John R. Weaver

Brinson Prize Fellow at MIT Kavli Institute for Astrophysics and Space Research

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Research Interests

Observational galaxy formation and evolution: stellar mass assembly, massive galaxies, dark matter halo connection, mass functions, spatially resolved properties, quenching, early galaxies, catalogs, photometric and statistical methods

Highlights

180+ publications, 12,500+ citations; 7 first-author papers with 1,085 citations
Catalog lead: COSMOS2020, UNCOVER/MegaScience; co-lead: DAWN (900+ citations)
co-PI, Cosmic Dawn Survey; co-lead, Euclid high-z team & NASA Galaxies SIG
3 programs as PI/co-PI (22 h JWST; $320k); co-I on 42 more (1500+ h in total)

Positions

Brinson Prize Fellow, Massachusetts Institute of Technology	2025–
Postdoctoral Research Associate, Univ. of Massachusetts Amherst	2022–2025
Graduate Fellow, Cosmic Dawn Center, Niels Bohr Institute	2018–2022

Professional Experience

Visiting Researcher, Institute for Astronomy, University of Hawai'i	2020
Visiting Researcher, Caltech/IPAC	2019
Visiting Researcher, Institut d'Astrophysique de Paris	2018
Margaret Mayall Fellow, AAVSO: development of the AVSpec spectroscopic database	2016–2018
Undergraduate Researcher, University of St Andrews	2016–2018
Summer Research Intern, Max Planck Institute for Astronomy	2017
Summer Research Student, Leiden Observatory (LEAPS)	2016
NSF REU Student, Maria Mitchell Observatory	2015

Education

Ph.D. in Astrophysics, University of Copenhagen — 2018–2022
COSMOS2020: Insights into Galaxy Assembly and Evolution over the First Ten Billion Years
Advisors: Sune Toft, with Peter Capak & David Sanders

MPhys (Honours) in Astrophysics, University of St Andrews — 2013–2018
The Origins of Bimodality: Post-starburst Galaxies at $z < 0.1$
First Class Honours | Advisor: Vivienne Wild

Honors & Awards

AAS Berkeley Prize (UNCOVER team; photometry & catalog lead)	2026
Brinson Prize Fellowship, The Brinson Foundation & STScI	2025
IDA PhD Prize (best Danish astronomy PhD thesis)	2023
Outstanding PhD Thesis Prize, University of Copenhagen	2023
Astrophysics MPhys Thesis Prize, University of St Andrews	2018
Margaret Mayall Fellowship, AAVSO	2016

Leadership

Co-lead, NASA Galaxies Science Interest Group (Cosmic Origins Program)	2026–
Euclid Consortium: high-z galaxy team co-lead; Lyman-break galaxy work-package co-lead; US/NASA high-z coordinator	2022–
PI, Beasts in the Bubbles (JWST GO-2659); co-PI, JWST GO-11286	2022–
Photometry & catalog lead, UNCOVER/MegaScience JWST surveys (incl. BUFFALO and MindTheGaps imaging)	2022–2025
Co-PI, Cosmic Dawn Survey (Euclid Deep & Auxiliary Fields); photometry & catalog co-lead	2018–
Catalog lead, COSMOS2020 (COSMOS collaboration)	2018–2022
Workshop co-organizer Euclid Primeval Universe (DE, 2026); Lorentz Center, "Big Galaxies, Big Problems" (NL, 2025); BUFFALO team meeting (US, 2019)	2019–2026

Collaborations

Current: Euclid Consortium; COSMOS & COSMOS-Web; UNCOVER, MegaScience & UNCOVERed; MINERVA; MindTheGaps; Hawaii Two-0

Past: BUFFALO (2018–2022); SDSS MaNGA (2017–2018)

Research Program

Astro2020: Unveiling the Drivers of Galaxy Growth

How did massive galaxies assemble and stop forming stars?

Measured the stellar mass function and quiescent fraction to $z = 7.5$, finding an excess of massive galaxies at $z \approx 2.5$–5.5 that suggests efficient star formation in early massive halos; extended the census over $10\,\mathrm{deg}^2$ of the Euclid Deep Fields; traced the structures and formation histories of quiescent galaxies with JWST.

Weaver et al. 2023 (A&A); Zalesky, Weaver et al. 2026 (A&A); Cutler, Weaver et al. 2025 (ApJ); Steinhardt, Weaver et al. 2020 (ApJ); Weaver et al. 2018 (A&A)

What were their progenitors in the first billion years?

Identified bright $z = 6$–8 candidates in Euclid's Early Release Observations; studied [O III] $88\,\mu$m emission from luminous galaxies at $z > 8$ with ALMA; lead JWST spectroscopy of ultra-luminous $z \approx 7$–9 galaxies (GO-2659, PI; GO-11286, co-PI) and the Brinson program *Resolving the Crisis at Cosmic Dawn*.

Weaver et al. 2025 (A&A); Algera, Weaver et al. 2026 (OJAp)

Underpinning both: precise measurements from the largest surveys

Led the COSMOS2020 and UNCOVER/MegaScience catalogs and co-lead those of the Cosmic Dawn Survey, built with The Farmer, my profile-fitting photometry code for heterogeneous multi-wavelength data.

Weaver et al. 2022 (ApJS); Weaver et al. 2023 (ApJS); Weaver et al. 2024 (ApJS); Suess, Weaver et al. 2024 (ApJ)

Public Data Products & Software

COSMOS2020 catalogs (lead): 1.7M sources over $2\,\mathrm{deg}^2$, two independent photometric catalogs with photometric redshifts; public via IRSA, ESO, and CDS (Weaver et al. 2022; 578 citations; named in the abstracts of 80+ refereed papers)	2022
UNCOVER/MegaScience catalogs (photometry & catalog lead): led the HST+JWST photometry, catalogs, and public releases for ∼60,000 galaxies behind Abell 2744 (Weaver et al. 2024; Suess, Weaver et al. 2024; 290+ citations; named in the abstracts of 40 refereed papers)	2023–

Cosmic Dawn Survey catalogs (co-lead): pre-launch multiwavelength catalogs for the Euclid Deep Fields North and Fornax (Zalesky, McPartland, Weaver et al. 2025), and the stellar mass function measured from them (Zalesky, Weaver et al. 2026) — 2025

The Farmer: profile-fitting photometry package for deep galaxy surveys, built on The Tractor (Weaver et al. 2023) — 2023

aperpy: PSF-matched aperture photometry pipeline for JWST imaging (UNCOVER, MegaScience) — 2023

pygappy: stellar-population inference with gappy principal component analysis — 2018

AVSpec (development director): the first AAVSO spectroscopic database for citizen-science spectra of variable stars — 2016–2018

105 of my 159 collaboration papers are survey overviews or build on the catalogs above.

Computing: priority user of the CANDIDE (IAP) and H20 (IfA) clusters (1M+ CPU-hours each); NERSC Perlmutter. *Languages*: Python (expert), Fortran, SQL

Grants & Fellowships

Research Grants as PI/co-PI ($320k)

JWST Cycle 5 GO-11286 *"The Euclid–JWST Synergy: Revealing the Nature of Extremely Luminous $z \sim 9$ Galaxies"* (7.3 hours; co-PI)	$79k	2026
JWST Cycle 1 GO-2659 *"Beasts in the Bubbles: Characterizing ultra-luminous Galaxies at Cosmic Dawn"* (14.4 hours; PI; funded 2024–2026)	$241k	2022

Research Grants as co-I ($105k)

DIM ACAV+ Grants *"Expansion of the CANDIDE Cluster at the Institut d'Astrophysique de Paris"* (co-I; $40k in 2019, $65k in 2021)	$105k	2019–2021

Fellowships ($364k)

Brinson Prize Fellowship *"Resolving the Crisis at Cosmic Dawn"*	$360k	2025–2028
Margaret Mayall Fellowship, AAVSO	$4k	2016–2018

Observing Programs

Total Time (2019–present): 45 programs totaling 1500+ hours, 3 as PI/co-PI (22 h JWST, 1 night Magellan); plus CFHT (20N), Subaru (30N), and Keck (28N) via Hawaii Large Programs

As PI or co-PI

The Euclid–JWST Synergy: Revealing the Nature of Extremely Luminous $z \sim 9$ Galaxies; JWST Cycle 5, 7.3h, PIs: N. Allen, **J. Weaver**, P. Oesch — 2026

CHAR-BROIL with FIRE: Confirming HARd-to-explain Bright Reionization-era Objects from Infrared Light with FIRE; Magellan/FIRE, 1N, PI: **J. Weaver** — 2026

Beasts in the Bubbles: Characterizing ultra-luminous Galaxies at Cosmic Dawn; JWST/NIRSpec IFU Cycle 1, 14.4h, PI: **J. Weaver** — 2022

As co-I (42 programs)

JWST (15), ALMA (13), NOEMA (4), Keck (3), HST (2), VLT (2), Subaru (2), Liverpool Telescope (1); largest:

MINERVA medium-band imaging survey; JWST Cycle 4, 283h, PIs: A. Muzzin, W. Suess, D. Marchesini — 2025

VENUS: Vast Exploration for Nascent, Unexplored Sources; JWST Cycle 4, 242h, PI: S. Fujimoto	2025
Opening the 5.6–18 μm Window on the Deep Public Frontier Field; JWST Cycle 5, 77h, PIs: K. Whitaker, R. Bezanson, S. Price	2026
Fulfilling the UV Legacy of the Deep Public Frontier Field; HST Cycle 32, 72 orbits, PI: K. Whitaker	2024
Ultra-deep spectroscopy of MoM-z14 at $z = 14.44$; JWST Cycle 5, 55.1h, PI: R. Naidu	2026
Medium Bands, Mega Science; JWST/NIRCam Cycle 2, 50.1h, PI: W. Suess	2023
WERLS: Webb Epoch of Reionization Lyman-alpha Survey; Keck/MOSFIRE+LRIS, 29N, PIs: C. Casey & J. Kartaltepe	2022
Observing experience: Subaru/HSC; Keck/DEIMOS & MOSFIRE; Nordic Optical Telescope/ALFOSC	

Talks & Presentations

Colloquia & Invited Talks (18 since 2021)

Invited Talk, University of Michigan, Ann Arbor, US	11/2026
Invited Talk, University of California, Riverside, US	8/2026
Invited Talk, NASA Science Interest Group, online	2/2026
Colloquium, University of Manchester, UK	10/2025
Colloquium, University of St Andrews, UK	8/2025
Colloquium, Connecticut College, New London, US	4/2025
Invited Talk, Princeton University, Princeton, US	11/2024
Invited Talk, Institute for Advanced Study, Princeton, US	11/2024
Colloquium, Tufts University, Boston, US	9/2024
Invited Review, UK National Astronomy Meeting, Hull, UK	7/2024
Colloquium, Institute for Astronomy, Manoa, US	4/2024
Invited Talk, St Andrews Galaxy Group, University of St Andrews, UK	3/2022
Invited Review, Pan-SED Fitting Forum, online	3/2022
Invited Talk, LSST-DESC Working Group, online	2/2022
Invited Talk, Leiden Observatory, online	1/2022
Invited Talk, Institute for Astronomy, Hawaii, online	5/2021
Invited Talk, California Institute of Technology, online	4/2021
Colloquium, Institut d'Astrophysique de Paris, online	3/2021

Contributed Talks (19 since 2019)

BeyondHubble: Revisiting the Hubble Sequence Across Cosmic Time, KICC, Cambridge, UK	4/2026
Charting Cosmic Dawn in Copenhagen, Helsingør, DK	4/2026
The First Billion Years of the Universe, Aspen Center for Physics, Aspen, US	3/2026
AAS 245, National Harbor, US	1/2025
Tinsley Workshop, Yale, New Haven, US	10/2024
Extreme Galaxies, Iceland	5/2024
Raising the Veil on Star Formation Near and Far, KICC, Cambridge, UK	4/2024
COSMOS Collaboration Meeting, Paris, FR	7/2022

DAWN Summit 2022, Copenhagen, DK	6/2022
Quasars & Galaxies Through Cosmic Time, online	1/2022
Debating the Potential of Machine Learning in Astronomical Surveys, IAP, Paris, FR	10/2021
UK National Astronomy Meeting, virtual	7/2021
SAZERAC 2.0, virtual	7/2021
BUFFALO Collaboration Meeting, virtual	7/2021
AAS 237, virtual	1/2021
Galaxy Evolution in the Era of Roman, STScI, virtual	10/2020
BUFFALO Collaboration Meeting, virtual	6/2020
FREDDIE Talk, Institute for Astronomy, Honolulu, US	1/2020
Quasars in Crisis, Royal Observatory Edinburgh, UK	6/2019

Posters (6 since 2016)
First Light (Boston, 2023), Royal Astronomical Society (2020), INAF-IASF Milan (2019), AAS 231 (2018), AAS 229 (2017), AAS 227 (2016)

Research Mentorship

***Bold**: primary advisor; others co-advised.*

***Graduate Students* (7 since 2019)**

Lauren Henson	PhD, UC Riverside	2023–
Negin Nezhad	PhD, UC Riverside	2023–
Faezeh Manesh	PhD, UC Riverside UC Riverside students work on and are funded by my JWST program GO-2659	2023–
Sam Cutler	PhD, UMass → postdoc, Tufts Cutler et al. 2024, 2025	2022–2025
Natalie Allen	PhD, DAWN	2021–2022
Lukas Zalesky	PhD, IfA Hawaii → J.D., Georgetown Zalesky et al. 2025, 2026	2020–2024
Athanasios Anastasiou	MSc, DAWN	2019–2020

***Undergraduate Students* (9 since 2019)**

Mesk Abdalsalam	UROP, MIT SPHEREx with COSMOS2020 and Euclid	2026–
Scott Barrow	BSc, UMass → Fulbright Fellow	2023–2024
Ananya Sreeklekha	BSc, UMass → PhD, Toledo	2022–2023
Lillian Wright	BSc, UMass → PhD, SNU Wright et al. 2024	2022–2023
Tommy Clark	SURF, DAWN	2021
Christian K. Jespersen	Summer, DAWN → fellow, Toronto	2020
Jonas Vinther	Summer, DAWN → PhD, Copenhagen	2020
Julia Tiller	NSF REU, DAWN	2019
Albert Sneppen	Summer, DAWN → fellow, Cambridge	2019

Teaching

Research Topics in Astrophysics, UMass Amherst; co-instructor with Prof. Yun — 2023
Undergraduate, 12 students: lectured, supervised student research projects, and graded

Nordic Optical Telescope Summer School, University of Copenhagen; teaching assistant — 2021
Graduate, 12 students: led observing and data-reduction labs

Applied Statistics: From Data to Results, University of Copenhagen; (senior) teaching assistant — 2019–2020
Graduate, 140–160 students: led weekly problem-solving and computing sessions and graded problem sets and exams (2019); as senior TA, coordinated the TA team (2020)

Award: Best Science Course, University of Copenhagen (Applied Statistics teaching team) — 2021

Informal Teaching

Instructor, *MIT Splash*, a weekend program of courses for high-school students (which I attended as a student) — 2026

Writer and editor, *Astrobites*: research summaries for undergraduate readers (articles) — 2019–2021

Observing Director, *Napier Observatory*, St Andrews: weekly telescope sessions for 100+ students — 2013–2018

Service

Scientific Community

Proposal review panels: JWST, HST, NOIRLab, and Large Millimeter Telescope TACs; NASA Astrophysics (Roman) review (dates omitted to maintain anonymity)

Ad-hoc referee for ApJ(S), MNRAS, A&A (17 reports) — 2018–

Memberships: AAS, Royal Astronomical Society, Institute of Physics, European Astronomical Society, Astronomers Without Borders — 2014–

University Communities

Five Colleges Astro Colloquium Organizer, UMass Amherst — 2022–2024

Postdoctoral Representative, UMass Amherst — 2023

Student governance, St Andrews: Science & Medicine Faculty President, Physics School President, University Academic Council, Education Committee (co-chair) — 2016–2018

Diversity, Equity, and Inclusion

Equality & Diversity Committee, undergraduate DEI coordinator, St Andrews School of Physics — 2016–2018

Institute of Physics Project Juno Champion, the UK award for gender equity in physics departments (student lead, co-author of application) — 2017

Athena Swan Silver, the UK higher-education gender-equity charter (student lead, co-author of application) — 2017

Outreach

Programs & Roles (1000+ volunteer observatory hours)

NASA's Universe of Learning speaker; *Stars to STEM* volunteer — 2025–

Volunteer, *Astronomy on Tap Boston* — 2026–

Co-founder, *Astronomy on Tap! Copenhagen* (website) — 2019–2022

Associate Observer, *Frosty Drew Obs.* (200+ visitors/night; website) — 2014–2018

Public observing, *Maria Mitchell Observatory*, Nantucket — 2015

Astro lead, *SciNote*; columnist, *Heavens Above!* (*Sci@StAnd*) — 2013–2014

Observer & Open Night docent, *Olin Observatory*, Connecticut College — 2012–2014

Public Talks (50+ since 2013, incl.)

Richmond & Black River Astronomical Societies, virtual	2025
Astronomy on Tap: Copenhagen (2020), Las Vegas (2019)	2019–2020
AstroSoc St Andrews (4 talks); Thames Amateur Astro. Society	2016–2018

Media & Press

Press Releases & News Features

With Help from UMass Amherst, NASA's James Webb Space Telescope Uncovers New Details in Pandora's Cluster (UMass News; quoted)	2/2023
NASA Webb's Deepest Ever View of the Pandora Cluster (NASA)	2/2023
Mapping a Merger (ESO Picture of the Week)	2/2018

Interviews & Coverage

New image from Webb Telescope, processed by UMass astronomers (Boston Globe; interview)	2/2023
Black Holes Lurk in Literal Rings of Fire (SYFY Wire; interview)	2/2022
New Insights Into the Physics of Supermassive Black Holes (The Daily Galaxy; interview)	2/2022
A Golden Guiding Star (Weekendavisen; interview)	12/2021
NGC 7252: capturing a cosmic car crash (BBC Sky at Night Magazine)	4/2018
ESO's Very Large Telescope Observes Galaxy-Galaxy Merger Remnant (Sci-News)	3/2018
Geeking out at Frosty Drew (The Independent, RI)	1/2015

Podcasts & Video

The Jodcast: my work and the Euclid Mission (podcast)	4/2026
Searching for Luminous High-Redshift Galaxies with Euclid (Euclid Consortium; video)	6/2024

181 total, 7 first-author (1,085 citations), 5 student-led; h-index: 58; citations: 12,586

Full list on ADS ◇ 0000-0003-1614-196X

First-Author & Student-Led Papers (12 since 2018)

† Student-led

2026 [1] †Zalesky, L., **Weaver, J. R.**, McPartland, C. J. R., et al. Mar. 2026. "Euclid preparation: LXXXVI. Cosmic Dawn Survey: Evolution of the galaxy stellar mass function across $0.2 < z \leq 6.5$ measured over 10 square degrees". In: *A&A* 708, A104.

2025 [2] †Cutler, S. E., **Weaver, J. R.**, Whitaker, K. E., et al. Nov. 2025. "The Structure and Formation Histories of Low-mass Quiescent Galaxies in the A2744 Cluster Environment". In: *ApJ* 993, 169.

[3] **Weaver, J. R.**, Taamoli, S., McPartland, C. J. R., et al. May 2025. "Euclid: Early Release Observations – NISP-only sources and the search for luminous $z = 6$–8 galaxies". In: *A&A* 697, A16.

[4] †Zalesky, L., McPartland, C. J. R., **Weaver, J. R.**, et al. Mar. 2025. "Euclid preparation: LXI. Cosmic Dawn Survey: 'Pre-launch' multiwavelength catalogues for Euclid Deep Field North and Euclid Deep Field Fornax". In: *A&A* 695, A229.

2024 [5] †Cutler, S. E., Whitaker, K. E., **Weaver, J. R.**, et al. June 2024. "Two Distinct Classes of Quiescent Galaxies at Cosmic Noon Revealed by JWST PRIMER and UNCOVER". In: *ApJL* 967, L23.

[6] †Wright, L., Whitaker, K. E., **Weaver, J. R.**, et al. Mar. 2024. "Remarkably Compact Quiescent Candidates at $3 < z < 5$ in JWST-CEERS". In: *ApJL* 964, L10.

[7] **Weaver, J. R.**, Cutler, S. E., Pan, R., et al. Jan. 2024. "The UNCOVER Survey: A First-look HST + JWST Catalog of 60,000 Galaxies near A2744 and beyond". In: *ApJS* 270, 7. *Among the first public JWST photometric catalogs; top 1% of 2024 astro-ph.GA papers.*

2023 [8] **Weaver, J. R.**, Zalesky, L., Kokorev, V., et al. Nov. 2023. "The Farmer: A Reproducible Profile-fitting Photometry Package for Deep Galaxy Surveys". In: *ApJS* 269, 20.

[9] **Weaver, J. R.**, Davidzon, I., Toft, S., et al. Sept. 2023. "COSMOS2020: The galaxy stellar mass function. The assembly and star formation cessation of galaxies at $0.2 < z \leq 7.5$". In: *A&A* 677, A184. *Top 1% of 2023 astro-ph.GA papers; cited by 57 stellar-mass-function studies.*

2022 [10] **Weaver, J. R.** and Horne, K. May 2022. "Dust and the intrinsic spectral index of quasar variations: hints of finite stress at the innermost stable circular orbit". In: *MNRAS* 512.

[11] **Weaver, J. R.**, Kauffmann, O. B., Ilbert, O., et al. Jan. 2022. "COSMOS2020: A Panchromatic View of the Universe to $z \sim 10$ from Two Complementary Catalogs". In: *ApJS* 258, 11. *4th most-cited astro-ph.GA paper of 2022.*

2018 [12] **Weaver, J.**, Husemann, B., Kuntschner, H., et al. June 2018. "History and destiny of an emerging early-type galaxy. New IFU insights on the major-merger remnant NGC 7252". In: *A&A* 614, A32.

Major Contributions, 2nd–3rd Author (10 since 2020)

2026 [13] Algera, H., **Weaver, J. R.**, Bakx, T. J. L. C., et al. July 2026. "A first systematic study of [OIII] 88 μm at $z > 8$: two luminous oxygen lines and a powerful ionized outflow in the first 600 million years". In: *The Open Journal of Astrophysics* 9.

2025 [14] Atek, H., Gavazzi, R., **Weaver, J. R.**, et al. May 2025. "Euclid: Early Release Observations – A preview of the Euclid era through a galaxy cluster magnifying lens". In: *A&A* 697, A15.

[15] Treiber, H., Greene, J. E., **Weaver, J. R.**, et al. May 2025. "UNCOVERing the High-redshift AGN Population among Extreme UV Line Emitters". In: *ApJ* 984, 93.

2024 [16] Fujimoto, S., Wang, B., **Weaver, J. R.**, et al. Dec. 2024. "UNCOVER: A NIRSpec Census of Lensed Galaxies at $z = 8.50$–13.08 Probing a High-AGN Fraction and Ionized Bubbles in the Shadow". In: *ApJ* 977, 250.

2023 [17] Leung, G. C. K., Finkelstein, S. L., **Weaver, J. R.**, et al. Dec. 2023. "The Spitzer-HETDEX Exploratory Large-Area Survey. IV. Model-based Multiwavelength Photometric Catalog". In: *ApJS* 269, 46.

[18] Furtak, L. J., Zitrin, A., **Weaver, J. R.**, et al. Aug. 2023. "UNCOVERing the extended strong lensing structures of Abell 2744 with the deepest JWST imaging". In: *MNRAS* 523.

[19] Scoville, N., Faisst, A., **Weaver, J.**, et al. Feb. 2023. "Cosmic Evolution of Gas and Star Formation". In: *ApJ* 943, 82.

[20] Brinch, M., Greve, T. R., **Weaver, J. R.**, et al. Feb. 2023. "COSMOS2020: Identification of High-z Protocluster Candidates in COSMOS". In: *ApJ* 943, 153.

2022 [21] Kauffmann, O. B., Ilbert, O., **Weaver, J. R.**, et al. Nov. 2022. "COSMOS2020: UV-selected galaxies at $z \geq 7.5$". In: *A&A* 667, A65. *Role: COSMOS2020 catalog lead.*

2020 [22] Steinhardt, C. L., **Weaver, J. R.**, Maxfield, J., et al. Mar. 2020. "A Method to Distinguish Quiescent and Dusty Star-forming Galaxies with Machine Learning". In: *ApJ* 891, 136.

Survey & Catalog Collaboration Papers (105 since 2021)

Overviews of the surveys I helped lead, and papers built on the COSMOS2020, UNCOVER/MegaScience, or Cosmic Dawn Survey catalogs I led.

Other Collaboration Papers (54 since 2020)

Full lists: ADS public library.