

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 – Jul 2018 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 – Mar 2018 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)
 - International Conference on Machine Learning (ICML)
 - Neural Information Processing Systems (NeurIPS)
 - Neural Information Processing Systems (NeurIPS) Machine Learning & the Physical Sciences workshop
 - 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
 - Entropy
 - 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
 - Cogent Engineering
 - IEEE International Conference on Data Mining
 - International Journal on Geomathematics
- Referee for grant proposals:
 - Referee for US National Science Foundation (NSF) panel to allocate 40 million USD
 - 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 German Research Foundation (DFG)
 - Referee for Swiss National Science Foundation (SNSF)
- 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: **12.6 million GBP fEC**.

Broken down as **3.6 million GBP fEC on grants as PI** and **9.0 million GBP fEC on grants as Co-I**. All costings are quoted as full Economic Costing (fEC).

- Sep 2024 – present *Accelerated and differentiable spherical transforms*, Archer2
PI, 477k GBP (PI: **McEwen**; Co-I: Graham, Price)
- Sep 2024 – present *GLASS: A GPU-enabled ecosystem for simulating the universe*, Archer2
PI, 355k GBP (PI: Tessore; Co-I: **McEwen**, Roddy, Jeffrey, Loureiro, Joachimi, Spurio Mancini)
- Oct 2022 – Feb 2023 *SAX: Accelerated and differentiable spherical transforms in JAX*, Open Source
Co-I, 10k GBP Software Sustainability Funding, UCL Advanced Research Computing Centre (PI: Price; Co-I: **McEwen**)
- Oct 2022 – present *UCL Centre for Doctoral Training in Data Intensive Science and Technologies*,
Co-I, 1,275k GBP Science and Technology Facilities Council (PI: Konstantinidis; Co-I: Lahav, **McEwen**, Scanlon, Tennyson, Nikolaou, Waldmann, Aruliah, van Eylen, Facini, Malik, Joachimi)
- Apr 2022 – present *UCL-MSSL Astrophysics Consolidated Grant*, Science and Technology Facilities
Co-I, 1,121k GBP Council (PI: Page; Co-I: Kitching, **McEwen**, Van Eylen)
- Aug 2021 – present *Learned Exascale Computational Imaging (LEXCI)*,
PI, 1,196k GBP Engineering and Physical Sciences Research Council (PI: **McEwen**; Co-I: Betcke, Pereyra, Yates)
- Jul 2020 – Dec 2020 *Unlocking 360° Virtual Reality (VR) by Spherical Deep Learning Continuity*,
PI, 120k GBP Innovate UK (PI: **McEwen**; Co-I: None)
- Jun 2020 – May 2021 *Unlocking 360° Virtual Reality (VR) by Spherical Deep Learning*,
PI, 380k GBP Innovate UK (PI: **McEwen**; Co-I: None)
- Sep 2019 – Mar 2021 *Capacity building in Data Intensive Science (DIS) in the Middle East*,
Co-I, 375k GBP Science and Technology Facilities Council (PI: Lahav; Co-I: Tennyson, Konstantinidis, **McEwen**, Facini, Saintonge, Scanlon, Yates, Viti, Azzam)
- May 2018 – Apr 2019 *Next-generation virtual reality with artificial intelligence*,
PI, 100k GBP Innovate UK (PI: **McEwen**; Co-I: None)
- Jul 2018 *Summer school in Data Intensive Science and Technologies (DIST)*,
Co-I, 122k GBP Science and Technology Facilities Council (PI: Tennyson; Co-I: Hetherington, Konstantinidis, Lahav, **McEwen**, Scanlon, Yates, Viti)
- Jan 2018 – Dec 2021 *Fundamental physics from cosmological surveys*,
Co-I, 521k GBP Swedish Research Council (PI: Peiris; Co-I: **McEwen**, Mortlock)
- Oct 2017 – Sep 2023 *UCL Centre for Doctoral Training in Data Intensive Science and Technologies*,
Co-I, 2,114k GBP Science and Technology Facilities Council (PI: Konstantinidis; Co-I: Lahav, **McEwen**, Scanlon, Yates, Tennyson, Gryce, Viti)
- Aug 2017 – Jul 2020 *Illuminating the dark Universe with novel 3D spherical informatics methods*,
PI, 323k GBP Leverhulme Trust (PI: **McEwen**; Co-I: Kitching)
- Apr 2016 – Mar 2019 *UCL-MSSL Astrophysics Consolidated Grant*, Science and Technology Facilities
Co-I, 1,423k GBP Council (PI: Cropper; Co-I: Hepburn, Kawata, Kitching, **McEwen**, Page)
- Jan 2016 – Dec 2016 *DiRAC Resource Allocation*, Science and Technology Facilities Council (PI: Kawata;
Co-I, 1.47M hours Co-I: Branduardi-Raymont, Cropper, Ferreras, Kitching, **McEwen**, Wu, Zane)

- Sep 2015 – Sep 2016 *Signal Analysis on the Sphere*, Engineering and Physical Sciences Research Council
PI, 120k GBP (PI: **McEwen**; Co-I: None)
- Jun 2015 – Mar 2019 *Big-Data Compressive Sensing: Fast, Parallelised and Distributed Algorithms*,
PI, 928k GBP Engineering and Physical Sciences Research Council (PI: **McEwen**; Co-I: Hetherington, Jackson, Wiaux)
- Jun 2015 – Mar 2018 *UK Involvement in LSST: Phase A*, Science and Technology Facilities Council
Co-I, 186k GBP (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

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|-------------|---|
| 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

Postdoctoral Fellows Supervised

- Dr Tobias Liaudat (2022 – 2023), funded by EPSRC (*Learned Exascale Computational Imaging; LEXCI*), followed by **Faculty Position** at CEA Saclay.
- Dr Alessio Spurio Mancini (2020 - 2023), funded by Leverhulme Trust (*Illuminating the dark Universe*)

with novel 3D spherical informatics methods) and then STFC (*UCL-MSSL Astrophysics Consolidated Grant*), followed by **Faculty Position** at Royal Holloway University

- Dr Xiaohao Cai (2015 – 2020), funded by EPSRC (*Big-Data Compressive Sensing: Fast, Parallelised and Distributed Algorithms*) and then Leverhulme (*Illuminating the dark Universe with novel 3D spherical informatics methods*), followed by **Faculty Position** at University of Southampton
- Dr Dipak Munshi (2017 – 2021), funded by Leverhulme Trust (*Illuminating the dark Universe with novel 3D spherical informatics methods*), followed by Postdoctoral Fellow at Imperial College
- Dr Chris Wallis (2015 – 2017), funded by EPSRC (*Signal Analysis on the Sphere*), followed by Data Scientist at Resolver, **Chief Data Scientist** at Kagenova
- Dr Michelle Lochner (2014 – 2016), funded by STFC (*UK Involvement in LSST: Phase A*), followed by **Faculty Position** at University of the Western Cape

Postdoctoral Fellows Currently Supervising

- Dr Kiyam Lin (2024 – present), funded by STFC (*UCL-MSSL Astrophysics Consolidated Grant*)
- Dr Kevin Mulder (2023 – present), funded by EPSRC (*Learned Exascale Computational Imaging; LEXCI*)
- Dr Matt Price (2021 – present), funded by EPSRC (*Learned Exascale Computational Imaging; LEXCI*)

PhD Students Graduated

- Dr Kiyam Lin, *Joint primary PhD student supervisor* (2020 – 2024), funded by STFC-funded CosmoParticle Initiative, followed by **Postdoctoral Fellow** at UCL
- Dr Matthew Price, *Primary PhD student supervisor* (2017 – 2021), funded by STFC Studentship, followed by **Postdoctoral Fellow** at UCL
 - won Royal Astronomical Society (RAS) Michael Penston Thesis Prize runner-up
 - won UCL Maths and Physical Sciences (MAPS) Postgraduate Prize
 - won MSSL Alan Johnstone Award 2021 for Outstanding Scientific Achievement by Research Student
- Dr Catarina Alves, *Primary PhD student supervisor* (2018 – 2022), funded by STFC-funded CosmoParticle Initiative, followed by Associate at JPMorgan Chase
 - won Jon Darius Memorial Prize for Outstanding Postgraduate Research in Astrophysics,
- Dr Tarek Allam, *Primary PhD student supervisor* (2017 – 2022), funded by STFC-funded UCL CDT in DIS, followed by **Research Software Engineer** at the Alan Turing Institute
 - won UCL Perren Prize for best DIS CDT PhD thesis
- Dr Patrick Roddy, *Primary PhD student supervisor* (2017 – 2022), funded by STFC-funded UCL CDT in DIS, followed by **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), followed by **Canadian Institute for Theoretical Astrophysics (CITA) Fellow** and **Arts & Science Postdoctoral Fellow** at University of Toronto
 - won Royal Astronomical Society (RAS) Michael Penston Thesis Prize
- Dr Luke Pratley, *Primary PhD student supervisor* (2015 – 2019), funded by Graduate Research Scholarship (GRS) and William Georgetti Scholarship, followed by **Dunlap Fellow** at University of Toronto
 - 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

- Dr Peter Taylor, *Secondary PhD student supervisor* (2016 – 2019), funded by STFC Studentship, won **UCL Maths and Physical Sciences (MAPS) Deans Commendations**, followed by **NASA Postdoctoral Fellow** at JPL
 - won **MSSL Alan Johnstone Award 2018 for Outstanding Scientific Achievement by Research Student**
- Dr William Jennings, *Secondary PhD student supervisor* (2014 – 2019), funded by STFC Studentship, followed by **Data Scientist** at Monolith AI
- Dr Zoe Vallis, *Secondary PhD student supervisor* (2015 – 2019), funded by STFC Studentship, followed by **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, followed by **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, followed by Postdoctoral Researcher at University of Melbourne, **Presidential Fellow** at University of Manchester

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	Module Creator, Organiser, and Lecturer for <i>SPCE0038: Machine Learning with Big-Data</i> of MSc in Scientific Computing
2014 – 2017	Module Organiser and Lecturer 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, postdoctoral and faculty positions (UCL)
2011	Guest lecturer for Masters in Information Engineering (EPFL)
2008	Admissions interviewer in Physics (Clare College, University of Cambridge)
2007 – 2008	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 communities.
- 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 AI for the physical sciences
Jul 2024, ICML @ London, London, UK

- Statistical characterization and generative modelling of cosmological fields
Jul 2024, Connecting the Dots: Pattern Recognition in the Physical Sciences, London, UK
- Wide-field, field-level compression for simulation-based inference (SBI) for Euclid cosmic shear
Jun 2024, Euclid Collaboration meeting, Rome, Italy
- Proximal nested sampling with data-driven priors for inverse imaging
May 2024, SIAM Imaging 2024, Atlanta, US
- 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, SuSTaIn 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, Biolmaging UK, London, UK
- Cosmolnformatics
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

- Towards wide-field, field-level simulation-based inference (SBI) for Euclid cosmic shear
Jul 2024, National Astronomy Meeting (NAM), University of Hull, Hull, UK
- Scientific AI in cosmology
May 2024, Statistical Challenges in 21st Century, Chania, Crete
- 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

198 Articles

H-index: 52; Citations: 38,000+ (Google Citations)

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

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

- [1] Euclid Collaboration: Tessore et al. Euclid preparation. Angular power spectra from discrete observations. *Astron. & Astrophys.*, submitted, 2024, [arXiv:2408.16903](https://arxiv.org/abs/2408.16903).
- [2] Mousset, Allys, Price, Aumont, Delouis, Montier, and McEwen. Generative models of astrophysical fields with scattering transforms on the sphere. *Astron. & Astrophys.*, in press, 2024, [arXiv:2407.07007](https://arxiv.org/abs/2407.07007).
- [3] Whitney, Liaudat, Price, Mars, and McEwen. Using conditional GANs for convergence map reconstruction with uncertainties. In *58th Rencontres de Moriond*, 2024, [arXiv:2406.15424](https://arxiv.org/abs/2406.15424).
- [4] Mousset, Allys, Price, Aumont, Delouis, Montier, and McEwen. Scattering transforms on the sphere: application to large scale structure modelling. In *58th Rencontres de Moriond*, 2024, [arXiv:2407.08687](https://arxiv.org/abs/2407.08687).
- [5] Euclid Collaboration: Mellier et al. Euclid. I. Overview of the Euclid mission. *Astron. & Astrophys.*, in press, 2024, [arXiv:2405.13491](https://arxiv.org/abs/2405.13491).
- [6] Piras, Polanska, Mancini, Price, and McEwen. The future of cosmological likelihood-based inference: accelerated high-dimensional parameter estimation and model comparison. *Open J. Astrophys.*, 7, 2024, [arXiv:2405.12965](https://arxiv.org/abs/2405.12965), DOI:10.33232/001c.123368.
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- [9] Chan, Han, Wu, and McEwen. A covariant formulation for cosmological radiative transfer of the 21-cm line. *Mon. Not. Roy. Astron. Soc.*, 531(1), 2024, [arXiv:2404.14407](https://arxiv.org/abs/2404.14407), DOI:10.1093/mnras/stae1101.
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- [11] Price and McEwen. Differentiable and accelerated spherical harmonic and Wigner transforms. *Journal of Computational Physics*, 510:113109, 2024, [arXiv:2311.14670](https://arxiv.org/abs/2311.14670), DOI:10.1016/j.jcp.2024.113109.
- [12] Liaudat, Mars, Price, Pereyra, Betcke, and McEwen. Scalable Bayesian uncertainty quantification with data-driven priors for radio interferometric imaging. *Roy. Astron. Soc. Tech. & Instrum.*, 3(1):505—534, 2023, [arXiv:2312.00125](https://arxiv.org/abs/2312.00125), DOI:10.1093/rasti/rzae030.
- [13] 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.

- [14] Polanska, Price, Mancini, and McEwen. Learned harmonic mean estimation of the marginal likelihood with normalizing flows. In *International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering*, 2023, [arXiv:2307.00048](#), [DOI:10.3390/psf2023009010](#).
- [15] 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](#), [DOI:10.3390/psf2023009013](#).
- [16] Ocampo, Price, and McEwen. Scalable and equivariant spherical CNNs by discrete-continuous (DISCO) convolutions. In *International Conference on Learning Representations (ICLR)*, 2023, [arXiv:2209.13603](#).
- [17] Allam Jr. and McEwen. The tiny time-series Transformer: low-latency high-throughput classification of astronomical transients using deep model compression. *Roy. Astron. Soc. Tech. & Instrum.*, submitted, 2023, [arXiv:2303.08951](#).
- [18] Mars, Betcke, and McEwen. Learned interferometric imaging for the SPIDER instrument. *Roy. Astron. Soc. Tech. & Instrum.*, 2:760–778, 2023, [arXiv:2301.10260](#), [DOI:10.1093/rasti/rzad054](#).
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- [24] 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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