Marc A. Rafelski

Space Telescope Science Institute
3700 San Martin Drive
Baltimore, MD 21218

http://www.marc.rafelski.com
ORCID: 0000-0002-9946-4731
Email: mrafelski@stsci.edu

RESEARCH INTERESTS

Galaxy formation and evolution, chemical enrichment and physics of the Circumgalactic medium, absorption line systems, exchange of gas between galaxies and their surroundings, star formation, cosmic reionization, high-redshift galaxies

EDUCATION

Ph.D. in Physics, The University of California, San Diego — June 2011
Advisor: Prof. Arthur Wolfe

Masters of Science in Astronomy, The University of California, Los Angeles — June 2006
Advisor: Prof. Andrea Ghez

Bachelor of Science in Physics and Astronomy, The University of Arizona — May 2004
Magna Cum Laude and Honors, Advisor: Prof. Dennis Zaritsky

WORK EXPERIENCE

Branch Manager, Principal Staff Scientist, Space Telescope Science Institute — 2020-present
Instruments Division (INS), Cosmic Origins Spectrograph (COS)

Associate Research Scientist, Johns Hopkins University — 2017-present

Branch Deputy, Senior Staff Scientist, Space Telescope Science Institute — 2019-2020
Instruments Division (INS), Wide Field Camera 3 (WFC3)

Archive Scientist, Space Telescope Science Institute, Baltimore, MD — 2018-2019
Data Management Division (DMD), Archive Sciences (ASB)

STScI Scientist, Space Telescope Science Institute, Baltimore, MD — 2016-2018
Instruments Division (INS), Cosmic Origins Spectrograph (COS)

Postdoctoral Fellow, NASA Goddard Space Flight Center, Greenbelt, MD — 2014-2016
NASA Postdoctoral Program Fellow, Mentor: Jonathan P. Gardner

Postdoctoral researcher, California Institute of Technology, Pasadena, CA — 2011-2014
Infrared Processing and Analysis Center, Mentor: Harry Teplitz

Graduate student researcher, University of California, San Diego — 2006-2011

Graduate student researcher, University of California, Los Angeles — 2004-2006

Undergraduate student researcher, University of Arizona — 2002-2004

Summer student researcher, Rutgers University — 2004

Science Undergraduate Laboratory Internship (SULI) — 2003
Lawrence Berkeley National Laboratory

Undergraduate Research Fellowship (ERULF): — 2001
Brookhaven National Laboratory

GRANTS AND FUNDING OVERVIEW

Total funding as PI: >$4 million. Over $10 million as a Co-I. Titles listed in next section.

Grant	Year	Involvement	Value
NASA Keck 2025A	2025-2026	Admin PI, science Co-I	$18,650
STScI DDRF (2024B)	2024-2025	PI	$72,552
STScI DDRF (2024B)	2024-2025	PI	$54,132
HST GO, Cycle 32 (17815)	2024-2027	Admin Co-I, science Co-I	$95,800
JWST PAR, Cycle 3 (5398)	2024-2027	Co-PI	$265,995
JWST GO, Cycle 3 (5782)	2024-2027	Admin Co-I, science Co-I	$18,714
HST GO, Cycle 31 (17568)	2024-2027	Funding PI, science Co-I	$46,603
HST GO, Cycle 31 (17518)	2024-2027	Admin PI, science Co-I	$55,455
HST GO, Cycle 31 (17483)	2024-2027	Admin PI, science Co-I	$82,239
STScI DDRF (2023A)	2023-2024	PI	$37,372
HST GO, Cycle 30 (17147)	2022-2025	Funding PI, science Co-I	$370,070
HST GO, Cycle 30 (17133)	2022-2025	Admin PI, science Co-I	$75,435
STScI DDRF (2022B)	2022-2023	PI	$58,164
NASA Keck 2022B (N014)	2022-2024	PI	$15,462
JWST GO Cycle 1 (1571)	2022-2024	Funding PI, science Co-I	$283,604
HST GO, Cycle 29 (16889)	2022-2025	Admin PI, science Co-I	$30,729
HST GO, Cycle 29 (16734)	2022-2025	Funding PI, science Co-I	$15,000
NSF AGG 2020	2021-2024	PI	$433,306
STScI DDRF (2021A)	2021-2022	PI	$26,212
HST GO, Cycle 28 (16246)	2021-2023	Admin PI, science Co-I	$138,854
NASA Keck 2020B (N168)	2020-2022	Admin PI, science Co-I	$15,650
HST GO, Mid-Cycle 27 (16080)	2020-2023	Funding PI, science Co-I	$10,161
HST GO, Cycle 27 (15968)	2020-2023	Admin PI, science Co-I	$52,247
HST GO, Cycle 27 (15860)	2019-2022	Admin PI, science Co-I	$49,854
HST GO, Cycle 27 (15882)	2019-2022	Admin PI, science Co-I	$31,799
HST GO, Cycle 27 (15878)	2019-2021	Funding PI, science Co-I	$19,231
STScI DDRF (2019B)	2019-2022	PI	$45,530
NASA Keck 2019B (N010)	2019-2021	PI	$13,600
HST GO, Cycle 26 (15637)	2019-2021	PI	$631,798
HST GO, Cycle 26 (15647)	2019-2021	Funding PI, science Co-I	$372,197
STScI DDRF (2019A)	2019-2022	PI	$66,400
NASA Keck 2019A (N027)	2019-2021	PI	$11,750
NASA Keck 2018B (N188)	2018-2020	PI	$16,725
HST GO, Mid-Cycle 25 (15416)	2018-2021	PI	$66,634
HST GO, Cycle 25 (15100)	2018-2021	Admin PI, science Co-I	$113,834
HST GO, Cycle 25 (15283)	2018-2021	Admin PI, science Co-I	$43,675
HST GO, Cycle 25 (15163)	2018-2021	Funding PI, science Co-I	$32,507
HST GO, Cycle 25 (15186)	2018-2021	Funding PI, science Co-I	$38,500
HST GO, Cycle 25 (15410)	2018-2021	Funding PI, science Co-I	$35,019
HST AR, Cycle 24 (14580)	2017-2020	PI	$181,011

NASA Keck 2017A (N133)	2017-2019	PI	$12,400
NASA Keck 2016B (N032)	2016-2018	PI	$15,000
HST GO, Cycle 23 (14209)	2016-1019	Funding PI, science Co-I	$15,072
HST GO, Cycle 23 (14178)	2016-1019	Funding PI, science Co-I	$89,303
HST GO, Cycle 23 (14127)	2016-1019	Funding PI, science Co-I	$87,566
HST GO, Cycle 21 (13309)	2014-1017	Funding PI, science Co-I	$12,429
HST GO, Cycle 21 (13389)	2014-1017	Funding PI, science Co-I	$35,927
Total awarded			$4,251,442

Total Grants managed as PI: $4,251,442

SUCCSESSFUL GRANTS AND TELESCOPE PROPOSALS

National Science Foundation Astronomy and Astrophysics Research Grants (NSF AGG)

PI Collaborative Research: A Panchromatic View of Normal Galaxies in the Early Universe (**$433,306** 2021-2025, AST-2107989)

STScI Research Grants (Directors Discretionary Research Fund)

PI Another Panchromatic View of Normal Galaxies (2024B, **$72,552**)

PI The Impact of the Cosmic Web on the Morphological Evolution of Galaxies (2024B, **$54,132**)

PI The role of galaxy morphology in the mass-metallicity-SFR relation (2023A, **$37,372**)

PI A Panchromatic View of Normal Galaxies in the Early Universe (2022B, **$58,164**)

PI The Detection of High Redshift Lyman Continuum Emitters (2021A, **$26,212**)

PI The Energetic Role of Mass Outflows in Galaxy Evolution (2019B, **$45,530**)

PI The Cosmic Dawn of H I Rich Galaxies (2019A, **$66,400**)

James Webb Space Telescope

Admin-Co-I GO (6665) DISCS: Direct Imaging Survey of Circumgalactic Structure (**$95,800**, 2024, Cycle 3)

Co-PI PAR (5398) POPPIES: The Public Observation Pure Parallel Infrared Emission-Line Survey (2024 Cycle 3, 400 hrs, **$265,995**)

Co-I GO (5761) Ionized Gas Kinematics of a z > 4 Main Sequence Disk Galaxy (2024 Cycle 3, 5 hrs)

Co-I GO (5782) Abell 1689: Opening a Unique Window on Lensed Galaxies at Cosmic Noon (2024 Cycle 3, **$18,714**)

Co-I GO (4291) Galaxy angular momentum alignment with filaments at z~3: The effect of large scale structure on galaxies (2023 Cycle 2, 67.8 hrs)

Co-I PAR (3990) A NIRCam Pure-Parallel Imaging Survey of Galaxies Across the Universe (2023 Cycle 2, 600 hrs)

Co-I AR (3305) Analyzing Giant Clumps in JWST Images of Star-Forming Galaxies to Constrain Feedback (2023 Cycle 2)

Co-I PAR (1571) PASSAGE--Parallel Application of Slitless Spectroscopy to Analyze Galaxy Evolution (2021 Cycle 1, 591 hrs, $**283,623**)

Co-I GO (2123) A Pathfinder for JWST Spectroscopy: Deep High Spectral Resolution Maps of Galaxies over 1<z<6 (2021, Cycle 1, 74 hrs)

Collaborator DD-ERS (1345) The Cosmic Evolution Early Release Science (CEERS) Survey

Hubble Space Telescope

Admin-Co-I GO (17815) DISCS: Direct Imaging Survey of Circumgalactic Structure (**$95,800**, 2024, Cycle 32)

Admin-PI GO (17483) Characterizing Lyman-Alpha emitters with Snapshot Survey (CLASS) (**$82,239**, 2023, Cycle 31)

Admin-PI GO (17518) PIE+: Identifying LyC leakers through improved photometry of the PIE survey fields (**$55,455**, 2023, Cycle 31)

Co-I AR (17568) Unveiling the connection between gas flows around galaxies and the cosmic web using QSO spectra **($46,603**, 2023, Cycle 31)

Co-I GO (17608) Mapping HI 21cm emission from two FRB host galaxies at z~0.045 (2023, Cycle 31)

Co-I GO (17461) Unlocking the rich potential of JWST slitless spectroscopy with the help of HST: an optical follow-up campaign (2023, Cycle 31)

Co-I GO (17517) CONTACT: Circumgalactic Observations of Nuv-shifted Transitions Across Cosmic Time (2023, Cycle 31)

Co-I Gap Program (17309) Resolved imaging survey of the analogs of high-z massive, star-forming clumps (2023 multi-cycle)

Admin-PI GO (17133) Mapping the morphology of the ionizing radiation from a LyC emitting galaxy at z=4.00 (**$75,435** 2022, Cycle 30)

Co-I GO (17147) The Parallel Ionizing Emissivity Survey (**$370,070**, 2022, Cycle 30)

Co-I GO (17189) A panoramic study of low-density star formation in XUV disk galaxy NGC 3621: Testing for environmental dependency of clusters, OB associations, and the stellar hierarchy (2022 Cycle 30)

Admin-PI GO (16889) The molecular gas mass of high-redshift HI-selected galaxies (**$30,729**, 2021 Cycle 29)

Co-I GO (16877) Determining the host sub-structure and local environment characteristics of highly-active FRB 20201124A (2021 Cycle 29)

Co-I GO (16734) Calibrating local estimators for the escape fraction of ionizing radiation 2.7Gyrs after the Big Bang (**$15,000**, 2021 Cycle 29)

Co-I AR (16621) SUPERCAL: Unified Reprocessing of the Large HST Cosmology Survey Fields - New Science, Archival Legacy, and Pathfinder for JWST (2021 Cycle 29)

Admin-PI GO (16246) Are Narrow Line Region Outflows an Effective Mode of AGN Feedback? (**$138,854**, 2020 Cycle 28)

Co-I GO (16080) Resolving the Host Galaxies of Fast Radio Bursts (**$10,161**, 2020 mid-Cycle 27)

Admin-PI GO (15860) Accretion-Triggered Starbursts in Tadpole Galaxies (**$49,854**, 2019 Cycle 27)

Co-I GO(15878) Uncovering the birthplace of FRBs (**$19,231**, 2019 Cycle 27)

Admin-PI GO(15968) Paths to quiescence: gaseous feeding, morphology and star-formation histories of galaxies from the HST+MUSE Ultra Deep Field **($52,247**, 2019 Cycle 27)

Admin-PI GO (15882) The Nature of the Host Galaxies of High- Redshift Damped Lyman-alpha Absorbers **($31,799**, 2019 Cycle 27)

Co-I GO (15880) METAL-Z: Metal Evolution, Transport, and Abundance at Low Metallicity (Z) (2019 Cycle 27)

Co-I AR (15792) Cloud Exploration: A new tool for measuring galaxy substructures and a comprehensive census of giant star-forming clumps (2019 Cycle 27)

Co-I AR (15798) UV Light Reveals the Life of Giant Star-forming Clumps (2019 Cycle 27)

PI GO (15637) Exploring the gaseous surroundings of low-mass galaxies with an HST+MUSE Deep Field **($631,798**, 2019 Cycle 26, 90 orbit large program)

Co-I GO (15647) Ultraviolet Imaging of the Cosmic Assembly Near-infrared Deep Extragalactic Legacy Survey Fields (UVCANDELS) **($372,197**, 2019 Cycle 26)

PI GO (15416) Identifying DLA Host Galaxies: The First Deep Ultraviolet Imaging of a high NHI Damped Lyman-alpha System (**$66,634**, 2018 mid-cycle 25)

Admin PI GO (15100) Mapping the escaping ionizing flux of Lyman continuum galaxies (**$113,834**, 2017 Cycle 25)

Admin PI GO (15283) Witnessing the assembly of galaxies in an extended gas-rich structure at z~3.25 (**$43,675**, 2017 Cycle 25)

Co-I GO (15163) COS Ultraviolet Baryon Survey (CUBS) (**$32,507**, 2017 Cycle 25)

Co-I GO (15186) Enabling HST UV Exploration of the Low Surface Brightness Universe: A Pilot Study with the WFC3 X Filter Set (**$38,500**, 2017 Cycle 25)

PI AR (14580) The Role of Galaxy Morphology in the Mass-Metallicity-SFR Relation (**$181,011**, 2016 Cycle 24)

Co-I GO (14127) First Measurement of the Small Scale Structure of Circumgalactic Gas via Grism Spectra of Close Quasar Pairs (**$87,566**, 2015 Cycle 23)

Co-I GO (14209) The Final UV Frontier: Legacy Near-UV Imaging of the Frontier Fields (**$15,072**, 2015 Cycle 23)

Co-I GO/PAR (14178) WFC3 Infrared Spectroscopic Parallel Survey: The WISP Deep Fields (**$89,303**, 2015 Cycle 23)

Co-I SNAP (13309) UV Snapshot of Low-redshift Massive Star-forming Galaxies: Searching for the Analogs of High-redshift Clumpy Galaxies (**$12,429**, 2013 Cycle 21)

Co-I GO (13389) The Ultraviolet Frontier: Completing the Census of Star Formation at Its Peak Epoch (**$35,927**, 2015 Cycle 21)

Co-I GO/PAR (12568,12902,13352,13517) WFC3 Infrared Spectroscopic Parallel Survey WISP: A Survey of Star Formation Across Cosmic Time (2011-2014 Cycle 19-22)

Co-I AR (12821) Probing the Lyman continuum in sub-M* galaxies at z∼1 (2012, Cycle 22)

Co-I GO (12534) Panchromatic Hubble Ultra Deep Field: Ultraviolet Coverage (2011, C21)

Co-I AR (12645) H I Selected Survey for Damped Lyman alpha systems with z < 1 (2011, C19)

Co-I AR (10656) An HST/NICMOS Study of our Galaxy's Central Supermassive Black Hole (2006, Cycle 14)

Spitzer Space Telescope

Co-I DDT (13207) Low Mass AGN: Combining IRAC With Near-IR Grism Spectroscopy (2017)

Co-I GO (12093) Measuring Low Mass Galaxies In The WFC3 Infrared Spectroscopic Parallels Survey (2015)

Co-I GO (10041) Mass Assembly In The WFC3 Infrared Spectroscopic Parallels Survey (2013)

Co-I GO (90230) Low Mass Galaxy Evolution In The WFC3 Infrared Spectroscopic Parallels Survey (2012)

Atacama Large Millimeter Array (ALMA)

Co-I ALMA exploration of star-forming galaxies near enriched cosmic gas structures at cosmic noon (2024.1.00132.S)
PI Identifying HI-absorption-selected galaxies at z~4 (2023.1.00792.S)
Co-I Physical conditions in the molecular gas of a massive cold disk galaxy at z~4 (2022.1.01000.S, 2023.1.00976.S)
Co-I Molecular gas in High-redshift HI-Selected Galaxies (2023.1.01415.S)
Co-I Unveiling the contribution of dusty star-forming galaxies to the cosmic metal enrichment (2023.1.00461.S)
Co-I Unveiling the contribution of dusty star-forming galaxies to the cosmic metal enrichment (2023.1.00461.S)
PI High-resolution CII-158 micron Mapping of a Massive Cold Disk Galaxy at z~4.26 (2022.1.01150.S)
Co-I An ALMA view of the MUSE Ultra Deep Field (2021.1.00285.S, 2022.1.00091.S)
Co-I Molecular gas in HI-Absorption-selected galaxies at z~2 (2021.1.00706.S)
PI Characterizing Absorption-Selected galaxies at High-z (CASH) Survey (2019.1.01721.S)
Co-I Resolving the Wolfe Disk (2019.1.01844.S)
Co-I Detecting the Full Range of z~4 Galaxies Associated with Damped Ly-alpha Systems (2018.1.01784.S)
Co-I Mapping the Interstellar Medium of HI-Rich Galaxies at z~4 (2017.1.01052.S)
Co-I Characterizing Absorption-Selected High-z Galaxies (CASH) Survey (2016.1.00569.S)
Co-I [C II]158 micron Emission from Absorption-Selected Galaxies at z ~ 4 (2015.1.01564.S)]
Co-I [CII] Emission from H I - Selected Galaxies (2012.1.00351.S, 2013.1.00526.S)
Co-I Detection of CII line emission from a Damped Lyman alpha galaxy at z=4.26 (2011.0.00356.S)

W.M. Keck Telescopes

Co-I Follow-up LRIS Imaging of Parallel Surveys with JWST (FLIPS-JWST): Revealing How Dust Attenuation Evolves (NASA Keck Panel, 1.5 nights, 2025A **$18,650**)
Co-I Connecting galaxies and their high-density HI gas at high redshift with KCWI-KCRM (UC Keck Panel, 7 nights, 2023B, 2024A, 2024B)
PI Observing Lyman Continuum Galaxies in UVCANDELS with LRIS (NASA Keck Panel, 4.5 nights 2020B, 2021B, 2022B **$43,712)**
PI The Great Escape: Observing Lyman Continuum Galaxies with LRIS (NASA Keck Panel, 3 nights: 2018B, 2019B, **$30,325**)
Co-I The Holy Grail of DLA Research (UC Keck Panel, 4 nights: 2019B, 2020, 2022)
PI Probing the Small-Scale Structure of Circumgalactic Gas via Keck+HST observations (NASA Keck Panel, 4 nights: 2016B, 2017A, 2018A, 2019A, **$39,150**)
Co-I 23 UC-Keck proposals with Arthur Wolfe as PI (**40 nights** 2006-2012)

ESO Very Large Telescopes (VLT)

Co-I A MUSE view of the diversity of the circumgalactic medium at z~5 (P102 2018)

PI The Cosmic Dawn of HI Rich Galaxies
(2 proposals, 32 hours P98 (2016) & P100 (2017))

Co-I Unveiling the connection between star formation and neutral gas reservoirs at z>3 with MUSE (3 proposals P96, P97, P98)

Palomar 200 inch Telescope

PI Stellar Masses in the WFC3 Infrared Spectroscopic Parallel (WISP) Survey
(4 proposals, 2012B, 2013a, 2013b, 2014a, 17 nights)

Magellan Telescopes

Co-I Metallicities of Damped Lyman-alpha systems at z~5 (2012B)

Co-I The Cosmic Metallicity of Neutral Gas (2013A)

Co-I Sweeping Away the Dust: Understanding Attenuation in the Early Universe (2017B, 2018A, 2018B)

Astrosat

Co-I Deep far-UV survey of the JWST North Ecliptic Pole Time-Domain field (2022, 352,000s, A12_018)

Co-I LEGACY: AstroSat-UVIT Deep Field Legacy Survey (2019, 75,000s, A06_006)

The Karl G. Jansky Very Large Array (VLA)

Co-I Mapping HI 21cm emission from two FRB host galaxies at z~0.045 (2024, 24A-025)

Co-I The molecular gas mass of high-redshift HI-selected galaxies (2022, 22A-337)

Co-I The Host Galaxies of High-Redshift Damped Lyman-alpha Absorbers (2020, 21A-268)

GROUND BASED OBSERVING EXPERIENCE

W.M. Keck Observatory: 10m telescopes	Total: 48 nights
• HIRES: High Resolution Echelle Spectrometer	16 nights
• ESI: Echelle Spectrograph and Imager	17 nights
• LRIS: Low Resolution Imaging Spectrometer	6 nights
• NIRC: Near Infrared Camera	3 nights
• NIRC2: Near Infrared Camera 2	2 nights
• KCWI/KCRM: Keck Cosmic Web Imager and Cosmic Reionization Mapper	3 nights
• OSIRIS: OH Suppressing Infrared Integral-field Spectrograph	1 night
Palomar Observatory: 200-inch Telescope	Total: 17 nights
• LFC: Large Format Camera	12 nights
• DBSP: The Double Spectrograph	5 nights
Magellan Observatory: Baade & Clay 6.5m telescopes	Total: 6 nights
• FIRE: Folded-port InfraRed Echellette	2 nights
• IMACS: Inamori-Magellan Areal Camera & Spectrograph	1 night
• FourSTAR: Infrared Camera	1 night
• LDSS3: Low Dispersion Survey Spectrograph 3	2 nights
WIYN Observatory: 3.5m telescope (Mini-Mosaic Imager)	Total: 3 nights

AWARDS AND HONORS

- Space Telescope Science Institute Achievement Award 2021
  - COS lifetime extension team award
- AURA Technology & Innovation Outstanding Achievement Award 2021
  - For extending the mission life of HST COS FUV detector to 2030+
- NASA Agency Group Achievement Award 2018
  - For extending the mission life of HST COS FUV detector to 2025
- Space Telescope Science Institute Achievement Award 2018
  - COS lifetime Extension Initiative & COS 2025 Teams
- STScI Bonus Award for front-end work for COS team 2018
- Lindau Nobel Laureate meeting participant 2016
- Distinguished Fellow - Kosciuszko Foundation Collegium of Eminent Scientists 2016
- NASA Postdoctoral Program Fellowship 2014-2016
- Certificate in Teaching Innovative Laboratory Experiences, ISEE, UC Santa Cruz 2010
- Summer Graduate Teaching Fellowship, University of California, San Diego 2010
- UCLA Department of Physics & Astronomy Fellowship 2004-2005
- Excellence in Undergraduate Research Award in Physics, University of Arizona 2004
- Baird Scholarship, Baird Foundation, University of Arizona 2000-2004
- Weaver Award for Undergraduate Research, University of Arizona, Physics 2003
- Galileo Circle Scholarship, University of Arizona, College of Science 2003-2004
- Vesto M. Slipher Scholarship, University of Arizona, Physics 2003
- Phi Beta Kappa initiated 2002
- Glenn C. Purviance Scholarship, University of Arizona, Physics 2002
- George Gregson-Science Scholarship, University of Arizona, Physics 2001
- Vomaska Scholarship, University of Arizona, Physics 2000
- Academy of Achievement attendee 2000

SUPERVISOR AND MENTORING EXPERIENCE

Supervisor for COS Team (15-20 people) 2020-2025
Deputy supervisor for WFC3 Team (~15 people) 2019-2020
Supervisor and mentor for post-doctoral researchers:
- Ilias Goovaerts, Space Telescope Science Institute 2024-present
- Farhan Hassan, Space Telescope Science Institute 2024-present
- Kalina Nedkova, Johns Hopkins University 2022-present
- Grecco Oyarzun, Johns Hopkins University 2022-present
- Alexander Beckett, Space Telescope Science Institute 2022-present
- Mitchell Revalski, Space Telescope Science Institute 2019-2024
- Laura Prichard, Space Telescope Science Institute 2018-2021

Mentor for post-doctoral researchers:
- Ryan Vaught, Space Telescope Science Institute 2025-present
- Intae Jung, Space Telescope Science Institute 2022-present
- John Wu, Space Telescope Science Institute 2021-2022

Mentor and supervisor for technical staff conducting research:

- Paul Huwe, Space Telescope Science Institute 2021-2024
- Ben Sunnquist, Space Telescope Science Institute 2017-2023
- James White, Space Telescope Science Institute 2016-2017

Mentor for STScI technical Staff:

- Jonathan Aguilar, Space Telescope Science Institute 2021-present
- Bin Chen, Space Telescope Science Institute 2019

Mentor and supervisor for Undergraduate Interns in astronomy research:

- Abby Mintz (intern STScI, remote volunteer after) 2020-2022
- Jaclyn Baughman (summer intern STScI) 2018
- Anthony Pahl (summer intern NASA Goddard) 2016

TEACHING EXPERIENCE

UCSD Instructor of Physics: University of California, San Diego 2010
- Instructor for Physics 1A: Introductory Mechanics.

Guest Lecturer: Maui Community College 2008
- Astronomy instructor and team leader for the Po'okela short course. Taught inquiry-based activities for 1 week.

Teaching Assistant: University of California, San Diego 2006-2007
- Introductory astronomy lecture (Physics 5 and Physics 7) 2007
- Physics laboratory on waves and circuits (Physics 2CL) 2006

Guest Lecturer: University of California, Santa Cruz 2007
- Astronomy instructor for the CfAO Mainland Short Course. Taught inquiry-based activities for 1 week.

Guest Lecturer: Hawaii Island observatories 2006
- Astronomy instructor for the CfAO Akamai Observatory Short Course for Hawaii Island. Taught inquiry-based activities for 1 week.

Teaching Assistant: University of California, Los Angeles 2004
- Astronomy lab for non-majors

Teaching Assistant: University of Arizona 2001-2004
- Mechanics and Electricity, Magnetism, & Optics for non-majors 2001-2004

PROFESSIONAL ACTIVITIES

Committee work

- HST Telescope Time Review Board (TTRB) 2019-present
- Science Evaluation Committee (SEC) 2024
- Science Organizing Committee, STScI, 2023
  - The First Year of JWST Science Conference
- Workshop Organizing Committee, STScI MOS Galaxies 2021
- STScI Technical Staff Research Committee (TSRC) 2021-2023
- Research Support Advisory Committee (RSAC) 2018-2020
- Contributed to the HST senior review on Galaxies and IGM Nov. 2018
- Wrote high redshift galaxy surveys section with a UV-optical August 2015

Space telescope (LUVOIR) for the Cosmic Origins Program Analysis Group (COPAG) published by PASP

Review Panels and Telescope Allocation Committees 2014-present

- Hubble Space Telescope Panel
- Spitzer Space Telescope Panel (x2)
- NASA Hubble Fellowships Program (NHFP)
- NASA Astrophysics Data Analysis Program (ADAP) Panel
- NASA Earth and Space Science Fellowship (NESSF) (x3)
- NASA Earth and Space Science and Technology (FINESST)
- STScI Directors Discretionary Research Fund (DDRF) (x5)
- CFHT Taiwan TAC (x2)
- STScI Space Astronomy Summer Program (SASP) (x2)

Referee for Scientific Journals 2011-present

- Astrophysical Journal, Astronomy and Astrophysics, Monthly Notices of the Royal Astronomical Society

Press Releases

- Revealing a filament from the cosmic web January 2025
  https://www.eso.org/public/images/potw2504a/
- Hubble Finds Weird Home of Farthest Fast Radio Burst January 2024
  https://hubblesite.org/contents/news-releases/2024/news-2024-001
- Thousands of Galaxies Shine in Ultraviolet Light in New Hubble Image June 2022
  https://www.caltech.edu/about/news/thousands-of-galaxies-shine-in-ultraviolet-light-in-new-hubble-image
- Hubble Tracks Down Fast Radio Bursts to Galaxies' spiral arms May 2021
  https://hubblesite.org/contents/news-releases/2021/news-2021-010
- ALMA Discovers Massive Rotating Disk in Early Universe May 2020
  https://public.nrao.edu/news/alma-discovers-massive-rotating-disk-in-early-universe/
- ALMA Observes Galaxies Embedded in Super-Halos
  http://www.almaobservatory.org/en/press-room/press-releases/1148-alma-observes-galaxies-embedded-in-super-halos March 2017
- Hubble Reveals Stellar Fireworks in 'Skyrocket' Galaxy June 2016
  http://hubblesite.org/newscenter/archive/releases/2016/23/
- Hubble Team Unveils Most Colorful View of Universe Captured by Space Telescope June 2014
  http://hubblesite.org/newscenter/archive/releases/2014/27

Leadership

- COS Branch Manager 2020-present
- Leadership Development Program (LDP) 2020-2022
- WFC3 Branch Deputy 2019-2020
- JWST-MAST Spectroscopic Initiative Lead 2018-2019
- Front End Lead for Cosmic Origins Spectrograph (COS) 2018
- Deputy User Support Lead for the COS team 2017-2018
- Calibration Lead for the 4th lifetime position of the COS 2017-2018
- Support Scientists Representative 2017-2018

Other Service

- Leveler for Hubble Space Telescope Panel 2019
- Chambliss Judge for AAS 2019
- Co-author on 8 Astro2020 White Papers 2019

Professional Memberships

- American Astronomical Society (AAS) 2009-present
- International Astronomical Union (IAU) 2015-present

PROFESSIONAL DEVELOPMENT AS EDUCATOR

Active teaching methods in Astronomy Survey Courses 2009-2011

- NASA Center for Astronomy Education (CAE) workshops
  - AAS meeting #213, Long Beach, California 2009
  - AAS meeting #217, Seattle, Washington 2011

Professional Development Program (PDP): 2006-2008

- NSF Center for Adaptive Optics, Maui, Hawaii
  - Design team leader for stellar population inquiry activity 2008
  - Design team leader for galaxy evolution inquiry activity 2007
  - Team member for re-design of optics inquiry activity 2006

OUTREACH

Virtual Summer Camp: Astronomy discussion for Seattle elementary school 2020

PBS KIDS Ready Jet Go!: TV episode with Amy Mainzer on Telescopes 2016

Explore@NASAGoddard open house volunteer: Goddard Space Flight Center 2015

Reach For Tomorrow volunteer: University of California, San Diego 2008-2011

- Outreach volunteer for disadvantaged K12 students (1 day/year)

Tech Trek volunteer: University of California, San Diego 2008-2010

- Outreach volunteer for female K12 students (1 day/year)

Po'okela short course: Maui Community College, HI 2008

- Outreach team leader for native Hawaiian students (1 week + prep)

CfAO Mainland short course: University of California Santa Cruz 2007

- Outreach volunteer for disadvantaged students (1 week + prep)

CfAO Akamai Observatory short course: Waimea, Hawaii 2006

- Outreach volunteer for native Hawaiian students (1 week + prep)

Planetarium show volunteer: University of California, Los Angeles 2004-2006

Science Ambassador: University of Arizona 2003-2004

SELECTED REFEREED PUBLICATIONS (1st and 2nd author)

147 refereed journal papers published or accepted to date, garnering 7500+ citations leading to an H-index of 49. 21 1st and 2nd author papers published († marks my post-docs and students).

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Marc Rafelski, Michael Foley, Genevieve J. Graves, Katherine A. Kretke, Elisabeth Mills, Michael Nassir, and Shannon Patel, *Teaching Astronomy with an Inquiry Activity on Stellar Populations*, 2010, ASP Conference Series 436, Learning from Inquiry in Practice, eds. L. Hunter & A. J. Metevier (San Francisco, CA: ASP)

Emily L. Rice, Michael McElwain, Sarah Sonnett, and **Marc Rafelski**, 2010, *The Evolution of Inquiry Activities in the Akamai Observatory Short Course*, ASP Conference Series 436, Learning from Inquiry in Practice, eds. L. Hunter & A. J. Metevier (San Francisco, CA: ASP)

Rafelski, M., Ghez, A. M., Hornstein, S. D., Lu, J. R., Morris, M., 2006, *Photometric Stellar Variability in the Galactic Center*, Journal of Physics Conference Series, 54, 316

Hornstein, S. D., Matthews, K., Ghez, A. M., Lu, J. R., Morris, M., Becklin, E. E., Baganoff, F. K., **Rafelski, M**., *Infrared/X-ray intensity variations and the color of Sgr A*,* 2006, Journal of Physics Conference Series, 54, 399

TALKS AND POSTERS

41 oral presentations and 17 poster presentations at a range of universities and institutions across the United States, Europe, Australia, and Asia.

National Centre for Radio Astrophysics (NCRA) Colloquium: Pune, India 12/2024
- **Invited Talk:** Metallicity evolution of the ISM and CGM of galaxies

Baryons Beyond Galactic Boundaries: Pune, India 12/2024
- **Talk:** Evolution of the metallicity, incidence rate, and hydrogen mass density of damped Lyman-alpha systems out to z~5

Extreme Galaxies: Reykjavík, Iceland 05/2024
- **Talk:** The ISM and CGM of extremely low-mass galaxies at z~2 in the MUSE Ultra Deep Field (MUDF)

Wolfe Symposium in Astrophysics: San Diego, CA
- **Invited Talk:** Imaging Galaxies Associated with Damped Lyman Alpha Systems with KCWI 03/2024

American Astronomical Society Meeting #241: Seattle, WA 01/2023
- **iPoster:** Science with the Cosmic Origins Spectrograph into the 2030's

What matter(s) around galaxies 2022: The Alps (Champoluc), Italy 09/2022
- **Talk:** Connecting the CGM gas with galaxies giving rise to DLAs

SAZERAC: Metals and dust at high-redshift: Zoom
- **Talk:** The Metal Enrichment of Neutral HI gas Over Cosmic Time 05/2022

American Astronomical Society Meeting #235 01/2021
- **iPoster Plus:** Enabling Ultraviolet Science into the 2030's with the Cosmic Origins Spectrograph

STScI Research Talk: Baltimore, MD
- **Talk:** The Role of Gas in the Evolution of Galaxies 03/2020

CLEAR Collaboration Meeting: Baltimore, MD
- **Invited Talk:** Mass-Metallicity-SFR at z~1.2-2.3 and morphology 06/2019

American Astronomical Society Meeting #233: Seattle, WA
- **Poster:** The JWST-MAST Spectroscopic Initiative 01/2019

IGM2018: Revealing Cosmology and Reionization History with the Intergalactic Medium: Kavli IPMU, Kashiwa, Japan 09/2018
- **Talk:** Evolution of the metallicity, incidence rate, and hydrogen Mass density of damped Lyman-alpha systems out to z~5

HotSci Colloquium: STScI, Baltimore, MD 07/2018
- **Talk:** Evolution of the Physical Properties of HI-Rich Galaxies across 10 Billion Years

Wolfe Symposium in Astrophysics: Big Sur, CA 03/2018
- **Invited Talk:** The First Deep Ultraviolet Imaging of a high NHI Damped Lyman-alpha System

American Astronomical Society Meeting #231: Washington DC 01/2018
- **Invited Talk:** *The Ultraviolet Hubble Ultra Deep Field*
- **Poster:** COS2025: Extending the Lifetime of the FUV channel of the Cosmic Origins Spectrograph to 2025

What Matters Around Galaxies: Durham University, UK 06/2017
- **Talk:** *Evolution of the hydrogen mass density, metallicity, and star-formation rate in DLAs associated with galaxies*

Research Seminar: Durham University, UK 06/2017
- **Talk:** *The physical properties of HI-rich galaxies across 10 billion years*

STScI Spring Symposium: Lifecycle of Metals Throughout the Universe: Celebrating 50 years of UV Astronomy: STScI, Baltimore, MD 04/2017
- **Talk:** *UVUDF: Ultraviolet Coverage of the Hubble Ultradeep Field*
- **Poster:** The Metal Enrichment and Star Formation of HI gas (DLAs) Over Cosmic Time

What Shapes Galaxies: STScI, Baltimore, MD 04/2016
- **Poster:** *The Star Formation Rate Efficiency of Atomic-dominated Hydrogen Gas from z~1 to z~3*

Outskirts of Galaxies: Toledo, Spain 03/2016
- **Talk:** *SFR Efficiency of Atomic-dominated Hydrogen Gas in the Outskirts of Star Forming Galaxies from z~1 to z~3*

American Astronomical Society Meeting #227: Florida
- **Talk:** *The Star Formation Rate Efficiency of Atomic-dominated Hydrogen Gas from z~1 to z~3* 01/2016

Census, Evolution, Physics (Galaxies): Yale University, New Haven, CT 11/2015
- **Invited Talk**: *Overview of the WFC3 Infrared Spectroscopic Parallel Survey (WISPs)*

CAS Research Seminar: Johns Hopkins University 11/2015

- **Invited Talk**: *On the Non-evolution of the Star Formation Rate Efficiency of HI Rich Galaxies from z~1-3*

CANDELS Team Meeting: University of California, Santa Cruz 07/2015
- **Talk:** *UV Data and Science*

Thirty Meter Telescope Science Forum: AAAS, Washington DC 06/2015
- **Talk:** *Uncovering the Origin of the Rapid Decline in Metallicity of Hydrogen-Rich Galaxies at z~5*

Finding the UV-Visible Path Forward: Goddard, Greenbelt, MD 06/2015
- **Invited talk:** *Motivations for a future UV-visible telescope: High-redshift Galaxy and Deep-field Studies*

IGM@50: Is the Intergalactic Medium Driving Star Formation: Sarteano, Italy 06/2015
- **Invited talk:** *Evolution in the Star Formation Rate Efficiency of Damped Lyman-alpha Systems*

Astrophysics Colloquium: Durham University, UK 06/2015
- **Invited Talk:** *Evolution of the Star Formation Properties and Chemical Composition of Hydrogen Rich Galaxies in the Early Universe*

Hubble 2020: Space Telescope Science Institute 04/2015
- **Poster:** *Ultraviolet Through Near-infrared HST Imaging and Photometric Redshifts of Galaxies in the Hubble Ultra Deep Field*

Physics Colloquium: The Catholic University of America, Washington D.C. 02/2015
- **Invited Talk:** Chemical Composition and Star Formation Properties of Hydrogen Rich Galaxies in the Early Universe

Galaxies in Absorption: Paris, France 09/2014
- **Talk:** *The Metal Enrichment and Star Formation of DLAs Over Cosmic Time*

The Role of Hydrogen in the Evolution of Galaxies: Kuching, Malaysia 09/2014
- **Talk:** *The Metallicity Evolution Neutral Atomic Hydrogen gas out to High Redshift*

Intergalactic Matters: Heidelberg, Germany 06/2014
- **Poster:** *The Rapid Decline in Metallicity of Damped Lyman-alpha systems at z~5*

Astrophysics Colloquium: Melbourne University of Technology 05/2014
- **Invited Talk**: *Metallicity Evolution and Star Formation Properties of Damped Ly-alpha Systems*

The Near-Field Deep-Field Connection: University of California, Irvine 02/2014
- **Poster:** *The Rapid Decline in Metallicity of Damped Lyman-alpha systems at z~5*
- **Discussion Talk:** *CGM of the Milky Way and Beyond*

CAS Research Seminar: Johns Hopkins University 12/2013

• **Invited Talk**: *Star Formation Properties and Metallicity Evolution of HI Rich Galaxies at High Redshift*

Astronomy Seminar: University of California, Riverside 11/2013
• **Invited Talk**: *Star Formation Properties and Metallicity Evolution of HI Rich Galaxies at High Redshift*

Astrophysics Colloquium: University of Minnesota 11/2013
• **Invited Talk**: *Star Formation Properties and Metallicity Evolution of HI Rich Galaxies at High Redshift*

CANDELS Team Meeting: University of Kentucky 8/2013
• **Talk:** Data Challenges for CANDELS UV Data
• **Talk:** Overview of CANDELS UV Data in GOODS North

Intergalactic Interactions: Royal Observatory, Edinburgh, Scottland 6/2013
• **Talk:** *On the possible break in the metallicity evolution of DLAs at z~5*

CANDELS Team Meeting: University of California, Santa Cruz 9/2012
• **Talk:** *Data Reduction Challenges for Binned UV Data*

Keck Science Meeting: University of California, San Diego 9/2012
• **Talk:** *Metallicity Evolution of Damped Lyman-alpha Systems out to z~5*

Galactic Scale Star Formation: Heidelberg, Germany 8/2012
• **Talk:** *Measuring the evolution of the star formation rate efficiency from z~1-4*

UV Astronomy: HST and Beyond: Kaua'i, Hawai'i 6/2012
• **Poster:** *Ultraviolet Observations of the Hubble Ultra Deep Field*

American Astronomical Society Meeting #220: Anchorage, AK 6/2012
• **Talk**: *Ultraviolet Observations of the Hubble Ultra Deep Field*

The 2012 Greater IPAC Science Symposium: 3/2012
California Institute of Technology
• **Talk:** *Star Formation from DLA Gas in the Outskirts of Lyman Break Galaxies*

Keck Science Meeting: California Institute of Technology 9/2011
• **Talk:** *Metallicity Evolution of Damped Ly-alpha Systems out to z~5*

A Quarter Century of DLAs: Celebrating the career of Arthur Wolfe 7/2011
Ringberg Castle, Germany
• **Invited Talk:** *Star Formation from DLA Gas in the Outskirts of Lyman Break Galaxies at z~3*

Star Formation in Galaxies - the Herschel Era: 6/2011
Ringberg Castle, Germany
• **Invited Talk:** *Star Formation from DLA Gas in the Outskirts*

of Lyman Break Galaxies at z~3

Center for Galaxy Evolution Inaugural Workshop: Irvine, CA 3/2011
- **Poster:** *Star Formation from DLA Gas in the Outskirts of Lyman Break Galaxies at z~3*

American Astronomical Society Meeting #217: Seattle, WA 1/2011
- **Talk**: *Low Surface Brightness Emission in the Outskirts of LBGs at z~3: Possible Star Formation in Atomic-dominated DLA Gas*

Learning from Inquiry in Practice: The PDP Community Interchange 1/2010
Santa Cruz, CA
- **Poster:** *Stellar Populations Inquiry*

Keck Science Meeting: California Institute of Technology 9/2009
- **Poster:** *Search for Spatially Extended Star Formation Around Lyman Break Galaxies*

SFR@50: Filling the Cosmos with Stars: Sarteano, Italy 7/2009
- **Invited Talk**: *Search for Spatially Extended Star Formation around Lyman Break Galaxies in the Hubble Ultra Deep Field*

American Astronomical Society Meeting #213, Long Beach, CA 1/2009
- **Poster:** *Lyman Break Galaxies in the Hubble Ultra Deep Field through Deep U-Band Imaging*

Keck Science Meeting: University of California, Santa Cruz 9/2008
- **Poster:** *Ultra Deep Keck u-band Imaging of the Hubble Ultra Deep Field*

Keck Science Meeting: University of California, Irvine 9/2006
- **Poster:** *Photometric Stellar Variability in the Galactic Center*

From the Center of the Milky Way to Nearby Low-Luminosity 4/2006
Galactic Nuclei, Bad Honnef, Germany
- **Poster:** *Photometric Stellar Variability in the Galactic Center*