Prof. Eric Gawiser

Curriculum Vitae

Department of Physics and Astronomy
Rutgers University
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EDUCATION

Ph.D. Physics, University of California at Berkeley, 1999, Ph.D. Thesis: "Big Bang Leftovers in the Microwave: Cosmology with the Cosmic Microwave Background Radiation," thesis committee Joseph Silk (advisor), George Smoot, Tom Broadhurst

M.A. Physics, University of California at Berkeley, 1996

A.B. Physics, *magna cum laude*, Princeton University, 1994, Senior Thesis: "Cosmic Strings in an Open Universe," advisors David Spergel & Neil Turok. Certificates in Applied and Computational Mathematics and in Science Policy (from the School of Public and International Affairs)

Language Skills: English (native), Spanish (fluent), French (reading)

AWARDS & FELLOWSHIPS

Rutgers School of Arts & Sciences Award for Distinguished Contributions to Undergraduate Education, 2021

Awarded Builder Status in the LSST Dark Energy Science Collaboration, 2021

Fellow, American Physical Society, 2018, "For exceptional accomplishments and leadership in the study of galaxy evolution and Cosmology."

National Science Foundation CAREER Award, 2011–2016

Rutgers Society of Physics Students Outstanding Teacher Award, 2012

Rutgers School of Arts & Sciences Award for Distinguished Contributions to Undergraduate Education, 2012

NSF Astronomy & Astrophysics Postdoctoral Fellowship, 2002–2006

Andes Prize Fellowship, Yale University, 2002–2004

Phi Beta Kappa Fellowship, U.C. Berkeley, 1999

Outstanding Graduate Student Instructor Award, U.C. Berkeley, 1998

NSF Graduate Research Fellowship, U.C. Berkeley, 1995–1998

Department of Education GAANN Fellowship, U.C. Berkeley, 1995

Elected to Phi Beta Kappa, Sigma Xi at Princeton University, 1994

PUBLICATIONS

Over 400 publications, including 5 invited review articles, 187 refereed journal papers, 27 conference proceedings, and 139 conference abstracts/circulars. These publications have received more than 23,000 citations, with an h-index of 74.

RESEARCH INTERESTS

I study large samples of distant galaxies for the dual purposes of understanding how galaxies form and of using their spatial clustering to probe dark energy and dark matter.

The nature of dark energy and dark matter: The influence of dark energy on the expansion rate of the universe makes it possible to probe cosmology via statistical analysis of large surveys of high-redshift galaxies. As a member of HETDEX, Simons Observatory, and the LSST Dark Energy Science Collaboration, I compare the "standard rod" of baryon acoustic oscillations with the scale at which excess galaxy clustering is seen and cross-correlate the galaxy distribution with gravitational lensing of the Cosmic Microwave Background. This allows us to infer the dark energy equation-of-state and to probe its time evolution. Combining this with our measurements of the growth of cosmological structure will reveal whether cosmic acceleration is caused by dark energy or modifications to General Relativity. The galaxy power spectrum measured by these experiments also constrains dark matter properties including neutrino masses and their hierarchy.

Formation of galaxies like the Milky Way: Hierarchical cosmology predicts that typical present-day galaxies formed from multiple low-mass, high-redshift progenitors that underwent significant merging and rapid star formation. As a member of the ODIN, UVCANDELS, CEERS, and LADUMA collaborations, I study the clustering, spectral energy distributions, and gas content of high-redshift galaxies in order to determine their dark matter halo masses, star formation properties, and present-day descendants. My group's non-parametric method of star formation history reconstruction allows us to determine the origin, evolution, and scatter of the correlation between galaxies' star formation rates and stellar masses and to thereby constrain the physical processes that regulate galaxy growth.

RESEARCH EXPERIENCE

Distinguished Professor, Department of Physics and Astronomy, Rutgers University, July 2023–present

- Co-PI (2020-present) of ODIN (One-hundred-deg^2 DECam Imaging in Narrowbands, PI K.-Soo Lee, Lee et al. 2024). This NOIRLab survey program built three custom narrow-band filters and was awarded 83 nights of observing time from 2021-23 on the CTIO 4m telescope to discover 100,000 Lyman Alpha Emitting (LAE) galaxies at redshifts of 2.4, 3.1, and 4.5. Strong overdensities in the distribution of LAEs identify galaxy protoclusters, which are the most massive structures in the early universe. Showed that Lyman Alpha Blobs are preferentially found close to filaments rather than in protoclusters or voids (Ramakrishnan et al. 2023). Developed improved techniques for selecting LAEs and made the most precise measurement of their Equivalent Width distributions (with graduate student N. Firestone, Firestone et al. 2024)

- Pioneered the use of Machine Learning methods for selecting "lens" galaxy samples for 3x2pt cosmology analysis. Boosted decision trees and random forest photometric redshift algorithms are trained on realistically non-representative spectroscopic training sets to calculate the initial distance estimates. Galaxies are placed into optimal bins of distance, and convolutional neural networks are trained to identify and exclude the galaxies whose distance estimates are least reliable, leading to a significant increase in constraining power (with graduate students I. Moskowitz and A. Broussard, Broussard & Gawiser 2021, Moskowitz et al. 2023, 2024)

Professor, Department of Physics and Astronomy, Rutgers University, July 2017–June 2023

- Served as Analysis Coordinator (2021-23) and Deputy Spokesperson (2017-19) of the Vera C. Rubin Observatory Legacy Survey for Space and Time (LSST) Dark Energy Science Collaboration (DESC), a group of 1200 scientists working to determine the nature of dark energy and to distinguish it from modifications to General Relativity as the cause of cosmic acceleration. Identified scientific priorities for initial LSST data releases. Designed and implemented DESC Career Support Initiative to provide career mentoring to junior members and new faculty. Initiated DESC Seminars in 2017 as a series of virtual scientific talks.

- Discovered evidence for synchronized star formation in Local Volume dwarf galaxies over the past 3 Gyr spanning multiple regions up to 4 Mpc from the Milky Way. Star formation histories determined independently from Color Magnitude Diagrams and Spectral Energy Distributions both lead to this surprising result, which was not predicted by current models of galaxy evolution. Performed the first search for galactic conformity using the star formation histories to probe this backwards in time, finding indications of conformity on 2-3 Mpc scales at both the present day and lookback times of 1 Gyr (with graduate student C. Olsen, Olsen et al. 2021, 2023)

- Introduced the Dense Basis method, the first non-parametric method for the reconstruction of galaxy star formation histories from their observed spectral energy distributions using Gaussian Processes. Found the fraction of galaxies exhibiting multiple major episodes of star formation and the typical lag time between these episodes. Used Rutgers' supercomputer to create trajectories vs. time for 18,000 distant galaxies on the Star Formation Rate (SFR) vs. Stellar Mass (M_*) diagram, extending knowledge of the SFR-M_* correlation by two orders of magnitude down to 10^7 solar masses at $z > 4$ and finding it to remain linear (with graduate student K. Iyer, Iyer & Gawiser 2017, Iyer et al. 2018, 2019, 2020)

- Developed a method to measure short-term burstiness in a galaxy population's star formation histories via the scatter in their ratios of star formation rates measured with Hα and near-UV emission; found discrepancy between model predictions and 3D-*HST* observations of this ratio. Expanded the method to directly infer the intrinsic scatter by correcting for sources of observational scatter, including the use of Balmer decrements to correct for dust attenuation (with graduate student A. Broussard, Broussard et al. 2019, 2022)

- Showed that LSST galaxies are numerous enough to allow for a simultaneous measurement of Milky Way dust and large-scale structure, with the best approach being a Bayesian analysis that uses a map like SFD as a prior but updates it with LSST data (with graduate student M. Bravo Santa Cruz, Bravo et al. 2021)

- Created improved estimators for angular correlation functions that correct for contamination in galaxy samples with imprecise radial distances; showed that these estimators remove bias caused by contamination and that galaxies or galaxy pairs can be assigned weights to minimize the variance (with graduate student H. Awan, Awan & Gawiser 2020)

Visiting Professor, Center for Computational Astrophysics, Flatiron Institute, Spring 2018

Associate Professor (tenured), Department of Physics and Astronomy, Rutgers University, Jan. 2012-June 2017

- Demonstrated that LSST can use large telescope dithers to reduce dark energy systematics by a factor of ~ 10 (with graduate student H. Awan, Awan et al. 2016). Proposed a novel "rolling" cadence that will enable LSST to discover more Type Ia supernovae for dark energy studies (with undergraduate student C. Carroll & colleague S. Jha, Carroll et al. 2014)

- Made the first statistically self-consistent measurement of intrinsic scatter in the Star Formation Rate-Stellar Mass correlation, using UVUDF+CANDELS galaxies at $0.5 < z < 3$ with proper accounting for covariance in observational errors on each quantity. Found that intrinsic scatter does not increase at dwarf galaxy masses, in conflict with predictions of hydrodynamic simulations (with research scientist P. Kurczynski, Kurczynski et al. 2016)

- Developed a Bayesian method for separating > 1 million emission lines detected by HETDEX into Lyα and [O II]. Showed that the resulting improvements in purity and completeness of the Lyα sample reduce errors on cosmological distance estimation via Baryon Acoustic Oscillations by 15% (with undergraduate student A. Leung, Leung et al. 2017)

- Introduced a method for replacing uncertain properties in semi-analytical galaxy formation models with better-determined proxy properties. Applied this to sub-millimeter galaxies and showed that using the product of star formation rate and dust mass as a proxy for sub-millimeter luminosity matches observations (with graduate student A. Muñoz Arancibia and colleague N. Padilla, Muñoz Arancibia et al. 2015)

- Analyzed deep CANDELS photometry of 20 Lyman α Emitting (LAE) galaxies at redshift 2 and found that stacked Spectral Energy Distribution fitting is nearly unbiased but hides significant scatter in individual galaxy stellar masses and ages. Found that Lyman α photons emitted by LAEs avoid repeatedly scattering in dusty regions and that LAEs lie above the star-forming sequence in the star formation rate-stellar mass diagram (with undergraduate students C. Vargas & H. Bish, Vargas et al. 2014).

- Found dwarf galaxies at high redshift, $1 < z < 8$, in the Hubble Ultraviolet Ultradeep Field (UVUDF) to be significantly bluer than local galaxies of comparable luminosity (with research scientist P. Kurczynski, Kurczynski et al. 2014)

- Used the Millenium-II simulation dark matter halo merger trees to show that most Lyman α Emitting galaxies at redshift 3 evolve into typical (L^*) central galaxies today but a significant minority evolve into lower-mass satellite galaxies residing in groups and clusters (with graduate student J. Walker Soler, Walker Soler et al. 2012).

- Showed that the Fisher Matrix formalism is an accurate and efficient way to estimate uncertainties on Spectral Energy Distribution fitting parameters and can therefore be used for astronomical survey design (with research scientist V. Acquaviva, Acquaviva et al. 2012b)

- Used stacked spectroscopy of high-redshift star-forming galaxies to find that subsets with and without Lyman α emission show Galactic winds comprised of neutral gas clouds embedded in ionized gas (with graduate student M. Berry, Berry et al. 2012)

Visiting Professor, Department of Astrophysical Sciences, Princeton University, Fall 2014

Assistant Professor, Department of Physics and Astronomy, Rutgers University, Sep. 2007-Dec. 2011

- Led MUSYC collaboration, a group of 30 astrophysicists studying the formation and evolution of galaxies and supermassive black holes (60 refereed publications since 2007)

- Introduced a new cosmological parameter that can falsify the concordance GR+ΛCDM cosmological model by revealing scale-dependence in the growth of density fluctuations (with postdoc V. Acquaviva, Acquaviva & Gawiser 2010)

- Identified Lyman α Emitting galaxies at redshifts 2 and 3 as progenitors of typical (L^*) present-day galaxies. Found that these galaxies are low in mass and undergoing rapid star formation (with graduate student L. Guaita, Guaita et al. 2010, 2011, Gawiser et al. 2007)

- Found that Lyman α Emitting galaxies at redshift 3 are the smallest galaxies yet studied and that their Lyman α emission is no more extended than their ultraviolet continuum. Showed that morphological differences between rest-frame optical and ultraviolet emission are greater for star-forming than for passive galaxies (with postdoc N. Bond, Bond et al. 2009, 2010, 2011, 2012)

- Developed an optimal algorithm for simultaneous stacking and deblending of source fluxes in astronomical images and used it to measure and compare star formation rates of galaxies at X-ray, ultraviolet, sub-millimeter, and radio wavelengths (with research scientist P. Kurczynski, Kurczynski & Gawiser 2010, Kurczynski et al. 2012)

- Made first measurement of dark matter halo masses of X-ray-selected AGN at redshift 3 (with graduate student H. Francke, Francke et al. 2008)

- Created GalMC, a Markov Chain Monte Carlo code for galaxy spectral energy distribution fitting that is ~100 times more efficient than standard methods and produces accurate estimates of parameter uncertainties. SpeedyMC version achieved factor of 20,000 speed-up for large galaxy samples by interpolating over pre-computed template libraries. (with postdoc V. Acquaviva, Acquaviva, Gawiser & Guaita 2011, 2012, Acquaviva et al. 2012a)

Visiting Professor, Department of Physics, U.C. Davis, Jan.-Aug. 2010, Jan.-Aug. 2011

Visiting Professor, U.C. Berkeley Center for Cosmological Physics and Lawrence Berkeley National Laboratory, June 2008-Aug. 2009

Visiting Professor, Department of Physics and Astronomy, Rutgers University, Sep. 2006-Aug. 2007

NSF Astronomy & Astrophysics Postdoctoral Fellow (AAPF) and Andes Prize Fellow, Yale University, 2002-2007

- Created MUSYC collaboration (with P.G. van Dokkum, C.M. Urry, J. Maza and P. Lira)

- First application of Spectral Energy Distribution fitting to stacked galaxy photometry showed that Lyman α Emitting galaxies at redshift 3 are young objects undergoing rapid star formation (Gawiser et al. 2006b)

- Developed APCORR (corrected aperture) photometry method for use on MUSYC catalog of 277,341 optically-selected objects over a square degree of sky (Gawiser et al. 2006a)

Postdoctoral Research Physicist, University of California at San Diego, 1999-2002

- Determined the cosmic star formation rate from Damped Lyman α systems, which contain the majority of neutral hydrogen gas in the universe (with A.M. Wolfe & J.X. Prochaska, Wolfe et al. 2003ab)

- Made first measurement of the spatial cross-correlation of Damped Lyman α systems and Lyman break galaxies (Gawiser et al. 2001)

Graduate Research Fellow, University of California at Berkeley, 1994-1999

- Found evidence for non-zero neutrino masses from the combination of CMB anisotropy and large-scale structure data (Gawiser & Silk 1998)

- Developed method to break degeneracy between cosmological parameters and the primordial power spectrum, enabling both to be measured from combined CMB anisotropy and large-scale structure data (Gawiser 1999)

- Quantified the foreground contamination of CMB anisotropy experiments caused by microwave emission from luminous infrared galaxies, radio galaxies, and galaxy clusters (Gawiser & Smoot 1997, Sokasian et al. 2001, Gawiser 1999)

Visiting Graduate Researcher, Institut d'Astrophysique de Paris, Fall 1997

GRANTS AWARDED AS P.I.

Over $4 million in grants awarded from DOE, NASA, and NSF.

DOE High Energy Physics Research Grant DE-SC0010008, "Research in Theoretical High Energy Physics" (2019-2025), $1,140,000 for Cosmic Frontiers effort led by Gawiser; Scott Thomas is P.I. of the umbrella grant.

NSF Astronomy & Astrophysics Grant 2206222, "Collaborative Research: Tracing the Evolution of the Largest Cosmic Structures and their Galaxy Constituents in the Distant Universe" (2022-2025), $230,675.

NASA Astrophysics Data Analysis 21-ADAP21-0169, "Constraining the Regulation of Galaxy Growth with Star Formation Histories" (2022-2025), $263,651.

SLAC Sub-contract 212593, "LSST Dark Energy Science Collaboration (DESC) - Analysis Coordinator" (2021-2023), $175,211 for teaching buyout and postdoc and travel support.

Hubble Space Telescope GO-15647.020, "Ultraviolet Imaging of the Cosmic Assembly Near-infrared Deep Extragalactic Legacy Survey Fields (UVCANDELS)" (2019-2022), $73,973 awarded for Rutgers portion of project (Program PI Harry Teplitz).

Hubble Space Telescope HF2-51441.001, "The Galaxy-Halo Connection: Probing the Dark Universe with Galaxies", (2019-2022), $317,561 awarded to Rutgers for Dr. Yao-Yuan Mao's Einstein Fellowship

Awarded over 2 million CPU hours on Rutgers' supercomputer, Caliburn, 2018-2021

SLAC Sub-contract 183464, "LSST-DESC Deputy Spokesperson" (2017-2019), $81,016 for teaching buyout and travel support.

DOE High Energy Physics Research Grant DE-SC0011636, "Probing the Physics of Dark Energy with LSST: Large Scale Structure and Supernovae" (2016-2019), $465,000 (Saurabh Jha is Co-PI).

Hubble Space Telescope Cycle 24 AR-14564, "Reconstructing Star Formation Histories to Reveal the Origin and Evolution of the SFR-M* Correlation", (2016-2019), $125,756.

DOE High Energy Physics Research Grant DE-SC0011636, "Optimizing the LSST Survey Strategy for Dark Energy Studies," (2014-2016), $160,000.

NSF Astronomy & Astrophysics Research Grant 1055919, "CAREER: Explaining the Connection between Lyman Alpha Emitters and Typical Present-day Galaxies," (2011-2016), $843,442.

Hubble Space Telescope GO-12534.12, "The Panchromatic Hubble Ultra Deep Field: Ultraviolet Coverage" (2012-2015), $78,004 awarded for Rutgers portion of project (Program PI Harry Teplitz)

Spitzer Space Telescope AO-8 GO-80100, "Spitzer-HETDEX Exploratory Large Area (SHELA) Survey," (2011-2014), $12,400 awarded for Rutgers portion of project (Program PI Casey Papovich).

Hubble Space Telescope Multi-Cycle Treasury GO-12060.57, "Cosmic Assembly Near-IR Deep Extragalactic Legacy Survey (CANDELS) - I" (2010-2015), $86,316 awarded for Rutgers portion of project (Program PIs Sandy Faber, Harry Ferguson).

NSF Astronomy & Astrophysics Research Grant 0807570, "Collaborative Research: The Physical Properties of Lyman Alpha Emitters at $2 < z < 3$," (2008-2011), $227,806 (includes $10K REU Supplement).

DOE Dark Energy Pathfinder Experiment, "Lyman Alpha Emitting Galaxies at $2 < z < 3$: Towards a Calibrated Probe of Dark Energy," (2008-2009), $78,264.

Spitzer Space Telescope AO-5 AR-50805, "Comparing the Stellar Populations of Star-forming Galaxies at $z = 2$," (2008-2011), $75,000.

Spitzer Space Telescope AO-4 AR-40823, "A SIMPLE Proof that Lyman Alpha Emitters are Galaxies in the Act of Formation" (2007-2010), $63,281.

Hubble Space Telescope Cycle 16 AR-11253, "Sizes and Morphology of $z = 3.1$ Lyman Alpha Emitting Galaxies in the Extended CDF-S" (2007-2009), $67,400.

Spitzer Space Telescope AO-3 GO-30873, "The Ages and Star Formation Rates of Massive Galaxies at $z = 2 - 3$" (2006-2008), $50,466 awarded for Yale portion of project (Program PI Ivo Labbé).

Co-P.I., NSF conference grant, "NSF Astronomy and Astrophysics Postdoctoral Fellows Symposium" (2005), $14,234.

Awarded $20,000 in research support from Isaac Newton Fund, Yale Astronomy Department, 2004–2006

NSF AAPF, "A Square-Degree Survey for Galaxies at $z = 3 - 5$" (2002-2006), $194,000.

STUDENTS AND RESEARCHERS MENTORED

Faculty mentor for Hubble/Einstein Fellow Yao-Yuan Mao, Rutgers, 2019-2022. Yao is now an Asst. Professor at Utah

Supervisor for research scientist Peter Kurczynski, Rutgers, 2008-2016. Peter is now Chief Scientist of the NASA Cosmic Origins Program

Postdoctoral supervisor for Heather Prince, Rutgers, 2022-present

Postdoctoral supervisor for Viviana Acquaviva, Rutgers, 2009-2012. Viviana is now a (full) Professor at the City University of New York

Postdoctoral supervisor for Nicholas Bond, Rutgers, 2007-2010. Nick is now at Goddard Space Flight Center

Ph.D. Thesis advisor for Nicole Firestone, Rutgers, 2022-present

Ph.D. Thesis advisor for Irene Moskowitz, Rutgers, 2021-present

Ph.D. Thesis advisor for Charlotte Olsen, Rutgers, 2017-2023. Charlotte is now an LSST Catalyst Fellow at the City University of New York.

Ph.D. Thesis advisor for Adam Broussard, Rutgers, 2017-2022. Adam is now a Research and Development Engineer at Raytheon Corporation.

Ph.D. Thesis advisor for Humna Awan, Rutgers, 2015-2020. Humna is now a Leinweber Center for Theoretical Physics Postdoctoral Fellow at U. Michigan

Ph.D. Thesis advisor for Kartheik Iyer, Rutgers, 2015-2019. Kartheik is now a NASA Hubble Fellow at Columbia University

Ph.D. Thesis advisor for Jean Walker Soler, Rutgers, 2008-2016. Jean is now a University Lecturer at the New Jersey Institute of Technology.

Ph.D. Thesis co-advisor for U. Católica graduate student Alejandra Muñoz Arancibia, 2011-2015. Nelson Padilla and Sofía Cora were her co-advisors at U. Católica and U. La Plata, respectively. Alejandra is now a Postdoctoral Fellow at U. de Chile

Ph.D. Thesis co-advisor for Lucia Guaita, U. Católica, 2007-2010. Nelson Padilla was her co-advisor at U. Católica. Lucia is now an Assistant Professor at Universidad Andres Bello in Santiago, Chile

Ph.D. Thesis co-advisor for Harold Francke, Universidad de Chile, 2005-2008. Paulina Lira was his co-advisor at U. de Chile. Harold is now Scientific Staff at ALMA

Co-advisor for UC San Diego graduate student Jeff Cooke, 2000-2002. Jeff is now a Professor at Swinburne University

Graduate research supervisor for Danisbel Herrera, Rutgers, 2023-present

Graduate research supervisor for Jacob Kennedy, Rutgers, 2023-present

Graduate research supervisor for Catie Raney, Rutgers, 2014-2015

Graduate research supervisor, Research Qualifying Exam advisor, and Ph.D. Committee member for Michael Berry, Rutgers, 2009-2014. Mike is now a data scientist at Amazon

Research supervisor for Ohio State University graduate student Crystal Burgos in Simons/National Society of Black Physicists Scholars Program, 2021

Senior Honors Thesis advisor for Rutgers undergraduates Joe Santos (2023-24, co-advised by Heather Prince), George Kharchilava (2022), Barbara Benda (2021-22, now Ph.D. student at U. Washington), Elisabeth Turner (2020-21, now Ph.D. student at Tufts), Lana Eid (2018-2019, now Ph.D. student at Rutgers), Nakul Gangolli (2017-2018, now Ph.D. student at U.C. Riverside), Jiaoyue Yuan (2016-2017, now Ph.D. student at UC Santa Barbara), Andrew Leung (2014-2015, now Ph.D. student at U. Texas Austin), Hannah Bish (2013-2014, Ph.D. from U. Washington, now a Postdoc at STScI), Carlos Vargas (2011-2012, later an NSF Graduate Research Fellow at New Mexico State, now PI of the $20M NASA ASPERA mission and Asst. Prof. at U. Arizona) and Graham Kanarek (2007-2008, Ph.D. from Columbia, now Staff Scientist at Space Telescope Science Institute)

Research supervisor for Rutgers undergraduates Bailey Thompson (2023-present), Govind Ramgopal (2023-present), Rameen Farooq (2020-23), Juliette Stecenko (Sep. 2016-Aug. 2019, now a Ph.D. student at UConn), Rachel Bailey (Sep. 2013-May 2014), Chris Carroll (2012-2013, later a Ph.D. student at Dartmouth, now an LSSTC Catalyst Postdoctoral Fellow at Washington State) and Heidi Moreira (Fall 2010), U. Maryland undergraduate Shreya Karthikeyan (REU Summer 2021), Western Washington undergraduate Holly Christenson (REU Summer 2015, now Ph.D. student at U.C. Riverside), Cornell undergraduate Humna Awan (REU Summer 2014, later Ph.D. student at Rutgers), U. Chicago undergraduate Aneesa Sonawalla (Summer 2013, later Ph.D. student at Georgia Tech), Yale data assistant David Herrera (2003-2006, now staff member at NOAO), Yale undergraduates Alison Kaptur (2006), Ruth Toner (2004), and David Moore (2003, now Assoc. Prof. at Yale) and U. de Chile undergraduate Gullermo Blanc (2004)

Mentor for LSST-DESC postdoctoral researcher Tanveer Karim, U. Toronto, 2024

Mentor for Simons Observatory postdoctoral researcher Zack Li, UC Berkeley, 2024

Mentor for LSST-DESC graduate student Zhou Conghao, U.C. Santa Cruz 2023

Mentor for Simons Observatory graduate student Rita Sonka, Princeton, 2023

Mentor for Simons Observatory graduate student Carlos Sierra, U. Chicago, 2022

Mentor for Simons Observatory postdoctoral researcher Davide Poletti, SISSA (Italy), 2021

Mentor for Simons Observatory postdoctoral researcher Kevin Crowley, U.C. Berkeley, 2019-2020

Mentor for Simons Observatory graduate student Carlos Hervias, U. Manchester, 2018

Mentor for Simons Observatory postdoctoral researcher Joy Didier, USC, 2017–2018

Ph.D. Committee outside member for U.T. Austin graduate student Matt Stevans (Ph.D. 2019). Matt is now in the private sector

Ph.D. Committee outside member for U.T. Austin graduate student Guillermo Blanc (Ph.D. 2011). Guillermo is now a Staff Scientist at Carnegie Observatories

Ph.D. Committee member for Rutgers Graduate School of Education Ed.D. student Heather Rave, 2013-2018. Heather is now an Associate Professor of Physics at St. Thomas Aquinas College

Ph.D. Committee member for Rutgers Physics & Astronomy graduate students Amir Kazemi-Moridani, Anthony Young, Kyle Dettman (Ph.D. 2021), Elaad Applebaum (Ph.D. 2021), John Wu (Ph.D. 2019), Jisoo Moon (Ph.D. 2019), Wenhan Zhang (Ph. D. 2019), Joshua Paramanandam (Ph.D. 2015), Chelsea Sharon (Ph.D. 2013), Sean Stratton (Ph.D. 2012), Dmitri Ivanov (Ph.D. 2012) & Hyowon Park (Ph.D. 2011)

Faculty mentor for Rutgers Honors Program undergraduates Lillian Simhon, Suchi Borkar, and Siddarth Narayanan (2023-present), Shreerang Nitinbhai Patel (2022-present), Kathy Lopez Salmoran (2021-present), Kevin Gendi (2020-present), Jiaming Pan, Khovesh Ramdin, & Jenny Vecchione (2019-2023), Roushmi Akther (2018-2022), Vineeth Vattikuti (2017-2021), Harpal Dhillon & Neeharika Thuravil (2016-2020), Nicholas Buchinski, Priyanka Dhulkhed, & Nicholas Petriello (2015-2018), Daniel Hertz-Kintish, Koby Hodes, Harankumar Nallasivan, Vedant Sachdeva & Ryan Tracy (2013-2017), Rachel Bailey, Tulsi Desai & Emily Goodman (2012-2016), Vishal Gandhi, Richa Rana & Liz Tatum (2011-2015), Punit Arora & Michelle Huang (2010-2014), Danielle Caminiti, Priya Jaisinghani, Nilesh Jambhekar, & Margaret Zientek (2009-2013), and Deflin Balili, Teresa Harvey, Helen Janiszewski & Paul Menell (2008-2012)

AWARDS, GRANTS AND FELLOWSHIPS TO RESEARCH GROUP (RECENT)

NSF Graduate Research Fellowship to Nicole Firestone, 2023-2026, $147,000

Chambliss Astronomy Achievement Student Award Honorable Mention to Irene Moskowitz at January 2024 AAS meeting

APS Mid-Atlantic States Early Career Grant to Heather Prince (2023), $500

APS Mid-Atlantic States Travel Grants to Joe Santos & Bailey Thompson (2023), $600

LSST Discovery Alliance Travel Award to Joe Santos (2023)

Aresty Research Assistantships to Govind Ramgopal and Bailey Thompson (2023-2024)

Richard J. Plano Summer Research Internship to Joe Santos (2023), $5500

Aryabhata Endowed Award in Astronomy for top graduating senior awarded to George Kharchilava (2023)

Sigma Xi Grant-In-Aid-of-Research to Nicole Firestone, "One-hundred-square-degree DECam Imaging in Narrowbands Observations In Chile"" (2023), $4790.

Robert A. Schommer Prize for best astrophysics paper led by a Rutgers graduate student awarded to Charlotte Olsen (2022)

Aryabhata Endowed Award in Astronomy for top graduating senior awarded to Barbara Benda (2022)

Noemie Koller Endowed Scholarship awarded to Charlotte Olsen (2022-2023)

Koller Undergraduate Scholarship awarded to Rameen Farooq (2022-2023)

Richard J. Plano Summer Research Internship to George Kharchilava (2022), $5500

Richard J. Plano Outstanding Teaching Assistant Award to Nicole Firestone, 2022

Lovelace Graduate Fellowship awarded to Irene Moskowitz (2021-2022)

Chambliss Astronomy Achievement Student Award to Charlotte Olsen at June 2021 AAS meeting

Richard J. Plano Summer Research Internship to Rameen Farooq (2021), $5500

Harvey Waterman Medal of Excellence awarded to Humna Awan for one of the two best Ph.D. theses completed at Rutgers University in 2020

Richard J. Plano Dissertation Prize to Humna Awan for top 2020 Ph.D. thesis in Rutgers Physics and Astronomy Department

Leinweber Center for Theoretical Physics (LCTP) Postdoctoral Fellowship at University of Michigan (2020-2023) to Humna Awan

Dunlap Postdoctoral Fellowship at University of Toronto (2019-2022) to Kartheik Iyer

Aresty Research Assistantships to Barbara Benda and Elisabeth Turner (2020-2021)

Aresty Summer Science Studentship to Rameen Farooq (2020), $3000

Fellowship of Excellence in Computational and Data Science from Rutgers Discovery Informatics Institute awarded to Humna Awan (2017-2020), $65,000

Rutgers University Louis Bevier Dissertation Completion Fellowship to Humna Awan (2019-2020)

Chambliss Astronomy Achievement Student Award to Adam Broussard at Jan. 2019 AAS meeting

SCIENTIFIC COLLABORATIONS (INCLUDING LEADERSHIP ROLES)

Vera C. Rubin Observatory Legacy Survey of Space and Time (LSST) Dark Energy Science Collaboration (DESC): Analysis Coordinator, 2021-2023. Deputy Spokesperson, 2017-2019. Convener, DESC Large-Scale Structure Working Group, 2012-2017.

Co-P.I., ODIN (One-hundred-square-degree DECam Imaging in Narrowbands, PI K.-Soo Lee), 2020-present

P.I., MUSYC (Multiwavelength Survey by Yale-Chile), 2003-2016 (Pieter van Dokkum served as joint PI until 2008)

Coordinating Council Member and Co-Chair of Ancillary Data Working Group, LADUMA (Looking At the Distant Universe with the MeerKAT Array) 5000-hour Large Survey Project, 2010-present

Co-Chair, LSST (Large Synoptic Survey Telescope) Science Collaboration on Large-Scale Structure, 2010-2016 (Member 2006-2016)

Member, JWST Cosmic Evolution Early Release Science (CEERS), 2017-present

Member, LSST Galaxies Science Collaboration, 2006-present

Member, HETDEX (Hobby Eberly Telescope Dark Energy Experiment), 2009-present

Member, Simons Observatory, 2017-present

Member, UVCANDELS (Hubble Ultraviolet survey of CANDELS fields), 2018-present

Member, UVUDF (Hubble Ultraviolet Ultradeep Field survey), 2012-2017

Member, CANDELS (Cosmic Assembly Near-IR Deep Extragalactic Legacy Survey) 900-orbit HST Multi-Cycle Treasury program, 2010-2019

Associate Member, Center for Computational Astrophysics, Flatiron Institute, 2016-present

Faculty Affiliate, Rutgers Discovery and Informatics Institute (RDI^2), 2013-2019

P.I., WOMBAT (Wavelength-Oriented Microwave Background Analysis Team), 1998-1999

PROFESSIONAL SERVICE

Member, APS Panel on Public Affairs (POPA), 2020-2023, including subcommittees on Physics & the Public and Energy & Environment. POPA advises the American Physical Society on issues of public policy, including drafting and evaluating long-term APS policy statements.

National Optical Astronomy Observatory (NOAO) Users' Committee, Chair 2011-2013, Member 2007-2013. Represented the U.S. astronomical community in advising NOAO on capital and procedural improvements

LSST Dark Energy Science Collaboration: Chair, Publications Committee, 2015-2016; Member, Operations Committee, 2017-2023; Member, EDI Committee, 2024-2026, Member, Publications Board, 2021-2023; Member, Membership Committee, 2017-2018; Member, Collaboration Council, 2014-2016

Simons Observatory EMC^2 (Engagement, Mentoring, and Climate Committee), Member 2020-present. Includes EDI efforts and participation in APS IDEA Workshops.

Enabling Science Committee of the Large Synoptic Survey Telescope Corporation Board, 2013-2017

American Astronomical Society: Member of van Biesbrock Prize Committee, 2016-2019; Candidate for Council, 2016; Member of Working Group on Astroinformatics & Astrostatistics, 2014-present; Agent for Rutgers University, 2013-2016

Steering Committee, National User Facility Organization (NUFO), 2010-2012. NUFO represents scientists who utilize NSF and DOE user facilities to Congress and the public; I was the first astrophysicist to serve in this capacity.

Candidate for AAAS Council from Section D (Astronomy), 2024

Candidate for APS Division of Astrophysics Executive Committee Member-at-Large, 2011

Referee, Physical Review (5 articles), Astrophysical Journal (16 articles), Astronomy & Astrophysics (8 articles), Monthly Notices of the Royal Astronomical Society (7 articles)

TAC Member, Hubble Space Telescope proposal review, 201X

Panelist, Hubble Space Telescope proposal review, 200X

Panelist, DOE High Energy Physics 201X, 202X
    Reviewer, DOE High Energy Physics 201X, 202X, SCGSR 201X

Panelist, NSF Astronomy AAG 201X, CAREER 200X

Panelist, NASA Astrophysics Theory Program proposal review, 200X

Reviewer, NSF Physics Frontiers Centers 201X

Reviewer, Grant proposals for Research Corporation, CONICYT-Chile

Reviewer, Observing proposals for Spitzer Space Telescope, Gemini Observatory, William Herschel Telescope

Member, SOC, HETDEX Science Meeting, Penn State, May 15-17, 2024

Member, SOC, "Cross-Correlating Galaxy Surveys and the CMB: New Probes of Cosmology", Special Session at 241st American Astronomical Society meeting, Jan. 2023

Member, SOC, "Beyond a Billion Galaxies: Preparing the Rubin Observatory LSST Dark Energy Science Collaboration (DESC) for Stage IV Cosmology," Special Session at 239th American Astronomical Society meeting, Jan. 2022 - cancelled due to pandemic

Member, SOC, "AstroData2020s: Science Opportunities with Astrophysics Archives of the Next Decade", Pasadena, CA, Dec. 2018

Member, SOC, 8th Korean Institute for Advanced Study (KIAS) Workshop on Cosmology and Structure

Formation, Seoul, Nov. 2018

Member, SOC, LSST Cadence Workshop, Phoenix, Aug. 2014

Member, SOC, LSST Dark Energy Science Collaboration Meeting in Pittsburgh, Dec. 2013

Chair, Organizing Committee, ODIN Collaboration Meeting at Rutgers, May 2023

Co-Chair, Organizing Committee, HETDEX Science Meeting at Rutgers, Oct. 2012

Chair, Organizing Committee, "Lyman Alpha Emitters as Probes of Galaxy Formation and Cosmology", Meeting-in-a-Meeting at Summer 2012 AAS conference

Chair, MUSYC collaboration meetings (2003-2012)

Member, Organizing Committee, Rutgers-Chile Astrophysics Meeting, Dec. 2009

Member, SOC, Oct. 2008 Understanding Lyman Alpha Emitters Conference at MPIA-Heidelberg

Chair, SOC/LOC, NSF Astronomy & Astrophysics Postdoctoral Fellows Symposia 2004, 2005

Member, SOC, 2004 Annual Meeting of Sociedad Chilena de Astronomía

Organizer, Calán-Yale collaboration meetings (Oct. 2002, Jun. 2003, Oct. 2003)

Colloquium Organizer, Yale Astronomy Department, 2004-2005

Created and led UCSD Cosmic Microwave Background Discussion Group, 2000

Journal Club Organizer, UCSD Center for Astrophysics & Space Sciences, 1999-2000

Professional Memberships: American Physical Society, American Astronomical Society, International Astronomical Union, International Astrostatistics Association, American Association of Physics Teachers, Sigma Xi, American Association for the Advancement of Science

RUTGERS SERVICE

Faculty Director, Aresty Research Center for Undergraduates, 2023-present. The Aresty Center offers undergraduates their initial research experience by matching them with faculty-led projects, with both a summer session for rising sophomores and an academic-year Research Assistant program for all returning students. Small grants are available for conference travel and other research expenses, and we sponsor an undergraduate research journal.

SAS Strategic Planning, Implementation, and Metrics Committee, Phase I Member, 2024

SAS IT Committee Member, 2023

SAS AI/ML/Data Science Committee Member, 2022-23

Developed Faculty Search Guidelines that incorporate EDI principles, adopted by the Physics and Astronomy faculty in 2020

Rutgers Leadership Academy, 2017-2019

Coordinating Council Member, Office of STEM Education, School of Arts & Sciences, 2019-2021

Internal Advisory Board, Rutgers Discovery Informatics Institute, 2018-2019

Institutional Representative for Rutgers University, Large Synoptic Survey Telescope (LSST) Corporation Board, 2008-2009, 2010-2011, 2013, 2017

Appointments & Promotions Committee Member, School of Arts & Sciences, 2017-2019

Mentor for Asst. Prof. Howon Lee (Mechanical & Aerospace Engineering), 2016-2017, through Rutgers Connection Network Faculty-to-Faculty Mentoring Program

Candidate for SAS Affirmative Action Committee, 2015

Time Allocation Committee for Rutgers proposals to the Southern African Large Telescope (SALT), 2011, 2013, 2015

Rutgers Day Volunteer, Astronomy Presentation on "Jersey Roots, Cosmic Reach", Apr. 2012 & Physics Sidewalk Demos, Apr. 2009

SAS Faculty Focus Group, Nov. 2009

Organizer, Rutgers Astrophysics seminars, Spring 2009, Fall 2013, Fall 2018, Spring 2024

Rutgers Physics & Astronomy Committees: Policy (16-17,19-20), Chair Election (19, 22), Colloquium (08-09, Co-Chair 09-10, Chair 11-12, 12-13, F13, Chair F18, Chair F23, S24), Community 12-20 (Chair S13 & S14, Co-Chair 15-16, Chair 16-17, Chair 19-24), COVID Crisis (F20), DELTA-P TA Training (Chair, 11-14), Diversity, Equity & Inclusion (21-23), Graduate Recruiting (08-09, S15, 15-16, 21-22), Graduate Student Organization Liaison (S10), Newsletter (Chair, 07-08), Outreach (S08, 09-10, F10, 11-12, S15), Ph.D. Qualifier (21-23), Teaching Peer Review (15-23), Undergraduate Advising (20-21,22-24), Undergraduate Studies (F07, F10, F20, S24)

Departmental Reappointment and Promotion Committees, 2012, 2018, 2020, Chair 2023

OBSERVING EXPERIENCE

Lead author of successful telescope observing proposals for Keck, VLT, Subaru, Gemini, Magellan, CTIO 4m, WIYN, and SALT

Visiting Astronomer, Keck Telescopes (15 nights), Subaru Telescope (1 night), Very Large Telescope (3 nights), Magellan Telescopes (14 nights), Cerro Tololo Interamerican Observatory (38 nights), Palomar Observatory (6 nights), Kitt Peak National Observatory (4 nights), Lick Observatory (1 night)

INVITED TALKS (RECENT)

Over 100 invited scientific talks, including 59 departmental colloquia, 24 conference talks, 13 conference reviews, one conference keynote, and seven lectures.

Invited Talk: AAS Special Session on Early Science with the Rubin Observatory, Jan. 2024, "Year 1 in the LSST Deep Drilling Fields: 100,000 Emission-Line Galaxies from ODIN"

Colloquium: Physics Department, The College of New Jersey, Oct. 2023, "Probing Dark Energy and Dark Matter with Distant Galaxies"

Invited Talk: KITP Conference on Galaxy Formation and Evolution in the Data Science Era, Mar. 2023, "Star Formation Histories of Galaxies Near and Far"

Invited Review: CCA/KITP Workshop on Building a Physical Understanding of Galaxy Evolution with Data-driven Astronomy, Jan. 2023, "Galaxy Scaling Relations and the Galaxy-Halo Connection"

Invited Talk: Dark Energy Camera at 10 years —- Looking Back, Looking Forward, Tucson, Sep. 2022, "Blobs, Galaxies, and Protoclusters Found with Lyman Alpha: Early Science from ODIN"

Colloquium: Physics & Astronomy Department, University of Oklahoma, Mar. 2022, "Probing Dark Energy and Dark Matter with Distant Galaxies and the CMB"

Invited Keynote: CosmoPalooza, Jan. 2022 (Zoom webinar keynote with over 280 attendees), "LSST DESC Overview and Introduction"

Invited Discussion Leader: Multi-Object Spectroscopy for Statistical Measures of Galaxy Evolution, May 2021, "Modelling Spectra and Simulations"

Invited Review: LSST-Athena Synergy Workshop (virtual), Apr. 2021, "Galaxy Evolution"

Invited Talk: Galaxy Formation and Evolution in the Era of the Nancy Grace Roman Space Telescope

(virtual), Oct. 2020, "Astrophysical Data Science in Roman Times"

LSST-DESC Collaboration-Wide Presentation: Sep. 2020, "The LSST DESC Data Challenge 2 Simulated Sky Survey"

Astrophysics Seminar: Physics & Astronomy Department, University of Pennsylvania, Feb. 2020, "The Galaxy Star Formation Rate-Stellar Mass Correlation"

Invited Discussion Leader: The Art of Measuring Galaxy Physical Properties, Milan, Italy, Nov. 2019, "Star Formation History Reconstruction and Quenching"

Invited Talk: Research Workshop, New Jersey Big Data Alliance, Nov. 2019, "Weighted Galaxy Clustering: A High-Dimensional Optimization Challenge"

Colloquium: Astronomy Department, Penn State University, Apr. 2019, "The Galaxy Star Formation Rate-Stellar Mass Correlation"

Colloquium: Physics & Astronomy Department, Tufts University, Oct. 2018, "Solving the Dark Energy Mystery with Distant Galaxies"

Invited Talk: Research Symposium, Rutgers Discovery Informatics Institute, Oct. 2018, "Big Data in Astrophysics"

Invited Review: Transients and Variable Stars Science Collaboration Meeting, Lehigh University, June 2018, "LSST Dark Energy Science Collaboration: Data Challenges"

Invited Discussion Leader: CCA-STScI JWST Workshop, June 2018, "Modeling Synthetic Galaxy Spectra"

Invited Review: WFIRST Foundation Science Working Group meeting, Greenbelt, MD, May 2018, "WFIRST-LSST Synergy: Dark Energy"

Colloquium: Physics & Astronomy Department, Purdue University, Nov. 2017, "Solving the Dark Energy Mystery with Distant Galaxies"

Invited Talk: Research Symposium, Rutgers Discovery Informatics Institute, Mar. 2017, "The Star Formation History and Clustering of Distant Galaxies"

Colloquium: Physics & Astronomy Department, Rutgers University, Sep. 2016, "Probing Dark Energy and Dark Matter with High-redshift Galaxies in the Era of Big Data"

Invited Talk: LSST Galaxies Science Collaboration meeting, Oxford University, July 2016, "An LSST Galaxy Sample Emulator"

Invited Talk: LSST Dark Energy Science Collaboration Meeting, Oxford, July 2016, plenary talks on "Large Scale Structure and Observing Strategy" and "Report from the Publications Committee"

Invited Talk: Cross-Correlation Spectacular with LSST: Exploring Synergies Between LSST and External Datasets to Discover Fundamental Physics, Brookhaven National Lab & Stony Brook University, May 2016, "Dazed & Confused: Multiwavelength Coverage of the LSST Deep Fields + LSST Survey Strategy + HETDEX"

Invited Talk: HETDEX Collaboration Meeting, U.T. Austin, May 2016, "Towards 3-D LAE Correlation Functions with HETDEX"

Colloquium: Departamento de Astronomía, U. de Chile, Apr. 2016, "The Galaxy Star Formation Rate-Stellar Mass Correlation"

Invited Talk: Mock Santiago: Preparing for the Next Generation Surveys, P.U. Católica de Chile, Apr. 2016, "Optimizing Survey Design for Galaxy Clustering with HETDEX and LSST"

Additional Invited Research Seminars (1997-2021) given at: AMNH, Arecibo Observatory, Argonne National Lab, Aspen Center for Physics, American University Cairo, Arizona State,

Berkeley, Boğaziçi University, Boston University, Caltech, Cambridge, Case Western Reserve, Chicago, Columbia, Cornell, CTIO, CUNY-CityTech, Dartmouth, Drexel, Edinburgh, Fermilab, Flatiron-CCA, Florida, Gemini Observatory, Harvard-CfA, Indiana, Institut d'Astrophysique de Paris, IAS, JILA-Colorado, Korean Institute for Advanced Study, LBNL, LLNL, MIT, MPIA-Heidelberg, NOAO, Ohio St., Oxford, Padova, Penn St., Princeton, P.U. Católica, RIT, Rutgers, Seoul National University, SLAC, Stanford, Stony Brook, STScI, Sussex, Texas A&M, TESRE-Bologna, Tufts, Turkish National Observatory, UC Davis, UCLA, UC Riverside, UCSB-KITP, UC Santa Cruz, UC San Diego, University College London, U. de Chile, U. Hawaii, U. Heidelberg, U. Maryland, U. Massachusetts, U. Minnesota, U. North Carolina, U. Oklahoma, U. Rochester, U. Texas Austin, Wesleyan, Yale

PUBLIC LECTURES

Steward Observatory, University of Arizona, Jan. 2020, "Is Cosmology in Crisis?"

Society of Physics Students, Rutgers University, Oct. 2019, "Solving the Dark Energy Mystery with Distant Galaxies"

New Jersey Astronomical Association, Apr. 2017, "The Other 95%: The Dark Side of the Universe"

Amateur Astronomers Association of Princeton, Dec. 2016, "The Other 95%: Revealing the Dark Universe"

Friends of Rutgers Astronomy, Sep. 2015, "Probing Dark Energy with Distant Galaxies"

Concordia Astronomy & Science Club, July 2013, "Studying Galaxies Far, Far Away Using Hydrogen, Big Mirrors, and Digital Cameras"

Rutgers Astronomical Society, Mar. 2012, "Studying Galaxies Far, Far Away Using Hydrogen, Big Mirrors, and Digital Cameras"

Rutgers Day, Rutgers' Busch Campus, Apr. 2010, "A Tour of the Universe"

Digital Universe Lecture for Latino high school students from around New Jersey hosted by Rutgers' Society of Hispanic Engineers, Apr. 2010, "A Tour of our Galaxy and Universe"

Hayden Planetarium, AMNH, Dec. 2009, "Using Light to Reveal the Dark Universe"

Amateur Astronomers, Inc. of New Jersey, Sep. 2009, "Studying Galaxies Far, Far Away Using Hydrogen, Big Mirrors, and Digital Cameras"

Society of Physics Students, Rutgers University, Apr. 2009, "Studying Galaxies Far, Far Away Using Hydrogen, Big Mirrors, and Digital Cameras"

Hayden Planetarium, AMNH, July 2008, "Things That Go Bang"

Hayden Planetarium, AMNH, May 2008, "How Much Space Is There in the Universe?"

Hayden Planetarium, AMNH, Nov. 2007, "Why Does the Universe Look the Way It Does?"

Hayden Planetarium, AMNH, Aug. 2007, "The Dark Side"

Frontiers in Astrophysics Lecture, Hayden Planetarium, AMNH, Apr. 2007, "Studying Galaxy Formation With Hydrogen, Big Mirrors, and Digital Cameras"

Leitner Observatory, Yale University, May 2007, "Studying Galaxy Formation With Hydrogen, Big Mirrors, and Digital Cameras"

Hayden Planetarium, AMNH, Aug. 2006, "Digital Universe: The Grand Tour"

Society of Physics Students, Yale University, Feb. 2006, "Studying Galaxy Formation Using the Hydrogen Atom, Big Mirrors, and Digital Cameras"

Hayden Planetarium, AMNH, Sep. 2005, "The Big Bang and Beyond"

Hayden Planetarium, AMNH, Aug. 2004, "Clustering in the Universe"

Hayden Planetarium, AMNH, Jul. 2004, "Structure of the Milky Way"

OUTREACH EXPERIENCE

Led Physics outreach to New Brunswick Health Sciences Technology High School (11th grade, 2023-2024). Monthly visits allowed us to reinforce the physics curriculum for under-served students with small-group hands-on demonstrations.

Led Physics outreach to New Brunswick High School (12th grade, 2022; 11th grade, 2020-2021; 9th grade, 2018-2019) and New Brunswick Middle School (7th grade, 2019-2020) in collaboration with Nurture thru Nature program. Monthly after-school visits (continued via WebEx during the pandemic) allowed us to reinforce physics curricula for under-served students with small-group hands-on demonstrations. Started as Gawiser's Capstone project for the Rutgers Leadership Academy.

Congressional Visit Days to advocate WFIRST (April 12, 2018), LSST (April 4, 2017; April 24, 2013), and National User Facilities (April 7, 2011).

Presentation to Association of American Universities (AAU) Council on Federal Relations, Dec. 2011, "The National User Facility Organization (NUFO)"

Hayden Associate, Hayden Planetarium, American Museum of Natural History (AMNH), 2007-2011.

Visiting Astronomer, AMNH, 2002-2007. Added the full SDSS and 2dF datasets to the publicly available Extragalactic Atlas of Hayden Planetarium's Digital Universe project.

MEDIA COVERAGE (RECENT)

Daily Galaxy, Sep. 16, 2022, "'Deeply Compelling' – Weird Existence of Primordial Black Holes in the Early Universe" (quoted as expert on dark matter) https://dailygalaxy.com/2022/09/the-weird-existence-of-primordial-black-holes-in-the-early-universe-harvard-smithsonian-center-for-a/

Daily Galaxy, May 14, 2022, "Earth's Astronomers on the Significance of the First Image of Milky Way's Supermassive Black Hole" https://dailygalaxy.com/2022/05/earths-astronomers-on-the-significance-of-the-first-image-of-milky-ways-supermassive-black-hole/

Rutgers Today, June 1, 2021, "Dwarf Galaxies Had Simultaneous 'Baby Boom' of New Stars" (described research with graduate student Charlotte Olsen); covered in *Sky & Telescope* and >50 articles in 16 countries on six continents

Mic, Sep. 17, 2020, "From black holes to dark matter, 6 space oddities explained by an expert" (quoted as that expert) https://www.mic.com/p/from-black-holes-to-dark-matter-6-space-oddities-explained-by-expert-19433701

BBC Mundo, June 12, 2020, "Qué es la 'materia perdida' del universo y por qué un grupo astrónomos cree haber resuelto el misterio de dónde se encuentra" (quoted in Spanish as outside expert commenting on Macquart et al. *Nature* paper using Fast Radio Bursts to find the missing baryons), https://www.bbc.com/mundo/noticias-53017989

Rutgers Today, Oct. 17, 2018, "Caliburn, New Jersey's Supercomputer, Catalyzes Cutting-Edge Research" (described research with graduate student Humna Awan)

Science, August 11, 2017, "Survey finds galaxy clumps stirred up by dark energy" (quoted as outside expert commenting on results from the Dark Energy Survey)

TEACHING EXPERIENCE

PHY 346, Observational Astrophysics for majors, Rutgers, Spring 2021 (synchronous remote), Spring 2022, Spring 2023, Spring 2024. 85 students, with average evaluation score 4.6 out of 5. Inaugural offerings of our new project-based curriculum combining previous courses in observational Optical and Radio astronomy, with added coverage of X-ray and Gravitational Wave astronomy. Co-developed with Prof. Andrew Baker.

PHY 610, Interstellar Medium for graduate students, Rutgers, Fall 2015, Fall 2023, 18 students, with average evaluation score 4.7 out of 5.

PHY 110, Astronomy and Cosmology for non-science majors, Rutgers, Fall 2007, Spring 2008, Fall 2009, Fall 2010, Fall 2020, Fall 2021. 745 students in total, with average evaluation score 4.7 out of 5. Evaluations averaged 4.8 for 163-student and 120-student synchronous remote versions in Fall 2020 and Fall 2021.

PHY 341 & 342, Principles of Astrophysics for physics majors, Rutgers, Fall 2011-Spring 2014, Spring 2020. 412 students in total, with average evaluation score 4.8 out of 5, including all student evaluation scores being 5.0 in the suddenly-synchronous-remote Spring 2020 semester.

PHY 689, graduate seminar on Data Science in Astrophysics, Rutgers, Fall 2016, Fall 2019. 15 students, with all student evaluation scores 5.0 out of a best possible 5.

PHY 608, Cosmology for graduate students, Rutgers, Spring 2009, Spring 2015, Spring 2017, Spring 2019. 50 students, with average evaluation score 4.8 out of 5.

IHS 293, Rutgers School of Arts & Sciences Interdisciplinary Honors Seminar on "The Science of Science Fiction", Spring 2016. 16 students, with average evaluation score 4.6 out of 5.

PHY 689, graduate seminar in Galaxy Formation, Rutgers, Fall 2009. 10 students, with average evaluation score 4.7 out of 5.

Lecturer, U.C. Berkeley, Introductory Astrophysics for non-science majors, Summer 1999. Taught two consecutive six-week classes of 30 students each with ten hours of lecture per week. The average rating on the students' evaluations was 6.3 out of a best possible 7.

Graduate Student Instructor, U.C. Berkeley, Honors Introductory Physics 1997, Introductory Astrophysics 1995, Introductory Physics 1994

School of Public and International Affairs Senior Thesis, Princeton University, 1994, "An Evaluation of the Princeton University Science Requirement", advisor David Wilkinson

REFERENCES

Prof. Robin Ciardullo, Penn State University, rbc@astro.psu.edu

Prof. George Fuller, U.C. San Diego, gfuller@ucsd.edu

Prof. Karl Gebhardt, University of Texas, Austin, gebhardt@astro.as.utexas.edu

Prof. Manish Parashar, Director, Utah Scientific Computing Imaging Institute and Director, NSF Office of Advanced Cyberinfrastructure, parashar@sci.utah.edu

Prof. David Spergel, President, Simons Foundation, dspergel@flatironinstitute.org

Prof. Michael Strauss, Princeton University, strauss@astro.princeton.edu

Prof. Tony Tyson, U.C. Davis, tyson@physics.ucdavis.edu

Prof. C. Megan Urry, Director, Yale Center for Astronomy & Astrophysics, meg.urry@yale.edu