Charlotte Mason

Associate Professor of Extragalactic Astrophysics Cosmic Dawn Center, University of Copenhagen address: Niels Bohr Institute, University of Copenhagen,

Jagtvej 128, 2200 København N, Denmark

email: charlotte.mason@nbi.ku.dk

website: http://charlottenosam.github.io

Research Interests Hydrogen reionization; high redshift galaxy formation and evolution; evolution of the intergalactic medium; dark matter; Lyman- α emission; 21-cm signal; gravitational lensing; Bayesian statistics

Academic Employment **Associate Professor** of Extragalactic Astrophysics

2021 -

Cosmic Dawn Center, Niels Bohr Institute, University of Copenhagen, Denmark

NASA Hubble Fellow & CfA Fellow

2018 - 2021

Center for Astrophysics | Harvard & Smithsonian, Cambridge, MA, USA

Education

2015 – 2018

Doctor of Philosophy (PhD) in Astronomy

University of California, Los Angeles, California, USA

Thesis: "Galaxies at the Epoch of Cosmic Reionization". Advisor: Prof. Tommaso Treu

2013 - 2015

Master of Arts (MA) in Physics, with Astrophysics Emphasis

University of California, Santa Barbara, California, USA

2009 - 2013

Master of Physics (MPhys), 4 Year Undergraduate Honours Degree

Merton College, University of Oxford, Oxford, UK

Thesis: "High-Redshift Disk Formation". Supervisors: Dr. Julien Devriendt & Dr. Adrianne Slyz

Selected Honours, Fellowships, and Awards L'Oréal-UNESCO For Women in Science Prize,

Royal Danish Academy of Science and Letters, 2023

NASA Hubble Fellowship, 2018

CfA Fellowship, Harvard-Smithsonian Center for Astrophysics, 2018

Rodger Doxsey Prize, AAS, 2018

Dr. Pliny A. and Margaret H. Price Prize in Cosmology and AstroParticle Physics,

CCAPP, Ohio State University, 2017

NASA Earth and Space Science Fellowship (NESSF), 2016 – 2018

Chair's Outstanding Service Award, Physics Department, UC Santa Barbara, 2015

Yzurdiaga Graduate Fellowship, *UC Santa Barbara*, 2013 Broida Fellowship, Physics Department, *UC Santa Barbara*

Fowler Prize for Achievement, 4 times, Merton College, University of Oxford, 2009 – 2013

Exhibition (Prize Scholarship), Merton College, University of Oxford, 2012

Summer Undergraduate Research Fellowship, *California Institute of Technology*, 2011 Scholar, International Summer School for Young Physicists, *Perimeter Institute*, 2008

Publications

84 journal articles (11 under review), including 10 as first author and 5 by students directly under my supervision. 949 first author paper citations, 3491 total citations. h index of 33 (ADS 2023-09-29).

Full publication list at end of CV.

Invited Colloquia, Seminars and Lectures

Charlotte Mason: CV

34. Munich Joint Astronomy Colloquium, ESO, Germany, 2023

33. Aarhus University, Denmark, 2023

32. Stockholm University, Sweden, 2023

31. University of Southern California, USA, 2023

30. University of Edinburgh, UK, 2023

29. Laboratoire d'Astrophysique de Marseille, France, 2022

Colloquium Colloquium

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Seminar

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Colloquium Seminar

27. Uppsala University, Sweden, 2022	28. Scuola Normale Superiore di Pisa, Italy, 2022	Colloquium
25. University of Hertfordshire, UK, 2022 24. Niels Bohr Institute, University of Copenhagen, Denmark, 2021 25. UCLA, USA, 2021 26. Colloquium 27. Kathmandu Astrophysics School, Nepal, 2020 27. University of Arizona, USA, 2020 28. Seminar 29. Cosmic Dawn Center, University of Copenhagen, Denmark, 2020 39. University of Sussex, UK, 2020 30. Colloquium 30. Institute for Cosmology and Gravitation, Portsmouth, UK, 2020 30. Colloquium 31. Institute for Cosmology and Gravitation, Portsmouth, UK, 2020 40. Colloquium 41. Lancaster University, UK, 2020 40. Seminar 41. University of Minnesota, USA, 2020 41. Tufts University, USA, 2019 42. University of Michigan, USA, 2019 43. University of Michigan, USA, 2019 44. Tufts University of Melbourne, Australia, 2019 45. UTA, Canada, 2019 46. University of Melbourne, Australia, 2019 47. University of Connecticut, USA, 2018 48. Harvard-Smithsonian CfA, USA, 2018 49. University of Connecticut, USA, 2018 50. University of Connecticut, USA, 2018 50. University of Connecticut, USA, 2018 60. University of Connecticut, USA, 2018 60. Seminar 60. UC Berkeley, USA, 2017 60. KIPAC, Stanford University, USA, 2017 61. UC Santa Barbara, USA, 2017 62. UC Santa Barbara, USA, 2017 63. University of Oxford, UK, 2016 64. CCAPP, Ohio State University, USA, 2017 65. UC Santa Barbara, USA, 2017 66. Seminar 67. UC Davis, USA, 2016 68. Seminar 69. University of Oxford, UK, 2016 69. Seminar 60. University of Oxford, UK, 2016 60. Seminar 60. University of Oxford, UK, 2016 60. Seminar 60. University of Oxford, UK, 2016	27. Uppsala University, Sweden, 2022	Seminar
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1. Institute for Cosmology and Gravitation, Portsmouth, UK, 2015 Seminar		
	1. Institute for Cosmology and Gravitation, Portsmouth, UK, 2015	Seminar

Conference Talks

Including 19 invited conference talks and reviews since 2016, marked with *

- *31. (upcoming) The chronology of the very early Universe according to JWST: the first billion years, ISSI, Switzerland, 2024
- *30. JWST turns one: the birth and growth of galaxies, Sexten CfA, Italy, 2023
- *29. Reionization in the Summer, Heidelberg, Germany, 2023
- *28. Annual Danish Astronomy Meeting, Frederica, Denmark, 2023
- *27. A new era in extragalactic astronomy: early results from JWST, Cambridge, UK, 2023 Invited Review
- *26. Growth of Galaxies in the Early Universe, Sexten CfA, Italy, 2023
- *25. Understanding the epoch of cosmic reionization, Sexten CfA, Italy, 2023
- *24. The Co-evolution of the Cosmic Web and Galaxies across Cosmic Time, KITP, CA, 2023
- *23. Reionization on a Blackboard, New York, NY, 2022

Invited Review

- *22. DAWN Inauguration Conference, Copenhagen, DK, 2022
- *21. Reionization and Cosmic Dawn, Berkeley, CA, 2022 (cancelled due to illness)
- *20. Growth of Galaxies in the Early Universe, Sexten CfA, Italy, 2022

19. SAZERAC: The 21cm signal, online, 2022

*18. SAZERAC: Learning the high-redshift Universe, online, 2022

Invited Review

Invited Review

*17. DAWN Summit, Copenhagen, DK, 2021

Invited Review

16. Cosmology From Home, online, 2021

- *15. EAS Symposium: Panchromatic and hyper-spectral observations of Cluster Lenses and Lensed Galaxies, online, 2020
- *14. Growth of Galaxies in the Early Universe, Sexten CfA, Italy, 2020
- 13. Barefoot EoR, Fitzroy Island, Australia, 2019
- 12. Big Eyes on the Early Universe, Los Angeles, CA, 2019
- *11. Growth of Galaxies in the Early Universe, Sexten CfA, Italy, 2019
- *10. KMOS@5, ESO, Garching, Germany, 2018
- *9. Growth of Galaxies in the Early Universe, Sexten CCfA, Italy, 2018
- 8. AAS 231, Washington DC, 2018

Dissertation Talk

7. Cosmic Dawn with JWST, STScl, Baltimore, MD, 2017

- 6. EWASS SS15: Unravelling the First Billion Years, Prague, CZ, 2017
- 5. Physical Characteristics of Normal Galaxies at z > 2, Leiden, NL, 2016
- 4. Galaxy Workshop, UC Santa Cruz, CA, 2016
- 3. The Reionization Epoch, Aspen Center for Physics, Aspen, CO, 2016
- *2. Growth of Galaxies in the Early Universe, Sexten CfA, Italy, 2016
- 1. First Light & Cosmology, Institut Astrophysique de Paris, France, 2015

Advising and Teaching Experience

PhD students

- Jo Verwohlt (University of Copenhagen), 2022-Project supervisor.
- Ting-Yi Lu (University of Copenhagen), 2021-Primary supervisor.
- Gonzalo Prieto Lyon (University of Copenhagen), 2021-Primary supervisor. 1 paper published.
- Rohan Naidu (Harvard), 2018-2020
 Co-supervisor for projects related to reionization. 2 papers published.

Masters students

• Kimi Kreilgaard (University of Copenhagen), 2022-, Primary supervisor.

Bachelors students

- Alexa Morales (Florida International University → UT Austin, NSF Graduate Research Fellow)
 Supervisor for SAO Summer REU program, 2020.
 - 1 published paper: Morales, Mason, et al. 2021. ApJ, 919, 120.
- Lily Whitler (Arizona State University → University of Arizona, NSF Graduate Research Fellow)
 Supervisor for SAO Summer REU program, 2019.
 - 1 published paper: Whitler, Mason, et al., 2020. MNRAS, 495, 3602.

Examinations

• PhD defense committee: Vasily Kokorev (NBI), Lukas Furtak (Sorbonne Université, France)

Teaching

- Lecturer: Cosmology. Unversity of Copenhagen 2022.
- Lecturer: Extragalactic Astrophysics. Unversity of Copenhagen 2021–2022.
- Primary Instructor: Astronomy Lab, 2015–2017. Interactive class taught in a planetarium and observatory. As Adjunct Faculty, Santa Barbara City College
- Teaching Assistant: Quantum Mechanics, Physics 1 Classical Mechanics for non-Physics student. Physics Department, UCSB

Training in teaching and mentorship

- Introduction to University Pedagogy course, University of Copenhagen, 2022
- PhD Supervision course, University of Copenhagen, 2021
- The Science of Teaching Science course, Harvard University, 2021
- Certificate in Undergraduate Mentoring in Science Education, Harvard University, 2020
- AAS Astronomy Ambassador, 2018

Major Grants (PI)

Career total: \$2.4 million (16 million DKK) in external funding.

- 2. Semper Ardens: Accelerate grant, Carlsberg Foundation, 2022
- 5 million DKK 8 million DKK

1. Villum Young Investigator, Villum Foundation, 2021

Approved Observing Proposals (PI)

- 5. JWST-GO-04287. Deep Spectroscopy of the First Ionized Bubbles: New Insight into the Beginning of Reionization (22 hours)
- 4. JWST-GO-03990. A NIRCam Pure-Parallel Imaging Survey of Galaxies Across the Universe (as Co-PI, PI T. Morishita, 600 hours)

- 3. ESO-109.24EZ.001 (DDT). The high redshift universe in full colour: the power of MUSE and JWST (5 hours)
- 2. MMT/Binospec 2019-2020. Unraveling Reionization with Resolved Lyman Alpha (15.5 nights)
- 1. Magellan/FIRE 2020. The Evolution of Super Massive Black Holes in the First Billion Years (2 nights)

Approved Observing Proposals (Col)

JWST (1 ERS program – Pl Treu, 7 GO programs – Pls: Dunlop, Malkan, Oesch, Roberts-Borsani, Becker, Castellano, Atek), HST (4 GO programs – Pls: Treu, Trenti, 2 archival programs – Pls: Bradač, Morishita), Spitzer (1 program – Pl: Bouwens), ESO (3 programs – Pls: Fontana, Sanchez-Janssen, Hayes), MMT (1 program – Pl: Tacchella)

Professional Service

- JWST User Committee ESA representive 2023-
- Conference scientific organizing committees: SAZERAC conference (online) 2020, 2021; EAS Symposium (Seville, Spain) 2021, First Light Conference (Boston, USA) 2023; First Stars Conference (New York, USA) 2024; Nordita Program "Cosmic Dawn at High Latitudes" (Stockholm, Sweden) 2024
- Seminar organizing: DAWN Cake talks, CfA High Redshift Galaxy Evolution Meeting, CfA Galaxies & Cosmology Seminar, UCSB Astrophysics Colloquia
- Grant/observing proposal reviewing: JWST Cycle 2 TAC External Review, NSF Astronomy and Astrophysics Grants, NASA Astrophysics Data Analysis Program, NASA FINESST graduate fellowship,
- Hiring committees: DAWN Fellowship committee (chair 2022), DAWN PhD selection committee
- Journal referee: ApJ, MNRAS, A&A, PRL
- Software tester for STScI JWST Data Analysis Development Forum
- Working groups: E-ELT ANDES Science Team member

Media, Outreach and DEI

- Media Interviews:
 - TV/video: BBC/PBS NOVA "Universe"; Videnskab.dk
 - Radio: NPR "All Things Considered"
 - Print: Scientific American; Science; Nature
- Outreach:
 - NASA Universe of Learning Subject Matter Expert
 - AAS Astronomy Ambassador
 - Organiser, host and speaker at Astronomy on Tap, Santa Barbara and Boston
 - Invited Public Talks: Royal Danish Academy of Science and Letters; Merton College, Oxford; Santa Barbara City College; Santa Barbara Salon; Santa Barbara Astronomical Society Volunteer at Cambridge Explores the Universe
 - Virtual classroom visits with YouthAstroNet
- DEI
 - Contributor to NHFP Anti-Racism Initiative: https://www.nhfp-equity.org
 - Committee member of UCSB Women in Physics group
 - Started a mentorship program for women in STEM at Oxford University

Publication List

Names of students directly under my supervision are underlined.

First author and student publications

- 15. <u>Lu</u>, T.-Y., et al. The reionising bubble size distribution around galaxies. arXiv e-prints, arXiv:2304.11192, 2023.
- 14. Prieto-Lyon, G., et al. Early Results from GLASS-JWST XXIII: The transmission of Lyman-alpha from UV-faint z ~3-6 galaxies. accepted for publication in ApJ, arXiv:2304.02666, 2023.
- 13. Prieto-Lyon, G., et al. The production of ionizing photons in UV-faint $z \sim 3-7$ galaxies. A&A, 672:A186, 2023.
- 12. Mason, C. A., Trenti, M., and Treu, T. The brightest galaxies at cosmic dawn. MNRAS, 521, 1:497–503, 2023.
- 11. Mason, C. A., et al. 21CMFISH: Fisher-matrix framework for fast parameter forecasts from the cosmic 21-cm signal. MNRAS, 524, 3:4711–4728, 2023.

- 10. Morales, A. M., et al. The Evolution of the Lyman-alpha Luminosity Function during Reionization. ApJ, 919, 2:120, 2021.
 - 9. Whitler, L. R., et al. The impact of scatter in the galaxy UV luminosity to halo mass relation on Ly α visibility during the epoch of reionization. MNRAS, 495, 4:3602–3613, 2020.
 - 8. Mason, C. A. and Gronke, M. Measuring the properties of reionized bubbles with resolved Ly α spectra. MNRAS, 499, 1:1395–1405, 2020.
- 7. Mason, C. A., et al. Model-independent constraints on the hydrogen-ionizing emissivity at z > 6. MNRAS, 489, 2:2669–2676, 2019.
- 6. Mason, C. A., et al. Inferences on the timeline of reionization at $z \sim 8$ from the KMOS Lens-Amplified Spectroscopic Survey. MNRAS, 485, 3:3947–3969, 2019.
- 5. Mason, C. A., et al. Beacons into the Cosmic Dark Ages: Boosted Transmission of Ly α from UV Bright Galaxies at z \gtrsim 7. ApJ, 857, 2:L11, 2018.
- 4. Mason, C. A., et al. The Universe Is Reionizing at $z \sim 7$: Bayesian Inference of the IGM Neutral Fraction Using Ly α Emission from Galaxies. ApJ, 856, 1:2, 2018.
- 3. Mason, C. A., et al. First Results from the KMOS Lens-Amplified Spectroscopic Survey (KLASS): Kinematics of Lensed Galaxies at Cosmic Noon. ApJ, 838, 1:14, 2017.
- 2. Mason, C. A., Trenti, M., and Treu, T. The Galaxy UV Luminosity Function before the Epoch of Reionization. ApJ, 813, 1:21, 2015.
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