of cosmological observations on the celestial sphere
 Advisor: Prof. Michael P. Hobson; Awarded: 21 July 2007
 2002 Bachelor of Engineering (**BE**) with Honours, *Information Engineering*, 1st Class Honours, **University of Canterbury**, New Zealand (NZ)
 Specialising in Information Engineering with additional Mathematics (GPA 8.9/9.0)

Other Appointments, Affiliations & Service

Science Collaborations

Jan 2012 – present Planck Satellite Mission Core Team Member, European Space Agency (ESA)
 Sep 2013 – present LSST Informatics and Statistics Science Collaboration (ISSC) UK point of contact
 Nov 2013 – present SKA Science Data Processor (SDP) working group
 Mar 2014 – present Euclid satellite Science Consortium, European Space Agency (ESA)
 Jun 2014 – present LSST:UK Board Member
 Oct 2014 – present LSST Dark Energy Science Collaboration (DESC)
 Feb 2017 – Mar 2020 LSST DESC Membership Committee

Institutional Fellowships & Professional Societies

Oct 2021 – present Turing Fellow, Alan Turing Institute
 Jun 2011 – present Fellow of the Royal Astronomical Society (RAS)
 May 2012 – present Member of the Institute of Electrical and Electronic Engineers (IEEE)
 Jan 2013 – present Member of the International Astrostatistics Association (IAA)
 Nov 2015 – present Fellow of the Higher Education Academy (HEA)

Departmental Administration

Oct 2017 – present Departmental Computing Services Steering Committee
 Oct 2020 – Oct 2022 Departmental Awards Committee
 Sep 2015 – Sep 2019 Chair of Departmental Extenuating Circumstances Committee
 Feb 2019 – Jan 2020 Departmental STFC PhD Extension Committee

Peer Reviewing

- Editor for Astroinformatics and Astrostatistics section of Universe (2022–)
- Referee for journal and conference articles:
 - International Conference on Learning Representations (ICLR)
 - Neural Information Processing Systems (NeurIPS)
 - International Conference on Machine Learning (ICML)
 - Monthly Notices of the Royal Astronomical Society
 - Royal Astronomical Society Techniques & Instruments
 - Astronomy & Astrophysics
 - Astrophysical Journal
 - Physical Review D
 - Physical Review E
 - Astronomy & Computing
 - Proceedings of the Royal Society A
 - Publications of the Astronomical Society of Japan
 - European Journal of Physics
 - IEEE Transactions on Signal Processing
 - IEEE Transactions on Image Processing
 - IEEE Signal Processing Letters
 - IEEE Journal of Selected Topics in Signal Processing
 - IEEE Transactions on Aerospace and Electronic Systems
 - Applied and Computational Harmonic Analysis
 - Annals of Statistics
 - Journal of Applied and Computational Mathematics
 - Journal of Mathematical Analysis and Applications
 - Electronic Journal of Statistics
 - Signal Image and Video Processing
 - Mathematics and Computers in Simulation
 - International Conference on Sampling Theory and Applications
 - European Signal Processing Conference
 - Measurement Science and Technology
 - Optics and Lasers in Engineering
 - IEEE International Conference on Data Mining
 - International Journal on Geomathematics
- Referee for grant proposals:
 - Referee for Royal Society University Research Fellowships (URFs)
 - Referee for STFC Consolidated Grant
 - Referee for STFC Impact Acceleration Account (IAA)
 - Referee for South African National Research Foundation (NRF)
 - Referee for Netherlands eScience Center (NLeSC)
- Referee for workshops:
 - Royal Society
- Referee for book submissions:
 - Referee for Birkhäuser Springer-Verlag on *Applied and Numerical Harmonic Analysis*

External Funding Awarded

Total grant funding awarded: **11.8 million GBP fEC**.

Broken down as **3.2 million GBP fEC on grants as PI** and **8.6 million GBP fEC on grants as Co-I**. All costings are quoted as full Economic Costing (fEC).

- Oct 2022 – Feb 2023 **Co-I, 10k GBP** *SAX: Accelerated and differentiable spherical transforms in JAX*, Open Source Software Sustainability Funding, UCL Advanced Research Computing Centre (PI: Price; Co-I: **McEwen**)
- Oct 2022 – present **Co-I, 1,275k GBP** *UCL Centre for Doctoral Training in Data Intensive Science and Technologies*, Science and Technology Facilities Council (PI: Konstantinidis; Co-I: Lahav, **McEwen**, Scanlon, Tennyson, Nikolaou, Waldmann, Aruliah, van Eylen, Facini, Malik, Joachimi)
- Apr 2022 – present **Co-I, 1,121k GBP** *UCL-MSSL Astrophysics Consolidated Grant*, Science and Technology Facilities Council (PI: Page; Co-I: Kitching, **McEwen**, Van Eylen)
- Aug 2021 – present **PI, 1,196k GBP** *Learned Exascale Computational Imaging (LEXCI)*, Engineering and Physical Sciences Research Council (PI: **McEwen**; Co-I: Betcke, Pereyra, Yates)
- Jul 2020 – Dec 2020 **PI, 120k GBP** *Unlocking 360° Virtual Reality (VR) by Spherical Deep Learning Continuity*, Innovate UK (PI: **McEwen**; Co-I: None)
- Jun 2020 – May 2021 **PI, 380k GBP** *Unlocking 360° Virtual Reality (VR) by Spherical Deep Learning*, Innovate UK (PI: **McEwen**; Co-I: None)
- Sep 2019 – present **Co-I, 375k GBP** *Capacity building in Data Intensive Science (DIS) in the Middle East*, Science and Technology Facilities Council (PI: Lahav; Co-I: Tennyson, Konstantinidis, **McEwen**, Facini, Saintonge, Scanlon, Yates, Viti, Azzam)
- May 2018 – Apr 2019 **PI, 100k GBP** *Next-generation virtual reality with artificial intelligence*, Innovate UK (PI: **McEwen**; Co-I: None)
- Jul 2018 **Co-I, 122k GBP** *Summer school in Data Intensive Science and Technologies (DIST)*, Science and Technology Facilities Council (PI: Tennyson; Co-I: Hetherington, Konstantinidis, Lahav, **McEwen**, Scanlon, Yates, Viti)
- Jan 2018 – present **Co-I, 521k GBP** *Fundamental physics from cosmological surveys*, Swedish Research Council (PI: Peiris; Co-I: **McEwen**, Mortlock)
- Oct 2017 – present **Co-I, 2,114k GBP** *UCL Centre for Doctoral Training in Data Intensive Science and Technologies*, Science and Technology Facilities Council (PI: Konstantinidis; Co-I: Lahav, **McEwen**, Scanlon, Yates, Tennyson, Gryce, Viti)
- Aug 2017 – present **PI, 323k GBP** *Illuminating the dark Universe with novel 3D spherical informatics methods*, Leverhulme Trust (PI: **McEwen**; Co-I: Kitching)
- Apr 2016 – Mar 2019 **Co-I, 1,423k GBP** *UCL-MSSL Astrophysics Consolidated Grant*, Science and Technology Facilities Council (PI: Cropper; Co-I: Hepburn, Kawata, Kitching, **McEwen**, Page)
- Jan 2016 – Dec 2016 **Co-I, 1.47M hours** *DiRAC Resource Allocation*, Science and Technology Facilities Council (PI: Kawata; Co-I: Branduardi-Raymont, Cropper, Ferreras, Kitching, **McEwen**, Wu, Zane)
- Sep 2015 – Sep 2016 **PI, 120k GBP** *Signal Analysis on the Sphere*, Engineering and Physical Sciences Research Council (PI: **McEwen**; Co-I: None)
- Jun 2015 – Mar 2019 **PI, 928k GBP** *Big-Data Compressive Sensing: Fast, Parallelised and Distributed Algorithms*, Engineering and Physical Sciences Research Council (PI: **McEwen**; Co-I: Hetherington, Jackson, Wiaux)
- Jun 2015 – Mar 2018 **Co-I, 186k GBP** *UK Involvement in LSST: Phase A*, Science and Technology Facilities Council (PI: Peiris; Co-I: Kitching, **McEwen**)

- Apr 2015 – Feb 2018 *Compressive Imaging for Radio Interferometry*, Engineering and Physical Sciences
Co-I, 650k GBP Research Council (PI: Wiaux; Co-I: Davies, **McEwen**)
- Apr 2015 – Mar 2017 *Next-Generation Radio Interferometric Imaging*, Science and Technology Facilities
Co-I, 47k GBP Council (PI: **McEwen**; Co-I: None)
- Mar 2015 – Feb 2018 *Harnessing Spherical Geometry in Scientific and Engineering Data Processing*,
Co-I, 263k GBP Australian Research Council (PI: Kennedy; Co-I: Durrani, **McEwen**)
- Nov 2013 – Oct 2016 *Square Kilometre Array (SKA) Science Data Processor (SDP)*, Science and
Co-I, 593k GBP Technology Facilities Council (PI: Abdalla; Co-I: **McEwen**, Yates)
- Sep 2013 – Mar 2015 Research Software Development Grant, UCL Research IT Service (PI: **McEwen**;
PI, 18k GBP Co-I: None)
- Sep 2011 – Sep 2017 Various travel grants and conference support from the Royal Society,
PI, 24.5k GBP Royal Astronomical Society (RAS) and Winton Capital (PI: **McEwen**; Co-I: None, 8 grants)

Prizes & Awards

2023	UCL Mathematical and Physical Science Faculty Education Award
2019	European Physical Society Giuseppe and Vanna Cocconi Prize as part of the Planck Team
2018	Gruber Cosmology Prize as part of the Planck Team
2018	RAS Group Achievement Award as part of the Planck Team
2011	URSI General Assembly and Scientific Symposium Young Researcher Award
2006	Lundgren Research Award, University of Cambridge
2005	Cambridge Philosophical Society Research Studentship
2005	Cambridge Philosophical Society Travel Award
2002 – 2006	Commonwealth Scholarship to support PhD at University of Cambridge
2002	FRST Technology in Industry Fellowship (declined)
2002	Canterbury Doctoral Scholarship (declined)
2001	Canterbury University Prize
2000	Ian McMillan Prize for Engineering
1999	Bishop Julius Scholarship
1998	John P Good Memorial University Prize for Mathematics
1998	Bruce Dall University Prize for Physics
1998	Makower McBeath University Prize for Microeconomics
1998	School of Economics and Finance University Prize
1998 – 2001	Tower Scholarship to support undergraduate degree
1997	National Bank Scholarship for highest grade in NZ for final-year high school Economics

Academic Supervision

PhD Students Graduated

- Dr Matthew Price, *Primary PhD student supervisor* (2017 – 2021), funded by STFC Studentship, **won Royal Astronomical Society (RAS) Michael Penston Thesis Prize runner-up, won UCL Maths and Physical Sciences (MAPS) Postgraduate Prize, won MSSSL Alan Johnstone Award 2021 for Outstanding Scientific Achievement by Research Student**, now Postdoctoral Fellow at UCL
- Dr Catarina Alves, *Primary PhD student supervisor* (2018 – 2022), funded by STFC-funded CosmoParticle Initiative, **won Jon Darius Memorial Prize for Outstanding Postgraduate Research in Astrophysics**, now Associate at JPMorgan Chase
- Dr Tarek Allam, *Primary PhD student supervisor* (2017 – 2022), funded by STFC-funded UCL CDT in DIS, **won UCL Perren Prize for best DIS CDT PhD thesis**, now Research Software Engineer at the Alan Turing Institute
- Dr Patrick Roddy, *Primary PhD student supervisor* (2017 – 2022), funded by STFC-funded UCL CDT in DIS, now Research Software Engineer at UCL Advanced Research Computing (ARC) Centre

- Dr Jennifer Chan, *Primary PhD student supervisor* (2014 – 2020), funded by Graduate Research Scholarship (GRS), **won Royal Astronomical Society (RAS) Michael Penston Thesis Prize**, now Canadian Institute for Theoretical Astrophysics (CITA) Fellow and Arts & Science Postdoctoral Fellow at University of Toronto
- Dr Luke Pratley, *Primary PhD student supervisor* (2015 – 2019), funded by Graduate Research Scholarship (GRS) and William Georgetti Scholarship, **won Royal Astronomical Society (RAS) Michael Penston Thesis Prize, won International Astronomical Union (IAU) Thesis Prize (Division B Facilities, Technologies and Data Science), won UCL Maths and Physical Sciences (MAPS) Postgraduate Prize, won MSSL Alan Johnstone Award 2019 for Outstanding Scientific Achievement by Research Student**, now Dunlap Fellow at University of Toronto
- Dr Peter Taylor, *Secondary PhD student supervisor* (2016 – 2019), funded by STFC Studentship, **won UCL Maths and Physical Sciences (MAPS) Deans Commendations, won MSSL Alan Johnstone Award 2018 for Outstanding Scientific Achievement by Research Student**, now NASA Postdoctoral Fellow at JPL
- Dr William Jennings, *Secondary PhD student supervisor* (2014 – 2019), funded by STFC Studentship, now Data Scientist at Monolith AI
- Dr Zoe Vallis, *Secondary PhD student supervisor* (2015 – 2019), funded by STFC Studentship, now Software Developer at VividQ
- Dr Yu Tao, *Secondary PhD student supervisor* (2014 – 2022)
- Dr Ellis Owen, *Secondary PhD student supervisor* (2014 – 2019), funded by STFC Studentship, now Postdoctoral Researcher at National Tsing Hua University (NTHU), Taiwan
- Dr Laura Wolz, *Secondary PhD student supervisor* (2011 – 2014), funded by STFC Studentship, was Postdoctoral Researcher at University of Melbourne, now Presidential Fellow at University of Manchester

PhD Students Currently Supervising

- Henry Aldridge, *Primary PhD student supervisor* (2023 – present), funded by STFC-funded UCL CDT in DIS
- Kiyam Lin, *Secondary PhD student supervisor* (2022 – present), funded by STFC
- Alicja Polanska, *Primary PhD student supervisor* (2022 – present), funded by STFC-funded UCL CDT in DIS
- Jessica Whitney, *Primary PhD student supervisor* (2022 – present), funded by EPSRC
- Matthijs Mars, *Primary PhD student supervisor* (2020 – present), funded by STFC-funded UCL CDT in DIS

Masters & Internship Student Supervision

- Jonatan Kawalek, *Primary masters student supervisor* (2021)
- Kaiyuan Hu, *Primary masters student supervisor* (2021)
- Tarek Allam, *Primary masters student supervisor* (2016), now PhD student at UCL
- Antoine Plouviez, *Primary internship student supervisor* (2016), now Masters student at Ecole Normale Supérieure
- Nathan Zerbib, *Primary masters student supervisor* (2015 – 2016)
- Mathieu Issartel, *Secondary masters student supervisor* (2014 – 2015)
- Remy Joseph, *Secondary masters student supervisor* (2013 – 2014), was PhD student at Ecole Polytechnique Fédérale de Lausanne (EPFL), now Postdoctoral Researchers at Princeton University
- Isabella Soldner-Rembold, *Primary masters student supervisor* (2012 – 2013), was PhD student at Max Planck Institute for Extraterrestrial Physics, now Data Scientist at Carbon Tracker
- Vlad Margarint, *Primary internship student supervisor* (2012)
- Thibaut Josset, *Primary internship student supervisor* (2012), now PhD student at Aix-Marseille University
- Athamos Stradis, *Primary masters student supervisor* (2011 – 2012)
- Tom Heritage, *Primary masters student supervisor* (2007 – 2008)

Teaching & Admissions Activities

2018 – present	Lecturer, Module Creator and Module Organiser for <i>SPCE0038: Machine Learning with Big-Data</i> of MSc in Scientific Computing
2014 – 2017	Lecturer and Module Organiser for <i>SPCEG007: Space-Based Communication Systems</i> of MSc in Space Science & Engineering
2014 – 2017	Lecturer for <i>SPCEGC03: Space Data Systems and Processing</i> of MSc in Space Science & Engineering
2013 – present	Interviewer for PhD and postdoctoral positions (UCL)
2011	Guest lecturer for Masters in Information Engineering (EPFL)
2008	Admissions interviewer in Physics (Clare College, University of Cambridge)
2007 – 2008	Covering supervisor for Part IA Physics (University of Cambridge)
2005 – 2007	Supervisor for Part IA Engineering Mathematics (University of Cambridge)
2004 – 2007	Supervisor for Part IB Engineering Mathematics (University of Cambridge)
2003 – 2004	Demonstrator for Part IA and IB Engineering Computer Programming (University of Cambridge)
2002	Primary School Student Mentor (Golden Key mentoring program)
2002	Supervisor for Circuits and Systems (University of Canterbury, NZ)
1999 - 2000	Supervisor for first year Mathematics (University of Canterbury, NZ)

Organisation of Summer Schools, Scientific Meetings & Discussion Forums

Summer School Organisation

- STFC Summer School in Artificial Intelligence and Machine Learning, 2018, London, *Co-Chair* (<https://indico.cern.ch/event/702529/overview>). National summer school for cohort of 129 PhD students throughout the country on STFC CDT PhD programmes in Data Intensive Science.

Conference & Workshop Organisation

- Biomedical and Astrophysical Signal Processing (BASP) Frontiers 2019, Switzerland, *Co-Chair* (<http://www.basppfrontiers.org>). Multi-disciplinary conference bringing together the biomedical, astrophysics and signal processing/applied mathematics communities.
- UCL Centre for Doctoral Training (CDT) in Data Intensive Science (DIS) Research Festival, 2017, London, *Co-Chair*. Multi-disciplinary conference highlighting research projects of the CDT.
- Biomedical and Astrophysical Signal Processing (BASP) Frontiers 2017, Switzerland, *Co-Chair* (<http://www.basppfrontiers.org>). Multi-disciplinary conference bringing together the biomedical, astrophysics and signal processing/applied mathematics communities.
- Big Data in the Physical Sciences, Alan Turing Institute (ATI) Summit, 2016, Royal Society, UK, *Scientific Organising Committee* (<https://indico.cern.ch/event/449964/overview>). Scoping meeting to address the role of physical sciences in the ATI.
- Cosmostatistics Initiative (COIN) Residence Programme, 2015, UK, *Scientific Organising Committee* (<http://iaacoin.wix.com/crp2015>). Inter-disciplinary unconference focusing on statistics and cosmology.
- Next-Generation Radio Interferometric Imaging for the SKA, Royal Society South Africa-UK Scientific Seminar, 2015, South Africa, *Chair* (<https://sites.google.com/site/royalsocradioimg2015>). Multi-disciplinary unconference focusing on radio interferometry and advanced imaging techniques (*e.g.* compressed sensing, Bayesian inference).
- Biomedical and Astrophysical Signal Processing (BASP) Frontiers 2015, Switzerland, *Co-Chair* (<http://www.basppfrontiers.org>). Multi-disciplinary conference bringing together the biomedical, astrophysics and signal processing/applied mathematics communities.
- Science on the Sphere, Royal Society International Scientific Seminar, 2014, UK, *Co-Chair* (<http://lateuniverse.wordpress.com/2014/05/13/science-on-the-sphere>). Multi-disciplinary conference bringing together the physical sciences and signal processing/applied mathematics communities.
- Biomedical Imaging and Astronomy: Shared Algorithms and Analyses, UCL, 2014, UK, *Co-Organiser*. Multi-disciplinary conference bringing together the biomedical imaging and astronomy communities.
- IEEE International Conference on Data Mining (ICDM) Astroinformatics Workshop 2013, USA, *Scientific Organising Committee* (<http://www2.cs.uh.edu/~vilalta/workshops/astro-icdm2013/index.html>). Multi-disciplinary conference bringing together the statistics, machine learning and astrophysics com-

munities.

- Biomedical and Astrophysical Signal Processing (BASP) Frontiers 2013, Switzerland, *Co-Chair* (<http://www.basppfrontiers.org>). Multi-disciplinary conference bringing together the biomedical, astrophysics and signal processing/applied mathematics communities.
- Biomedical and Astrophysical Signal Processing (BASP) Frontiers 2011, Switzerland, *Scientific Organising Committee* (<http://www.basppfrontiers.org>). Multi-disciplinary conference bringing together the biomedical, astrophysics and signal processing/applied mathematics communities.

Discussion Forums

- Led discussion forum at Big Data in the Physical Sciences, Alan Turing Institute Summit on *Extracting meaning from big-data*.
- Led discussion forum at UK Dark Energy Strategy 2020 meeting on *Methodological and algorithmic synergies in astronomy and multi-disciplinary connections*.
- Led discussion forum at Crick Institute Biomedical Imaging and Astronomy: Shared Algorithms and Analyses meeting on *Methodologies for analysing big-data*.

Scientific Talks

Invited Talks

- Scientific machine learning in astrophysics: machine learning for physics; physics for machine learning Oct 2023, Rubin Observatory Legacy Survey of Space and Time (LSST), Informatics and Statistical Science Collaboration (ISSC) Seminar
- Learned Exascale Computational Imaging (LEXCI): Update Oct 2023, ExCALIBUR Programme Workshop, Bristol, UK
- Machine learning in astrophysics: machine learning for physics; physics for machine learning Sep 2023, Alan Turing Institute, Space Science Interest Group Seminar, London, UK
- Scientific machine learning in astrophysics: machine learning for physics; physics for machine learning Sep 2023, Rutherford Appleton Laboratory (RAL) Scientific Machine Learning Seminar, Harwell, UK
- Machine learning for physics; physics for machine learning Jul 2023, European Astronomical Society (EAS) Annual Meeting, Krakow, Poland
- Proximal nested sampling for high-dimensional Bayesian model selection Jul 2023, Frontiers of Nested Sampling, Maximum Entropy Workshop, Max-Planck-Institut für Plasma-physik, Garching, Germany
- Geometric deep learning on the sphere for the physical sciences Jul 2023, Maths4DL: Conference on Deep Learning for Computational Physics, London, UK
- Learned Exascale Computational Imaging (LEXCI) May 2023, Blueprinting AI for Science At Exascale (BASE-II) Workshop, University of Leicester, UK
- Scalable and equivariant spherical CNNs by discrete-continuous (DISCO) convolutions May 2023, International Conference on Learning Representations (ICLR), Virtual
- Geometric deep learning on the sphere: scalable and equivariant spherical CNNs Oct 2022, CosmoStat seminar, CEA Saclay, France
- Bayesian model selection for likelihood-based and simulation-based inference Oct 2022, IAU International Astrostatistics Association, Astrostats & Astroinfo seminar
- Geometric deep learning on the sphere: scalable and equivariant spherical CNNs Sep 2022, REACH Seminar, University of Cambridge, UK
- Learned Exascale Computational Imaging (LEXCI) overview Jul 2022, ExCALIBUR Programme Workshop, Met Office, Exeter, UK
- A brief introduction to geometric deep learning May 2022, Physics-Astro Data (PAD) talk, UCL, London, UK
- Bayesian model selection in cosmology and astrophysics May 2022, 3rd IMA Conference on Inverse Problems from Theory to Application, Edinburgh, UK
- Learned Exascale Computational Imaging (LEXCI) overview Apr 2022, UCL ExCALIBUR meetup, London, UK
- Geometric deep learning on the sphere: spherical CNNs and scattering networks Apr 2022, STFC Scientific Machine Learning Seminar, Harwell (Remote), UK
- Bayesian uncertainty quantification for radio interferometry and beyond

- Apr 2022, Bayesian Astronomers Anonymous, Capetown, South Africa
- Geometric deep learning on the sphere: efficient generalized spherical CNNs
Apr 2021, Centre for Medical Image Computing (CMIC) Seminar, University College London (UCL), UK
- Geometric deep learning on the sphere: efficient generalized spherical CNNs
Mar 2021, Centre for Doctoral Training (CDT) in Data Intensive Science (DIS) Seminar, University College London (UCL), UK
- Deep learning on the celestial sphere
Dec 2020, European Space Agency (ESA) AI Workshop, Virtual
- UCL Centre for Doctoral Training (CDT) in Data Intensive Science (DIS)
Dec 2020, European Space Agency (ESA) AI Workshop, Virtual
- Geometric deep learning on the sphere: efficient generalized spherical CNNs
Nov 2020, Centre for Inverse Problems (CIP) Seminar, University College London (UCL), UK
- Geometric deep learning on the sphere: efficient generalized spherical CNNs
Oct 2020, AI Centre Seminar, University College London (UCL), UK
- Denoising and related inverse problems in astrophysics
Sep 2020, Benchmarking for AI for Science at Exascale (BASE) Workshop, Virtual
- Machine learning assisted Bayesian evidence computation
Jun 2019, IMA Conference on Inverse Problems from Theory to Application (IPTA), University College London (UCL), UK
- Sparse image reconstruction for the SPIDER optical interferometric telescope
Jun 2019, Electrical and Computer Engineering Seminar, UC Davis, USA
- Wavelet localisation of isotropic random fields on the sphere and cosmological implications: searching for primordial gravitational waves
Mar 2019, Mathematical Models and Methods in Earth and Space Sciences, University of Rome Tor Vergata, Rome, Italy
- High-dimensional uncertainty quantification in astrophysics
Dec 2018, Astrophysics Seminar, Imperial College, London, UK
- AstroStatistics & AstroInformatics in the context of the SKA and LSST
Sep 2018, AI for CERN and SKA, Alan Turing Institute, UK
- High-dimensional uncertainty quantification for radio interferometric imaging
Apr 2018, Workshop on Uncertainty Quantification and Computational Imaging, International Centre for Mathematical Sciences (ICMS), Edinburgh, UK
- Euclid big data: data science for science
Apr 2018, UCL Space Week, University College London (UCL), UK
- High-dimensional uncertainty quantification with sparsity-promoting priors and application to radio interferometric imaging
Jan 2018, Centre for Inverse Problems (CIP) Seminar, University College London (UCL), UK
- High-dimensional uncertainty estimation with sparse priors for radio interferometric imaging
Jun 2017, Statistical Foundations of Uncertainty Quantification for Inverse Problems, University of Cambridge, UK
- LSST Informatics and Statistics Science Collaboration (ISSC)
May 2017, Specialist Discussion Session on LSST, Royal Astronomical Society (RAS), UK
- Next-generation radio interferometric imaging for the SKA era
Mar 2017, School of Physics and Astronomy, University of Manchester, UK
- Sampling and geometry
Jul 2017, 12th International Conference on Sampling Theory and Applications (SampTA), Tallinn, Estonia
- Topic: Computational harmonic analysis on manifolds and graphs with application to astrophysics and machine learning (declined)
Dec 2016, Neural Information Processing Systems (NIPS), Barcelona, Spain
- Statistical approaches for sparse radio interferometric imaging
Oct 2016, 3GC4 Workshop, Port Alfred, South Africa

- Statistical approaches for sparse radio interferometric imaging
Oct 2016, CALIM 2016, Socorro, USA
- LSST Informatics and Statistics Science Collaboration (ISSC)
June 2016, National Astronomy Meeting (NAM), University of Nottingham, Nottingham, UK
- Wavelet reconstruction of E- and B-modes for weak lensing mass mapping and CMB polarisation
June 2016, Mapping the Cosmic Web, Royal Astronomical Society (RAS), London, UK
- Radio interferometry in the big-data era of the Square Kilometre Array (SKA)
Apr 2016, Mathematical & Physical Sciences (MAPS) Faculty Research Festival, University College London, London, UK
- Big-data in astronomy and astrophysics: extracting meaning from big-data
Feb 2016, Connecting the Dots, Institute of High Energy Physics, Vienna, Austria
- Astrostatistics and astroinformatics: big-data in astronomy and astrophysics
Jan 2016, UK Dark Energy Strategy 2020, Royal Astronomical Society, London, UK
- Sparsity in astrophysics: astrostatistics meets astroinformatics
Dec 2015, ERCIM International Conference on Computational and Methodological Statistics, London, UK
- Imaging data from next-generation radio interferometric telescopes with compressive sensing
Oct 2015, Department of Applied Mathematics & Theoretical Physics (DAMTP), University of Cambridge, UK
- Radio interferometric imaging with compressive sensing
Aug 2015, School of Information Science and Engineering, Australian National University (ANU), Australia
- Optimising radio interferometric imaging with compressive sensing
May 2015, Experimental Design and Big Data, Warwick Data Science Institute, University of Warwick, UK
- Sparsity in astrophysics: astrostatistics meets astroinformatics
Dec 2014, SuSTaln EdgeCutter Workshop on Astrostatistics, Royal Statistical Society, London, UK
- Spin scale-discretised wavelets on the sphere for the analysis of CMB polarisation
Dec 2014, ERCIM International Conference on Computational and Methodological Statistics, Pisa, Italy
- Spin scale-discretised wavelets on the sphere for the analysis of CMB polarisation
Sep 2014, Sparsity and Cosmology, Nice, France
- Sparsity in astrophysics: astrostatistics meets astroinformatics
Sep 2014, Royal Statistical Society International Conference, Sheffield, UK
- Radio interferometric imaging with compressive sensing
Aug 2014, Inverse Problems - from Theory to Application (IPTA), Bristol, UK
- Spherical signal analysis
Jul 2014, Science on the Sphere, Royal Society International Scientific Seminar, Kavli Royal Society International Centre, Buckinghamshire, UK
- Imaging observations from next-generation radio interferometric telescopes
Jun 2014, Research IT Services Annual Forum, University College London (UCL), UK
- Astronomical imaging initiatives
Jun 2014, BiImaging UK, London, UK
- CosmoInformatics
Mar 2014, Mullard Space Science Laboratory (MSSL), University College London (UCL), UK
- Primordial gravitational waves detected by BICEP2?
Mar 2014, School of Chemical & Physical Sciences, Victoria University, NZ
- Cosmological signal and image processing
Mar 2014, School of Information Science and Engineering, Australian National University (ANU), Australia
- Revisiting the spread spectrum effect in radio interferometric imaging
Mar 2014, CALIM 2014, Kiama, Australia
- Cosmological image processing

- Dec 2013, Auckland University of Technology (AUT) Seminar, Auckland, NZ
- Next-generation radio interferometric imaging with compressive sensing
- Dec 2013, Auckland University of Technology (AUT) Seminar, Auckland, NZ
- Cosmological image processing
- Nov 2013, Image and Vision Computing New Zealand 2013, Wellington, NZ
- Next-generation radio interferometric imaging with compressive sensing
- Nov 2013, IEEE NZ Central Section AGM, Wellington, NZ
- Scale-discretised wavelets on the sphere
- Aug 2013, Wavelets XV, SPIE Optics and Photonics, San Diego, USA
- Fourier-Laguerre transform, convolution and wavelets on the ball
- Jul 2013, 10th International Conference on Sampling Theory and Applications (SampTA), Bremen, Germany
- Signal processing on spherical manifolds
- Jun 2013, Probabilistic And Statistical techniques for Cosmological AnaLysis (PASCAL) workshop, Rome, Italy
- Exploiting sparsity for CMB data analysis
- Apr 2013, London Cosmology Discussion Meeting, Royal Astronomical Society, London, UK
- Sparsity: CosmoStats meets Cosmolnformatics
- Mar 2013, CosmoStats 2013, Banff, Canada
- Signal processing on spherical manifolds
- Mar 2013, School of Information Science and Engineering, Australian National University (ANU), Australia
- Towards realistic radio interferometric imaging with compressive sensing
- Mar 2013, Astronomy and Astrophysics, Victoria University, NZ
- Radio interferometric imaging with compressive sensing
- Jan 2013, London Cosmology Discussion Meeting, Royal Astronomical Society, London, UK
- Towards compressive sensing imaging of real radio interferometric observations
- Dec 2012, CALIM 2012, Cape Town, South Africa
- Cosmological signal processing
- Oct 2012, Institute of Cosmology and Gravitation, University of Portsmouth, UK
- Cosmological signal processing
- Oct 2012, Department of Physics and Astronomy, University of Southampton, UK
- Implications of a new sampling theorem for sparse signal reconstruction on the sphere
- May 2012, Astronomical Data Analysis (ADA), Cargese, Corsica
- Spherical signal processing for cosmology
- Mar 2012, Signal Processing for the Physical Sciences, Kavli Royal Society International Centre, Buckinghamshire, UK
- Spherical signal processing and the Multiverse
- Jan 2012, IFCA Seminar, University of Cantabria, Santander, Spain
- Sampling theorems and compressed sensing on the sphere
- Jan 2012, BASP Seminar, Ecole Polytechnique Federale de Lausanne (EPFL), Lausanne, Switzerland
- Spherical signal processing for cosmology
- Oct 2011, Astrophysics Seminar, University College London (UCL), London, UK
- Compressed sensing for radio interferometric imaging: review and future direction
- Sep 2011, IEEE International Conference on Image Processing (ICIP), Brussels, Belgium
- A novel sampling theorem on the sphere with implications for compressive sensing
- Sep 2011, Biomedical and Astrophysical Signal Processing (BASP) Frontiers, Villars, Switzerland
- Radio interferometric imaging with compressed sensing
- Sep 2011, Biomedical and Astrophysical Signal Processing (BASP) Frontiers, Villars, Switzerland
- Signal processing on the sphere and applications
- Aug 2011, CaSP Seminar, Victoria University, Wellington, New Zealand
- Wavelets on the sphere and cosmological applications
- Nov 2010, Guest Lecture for Advanced Signal Processing, Master in Information Technology, Ecole

Polytechnique Federale de Lausanne (EPFL), Lausanne, Switzerland

- Simulating full-sky interferometric observations with wavelets
Sep 2010, Astrophysics Seminar, Cavendish Laboratory, University of Cambridge, UK
- Compressed sensing for radio interferometric imaging on wide fields of view
Aug 2010, CALIM 2010, ASTRON, Dwingeloo, Netherlands
- Simulating full-sky interferometric observations
Apr 2008, CALIM 2008, Deep Surveys of the Radio Universe with SKA Pathfinders, Perth, Australia
- Detecting dark energy with wavelets on the sphere
Aug 2007, Wavelets XII, SPIE Optics and Photonics, San Diego, USA
- Wavelets on the sphere: new methodologies and cosmological applications
Jun 2007, Cosmology lunch talk, Department of Applied Mathematics & Theoretical Physics (DAMTP), University of Cambridge, UK
- Bianchi VII_h signatures and WMAP
Nov 2006, School of Physics and Astronomy, University of Nottingham, UK
- Large-scale anomalies in WMAP data: Deviations from isotropy
Oct 2006, CMB workshop, Institute of Astronomy, University of Cambridge, UK
- Detection of the ISW effect and corresponding dark energy constraints
Jun 2006, Institute of Astronomy, University of Cambridge, UK
- Detection of the ISW effect and corresponding dark energy constraints
Dec 2005, Astrophysics Seminar, Cavendish Laboratory, University of Cambridge, UK
- Planck workshop on non-Gaussianity: Fast directional spherical wavelets
Sep 2005, Planck workshop on non-Gaussianity, Instituto de Fisica de Cantabria, Santander, Spain
- Fast directional spherical wavelets for cosmology (Abstract)
Feb 2005, Cosmology lunch talk, Department of Applied Mathematics & Theoretical Physics (DAMTP), University of Cambridge, UK

Contributed Talks

- Physical machine learning for astrophysics: differentiable spherical harmonics; harmonic Bayesian evidence; spherical scattering networks, Nov 2023, Debating the Potential of Machine Learning in Astronomical Surveys, Paris, France
- Scalable and equivariant spherical CNNs by discrete-continuous (DISCO) convolutions
May 2023, International Conference on Learning Representations (ICLR), Virtual
- Efficient generalized spherical CNNs
May 2021, International Conference on Learning Representations (ICLR), Virtual
- Scattering networks on the sphere for scalable and rotationally equivariant spherical CNNs
Apr 2022, International Conference on Learning Representations (ICLR), Virtual
- Machine learning assisted Bayesian evidence computation
Sep 2019, IMA Conference on Inverse Problems from Theory to Application, University College London (UCL), UK
- Machine learning assisted Bayesian evidence computation
May 2018, Statistical Challenges in 21st Century Cosmology, Valencia, Spain
- LSST 3D Data Compression (3DDC) Taskforce
July 2016, LSST DESC collaboration meeting, University of Oxford, Oxford, UK
- Wavelet reconstruction of E- and B-modes for CMB polarisation and cosmic shear
May 2016, Statistical Challenges in 21st Century Cosmology, Chania, Crete
- Spin scale-discretised wavelets on the sphere for the analysis of CMB polarisation
May 2014, IAU Symposium on Statistical Challenges in 21st Century Cosmology, Lisbon, Portugal
- Sparsity, Euclid and the SKA
Sep 2013, Synergistic Science with Euclid and the Square Kilometre Array, Oxford, UK
- Background geometry and topology of the Universe: Bianchi VII_h cosmologies and Planck
Apr 2013, The Universe as seen by Planck, ESLAB Symposium, ESA/ESTEC, The Netherlands
- Spherical wavelet-Bayesian cosmic string tension estimation
Sep 2012, Big 3 (Big Bang, Big Data, Big Computing), Paris, France
- Detecting cosmic bubble collisions with optimal filters

- Mar 2012, Recontres de Moriond, La Thuile, Italy
- Intrinsic advantages of the w component and spherical imaging for wide-field radio interferometry
Aug 2011, XXXth General Assembly and Scientific Symposium of the International Union of Radio Science, Istanbul, Turkey
- Wavelet-based data compression on the sphere
May 2008, ADA 5, Heraklion, Crete
- Detection of the ISW effect and corresponding dark energy constraints
Mar 2006, Recontres de Moriond, La Thuile, Italy
- Fast directional spherical wavelets for CMB analysis
Apr 2005, National Astronomy Meeting, University of Birmingham, UK
- A high sigma detection of non-Gaussianity in the WMAP 1-year data
Jul 2004, 20th IAP Colloquium – CMB Physics and Observations, Paris, France
- A fast directional continuous spherical wavelet transform for the analysis of cosmological data
Mar 2004, Recontres de Moriond, La Thuile, Italy

Publications

189 Articles

H-index: 50; Citations: 32,000+ (Google Citations)

Google Citations profile (<http://scholar.google.co.uk/citations?user=V19kdRg7j1Y>)

arXiv profile (http://arxiv.org/a/mcewen_j_1)

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- [2] Price and McEwen. Differentiable and accelerated spherical harmonic and Wigner transforms. *Journal of Computational Physics*, submitted, 2023, [arXiv:2311.14670](https://arxiv.org/abs/2311.14670).
- [3] Liaudat, Mars, Price, Pereyra, Betcke, and McEwen. Scalable Bayesian uncertainty quantification with data-driven priors for radio interferometric imaging. *Roy. Astron. Soc. Tech. & Instrum.*, submitted, 2023, [arXiv:2312.00125](https://arxiv.org/abs/2312.00125).
- [4] Price, Mars, Docherty, Mancini, Marignier, and McEwen. Fast emulation of anisotropies induced in the cosmic microwave background by cosmic strings. *Open J. Astrophys.*, 6, 2023, [arXiv:2307.04798](https://arxiv.org/abs/2307.04798), [DOI:10.21105/astro.2307.04798](https://doi.org/10.21105/astro.2307.04798).
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- [6] McEwen, Liaudat, Price, Cai, and Pereyra. Proximal nested sampling with data-driven priors for physical scientists. In *International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering*, 2023, [arXiv:2307.00056](https://arxiv.org/abs/2307.00056), [DOI:10.3390/psf2023009013](https://doi.org/10.3390/psf2023009013).
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- [15] Goodwin-Allcock, McEwen, and R. Gray, P. Nachev. How can spherical CNNs benefit ML-based diffusion MRI parameter estimation? In *Computational Diffusion MRI*, 2022, [arXiv:2207.00572](#), [DOI:10.1007/978-3-031-21206-2_9](#).
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