Charlotte Mason

Associate Professor
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Research Interests

Hydrogen reionization; high redshift galaxy formation and evolution; evolution of the intergalactic medium; Lyman alpha emission from galaxies; gravitational lensing; Bayesian statistics

Academic Employment

Associate Professor 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

Honours, Fellowships, and Awards

Villum Young Investigator Award, 2021
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

Total of 39 peer reviewed journal articles, including 8 as first author. 487 first author paper citations, 1322 total citations. h index of 20 (ADS Sep 16, 2021).
Full publication list at end of CV.

Invited Talks and Lectures

UCLA, USA, 2021	Colloquium
Kathmandu Astrophysics School, Nepal, 2020	Lecture
University of Arizona, USA, 2020	Seminar
Cosmic Dawn Center, University of Copenhagen, Denmark, 2020	Seminar

	University of Sussex, UK, 2020	Colloquium
	Institute for Cosmology and Gravitation, Portsmouth, UK, 2020	Colloquium
	Lancaster University, UK, 2020	Seminar
	University of Minnesota, USA, 2020	Colloquium
	UT Austin, USA, 2019	Colloquium
	Tufts University, USA, 2019	Seminar
	University of Michigan, USA, 2019	Colloquium
	University of Melbourne, Australia, 2019	Colloquium
	CITA, Canada, 2019	Seminar
	McGill Space Institute, Canada, 2018	Seminar
	University of Connecticut, USA, 2018	Seminar
	Harvard-Smithsonian CfA, USA, 2018	Seminar
	UC Berkeley, USA, 2017	Seminar
	KIPAC, Stanford University, USA, 2017	Seminar
	UC Santa Barbara, USA, 2017	Seminar
	CCAPP, Ohio State University, USA, 2017	Seminar
	University of Oxford, UK, 2016	Seminar
	UC Davis, USA, 2016	Seminar
	Institute for Cosmology and Gravitation, Portsmouth, UK, 2015	Seminar

Conference Talks

DAWN Summit, 2021	
Cosmology From Home, 2021	
EAS Symposium: Panchromatic and hyper-spectral observations of Cluster Lenses and Lensed Galaxies, 2020	Invited Talk
Early Growth of Galaxies, Sexten Center for Astrophysics, Italy, 2020	Invited Talk
Barefoot EoR, Fitzroy Island, Australia, 2019	
Big Eyes on the Early Universe, Los Angeles, CA, 2019	
Early Growth of Galaxies, Sexten Center for Astrophysics, Italy, 2019	Invited Talk
KMOS@5, ESO, Garching, Germany, 2018	Invited Talk
Early Growth of Galaxies, Sexten Center for Astrophysics, Italy, 2018	Invited Talk
AAS 231, Washington DC, 2018	Dissertation Talk
Cosmic Dawn with JWST, STScI, Baltimore, MD, 2017	
EWASS SS15: Unravelling the First Billion Years, Prague, CZ, 2017	
Physical Characteristics of Normal Galaxies at $z > 2$, Leiden, NL, 2016	
Galaxy Workshop, UC Santa Cruz, CA, 2016	
The Reionization Epoch, Aspen Center for Physics, Aspen, CO, 2016	
Early Growth of Galaxies, Sexten Center for Astrophysics, Italy, 2016	Invited Talk
First Light & Cosmology, Institut Astrophysique de Paris, France, 2015	

Advising and Teaching Experience

PhD Students

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

Undergraduate Students

- Alexa Morales (Florida International University $\rightarrow$ UT Austin, PhD student)
  Supervisor for SAO Summer REU program, 2020.

1 published paper: Morales, Mason, et al. 2021. ApJ, arXiv:2101.01205

- 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.

Adjunct Faculty, Earth & Planetary Science Department, Santa Barbara City College
- *Astronomy Lab*, 2015–2017. Interactive class taught in a planetarium and observatory

Teaching Assistant, Physics Department, UCSB
- *Quantum Mechanics*, Fall 2013 (Upper Division)
- *Physics 1*, Spring 2014 (Lower Division, mechanics for non-Physics students)

Training in teaching and mentorship
- The Science of Teaching Science course, Harvard University, 2021
- Certificate in Undergraduate Mentoring in Science Education, Harvard University, 2020
- AAS Astronomy Ambassador, 2018

Approved Proposals (PI)

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 (CoI)

JWST (1 ERS program – PI Treu, 4 GO programs – PIs: Dunlop, Malkan, Oesch, Roberts-Borsani), HST (4 GO progams – PIs: Treu, Trenti, 2 archival programs – PIs: Bradač, Morishita), Spitzer (1 program – PI: Bouwens), ESO (3 programs – PIs: Fontana, Sanchez-Janssen, Hayes), MMT (1 program – PI: Tacchella)

Professional Service

- SOC, SAZERAC virtual conference, 2020, 2021
- Co-organizer of CfA High Redshift Galaxy Evolution Meeting
- Co-organizer of CfA Galaxies & Cosmology Seminar
- Co-organizer of UCSB Astrophysics Colloquia
- Reviewer for NSF Astronomy and Astrophysics Grants, NASA Astrophysics Data Analysis Program, NASA FINESST graduate fellowship
- Journal referee for ApJ, MNRAS, A&A
- Software tester for STScI JWST Data Analysis Development Forum

Outreach and Diversity

- Committee member of CfA APS Inclusion, Diversity, and Equity Alliance
- Contributor to NHFP Anti-Racism Initiative
- NASA Universe of Learning Subject Matter Expert
- AAS Astronomy Ambassador
- Volunteer at Cambridge Explores the Universe
- Virtual classroom visits with YouthAstroNet
- Host and speaker at Astronomy on Tap, Santa Barbara and Boston.
- Invited Public Talks at Santa Barbara City College, Santa Barbara Salon, Santa Barbara Astronomical Unit and Merton College, Oxford
- Committee member of UCSB Women in Physics group
- Started a mentorship program for women in STEM at Oxford University

Publication List

Students directly under my supervision are marked with †.

First author publications

8. Mason, C. A. and Gronke, M. Measuring the properties of reionized bubbles with resolved Lyα 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 Lyα 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 Lyα 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.
1. Mason, C. A., et al. Correcting the $z \sim 8$ Galaxy Luminosity Function for Gravitational Lensing Magnification Bias. ApJ, 805, 1:79, 2015.

Contributing author publications

31. Lemaux, B. C., et al. The size and pervasiveness of Lyα-UV spatial offsets in star-forming galaxies at $z \sim 6$. MNRAS, 504, 3:3662–3681, 2021.
30. Roberts-Borsani, G., et al. Improving $z \sim 7-11$ Galaxy Property Estimates with JWST/NIRCam Medium-band Photometry. ApJ, 910, 2:86, 2021.
29. Pelliccia, D., et al. RELICS-DP7: Spectroscopic Confirmation of a Dichromatic Primeval Galaxy at z $\sim$ 7. ApJ, 908, 2:L30, 2021.
28. Morales, A., et al. The Evolution of the Lyman-Alpha Luminosity Function During Reionization. arXiv e-prints, arXiv:2101.01205, 2021.
27. Morishita, T., et al. SuperBoRG: Exploration of Point Sources at z $\sim$ 8 in HST Parallel Fields. ApJ, 904, 1:50, 2020.
26. Mirocha, J., **Mason**, C., and Stark, D. P. Effects of self-consistent rest-ultraviolet colours in semi-empirical galaxy formation models. MNRAS, 498, 2:2645–2661, 2020.
25. Girard, M., et al. The KMOS Lens-Amplified Spectroscopic Survey (KLASS): kinematics and clumpiness of low-mass galaxies at cosmic noon. MNRAS, 497, 1:173–191, 2020.
24. 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.
23. Fuller, S., et al. Spectroscopically Confirmed Lyα Emitters from Redshift 5 to 7 behind 10 Galaxy Cluster Lenses. ApJ, 896, 2:156, 2020.
22. Gronke, M., et al. Lyman-alpha transmission properties of the intergalactic medium in the CoDaII simulation. arXiv e-prints, arXiv:2004.14496, 2020.
21. Naidu, R. P., et al. Rapid Reionization by the Oligarchs: The Case for Massive, UV-bright, Star-forming Galaxies with High Escape Fractions. ApJ, 892, 2:109, 2020.
20. Bradač, M., et al. Hubble Frontier Field photometric catalogues of Abell 370 and RXC J2248.7-4431: multiwavelength photometry, photometric redshifts, and stellar properties. MNRAS, 489, 1:99–107, 2019.
19. Hoag, A., et al. Constraining Lyman-alpha spatial offsets at 3 < z < 5.5 from VANDELS slit spectroscopy. MNRAS, 488, 1:706–719, 2019.
18. Ren, K., Trenti, M., and **Mason**, C. A. The Brightest Galaxies at Cosmic Dawn from Scatter in the Galaxy Luminosity versus Halo Mass Relation. ApJ, 878, 2:114, 2019.
17. Hoag, A., et al. Constraining the Neutral Fraction of Hydrogen in the IGM at Redshift 7.5. ApJ, 878, 1:12, 2019.
16. Morishita, T., et al. The Bright-end Galaxy Candidates at z $\sim$ 9 from 79 Independent HST Fields. ApJ, 867, 2:150, 2018.
15. Abramson, L. E., et al. The Grism Lens-amplified Survey from Space (GLASS). XII. Spatially Resolved Galaxy Star Formation Histories and True Evolutionary Paths at z > 1. AJ, 156, 1:29, 2018.
14. Livermore, R. C., et al. HST Follow-up Observations of Two Bright z $\sim$ 8 Candidate Galaxies from the BoRG Pure-parallel Survey. ApJ, 861, 2:L17, 2018.
13. Finney, E. Q., et al. Mass Modeling of Frontier Fields Cluster MACS J1149.5+2223 Using Strong and Weak Lensing. ApJ, 859, 1:58, 2018.
12. Hoag, A., et al. HST Grism Observations of a Gravitationally Lensed Redshift 9.5 Galaxy. ApJ, 854, 1:39, 2018.
11. Schmidt, K. B., et al. The Grism Lens-Amplified Survey from Space (GLASS). XI. Detection

of C IV in Multiple Images of the z = 6.11 Lyα Emitter behind RXC J2248.7-4431. ApJ, 839, 1:17, 2017.

10. Hoag, A., et al. Spectroscopic confirmation of an ultra-faint galaxy at the epoch of reionization. Nature Astronomy, 1:0091, 2017.
9. Wang, X., et al. The Grism Lens-amplified Survey from Space (GLASS). X. Sub-kiloparsec Resolution Gas-phase Metallicity Maps at Cosmic Noon behind the Hubble Frontier Fields Cluster MACS1149.6+2223. ApJ, 837, 1:89, 2017.
8. Santini, P., et al. Characterizing elusive, faint dusty star-forming galaxies: a lensed, optically undetected ALMA galaxy at z 3.3. A&A, 596:A75, 2016.
7. Bernard, S. R., et al. Galaxy Candidates at z $\sim$10 in Archival Data from the Brightest of Reionizing Galaxies (BORG[z8]) Survey. ApJ, 827, 1:76, 2016.
6. Agnello, A., et al. Spectroscopy and high-resolution imaging of the gravitational lens SDSS J1206+4332. MNRAS, 458, 4:3830–3838, 2016.
5. Huang, K.-H., et al. Detection of Lyman-alpha Emission from a Triply Imaged z = 6.85 Galaxy behind MACS J2129.4-0741. ApJ, 823, 1:L14, 2016.
4. Calvi, V., et al. Bright Galaxies at Hubble's Redshift Detection Frontier: Preliminary Results and Design from the Redshift z $\sim$9-10 BoRG Pure-Parallel HST Survey. ApJ, 817, 2:120, 2016.
3. Schmidt, K. B., et al. The Grism Lens-Amplified Survey from Space (GLASS). III. A Census of Lyα Emission at z $\gtrsim$ 7 from HST Spectroscopy. ApJ, 818, 1:38, 2016.
2. Treu, T., et al. The Grism Lens-Amplified Survey from Space (GLASS). I. Survey Overview and First Data Release. ApJ, 812, 2:114, 2015.
1. Schmidt, K. B., et al. Through the Looking GLASS: HST Spectroscopy of Faint Galaxies Lensed by the Frontier Fields Cluster MACSJ0717.5+3745. ApJ, 782, 2:L36, 2014.