Benjamin Alan Gregg

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Professional Overview

Recent Astronomy PhD graduate and researcher from the University of Massachusetts Amherst. Have a strong foundation and understanding of physics, astronomy, mathematics, and statistics. Expertise in managing large, diverse data sets and applying computer programming and various statistical methods/tools to tease out underlying trends and understand complex phenomena, like the star formation process in galaxies.

Education

Doctor of Philosophy (PhD) in Astronomy
University of Massachusetts Amherst (UMass)
2025, September 1
Advisor: Daniela Calzetti
Dissertation Title: "Exploring the Physical Connections between Newly Formed Stars, Gas, and Dust across Nearby Galaxy Environments"

Bachelor of Science (BS) in Physics
West Virginia University (WVU)
2018
Minors: Astronomy, Mathematics
GPA- 3.81; summa cum laude

Experience

Graduate Research/Teaching Assistant
University of Massachusetts Amherst, Astronomy | Sep. 2018 – Sep. 2025

- Reduced, processed, and analyzed data (imaging/high res spectra) from various telescopes (e.g., JWST, HST, ALMA, VLA) from UV to radio wavelengths
- Developed a deep and practical knowledge of Python, data analysis packages/tools, and statistical methods and applied to study/solve complicated problems like star formation
- Pioneered new methods to select and study emerging young star clusters in galaxies and to trace obscured star formation in the faraway universe with the NASA flagship telescope JWST
- Cultivated and maintained relationships with collaborators from all over the world
- Synthesized key results and published in academic journals
- Presented at academic conferences
- Led the preparation and instruction of introductory astronomy labs and courses

Undergraduate Research Assistant
West Virginia University, Physics & Astronomy | Mar. 2017 – Sep. 2018

- Planned, executed, and analyzed hundreds of hours of radio observations with the Green Bank 20m telescope to search for Fast Radio Bursts in correspondence with NASA SWIFT gamma-ray observations
- Developed expertise in remote observing, data collection and management, Linux, Python, and scientific communication

Selected Skills

General:

- Observational astronomy, photometry, data reduction/calibration, background modeling, computational physics, statistical inference, model fitting, scientific writing, coding (Python), big data analysis, data visualization, machine learning, critical thinking, complex problem solving, teamwork, communication

System/Software:

- Linux, macOS, LATEX, numpy, scipy, matplotlib, astropy, photutils, ds9, CASA, source extractor, CIGALE, GALFIT, Jupyter notebook

Observation/Reduction Experience:

- JWST, HST, ALMA, VLA

Publications

First author:

Gregg, B., Calzetti, D., Adamo, A. et al. (subm.) "The Calibration of Short Wavelength Polycyclic Aromatic Hydrocarbon Emission as Star Formation Rate Indicators with JWST" submitted to *The Astrophysical Journal.*

Gregg, B., Calzetti, D., Adamo, A. et al. "Feedback in Emerging Extragalactic Star Clusters, FEAST: The Relation between 3.3 μm Polycyclic Aromatic Hydrocarbon Emission and Star Formation Rate Traced by Ionized Gas in NGC 628" *The Astrophysical Journal*, Volume 971, Issue 1, 115. Aug 2024. [ADS]

Gregg, B., Calzetti, D., and Heyer, M. "Mid- and Far-Infrared Color-Color Relations within Local Galaxies" *The Astrophysical Journal*, Volume 928, Issue 2, 120. April 2022. [ADS]

Other:

Correnti, M., Bortolini, G., Dell'Agli, F., … **Gregg, B.** et al. "FEAST: Probing the Stellar Population of the Starburst Dwarf Galaxy NGC 4449 with JWST/NIRCam" *The Astrophysical Journal*, Volume 990, Issue 1, 72. Sep 2025. [ADS]

Elmegreen, B., Calzetti, D., Adamo, A., … **Gregg, B.** et al. "An Investigation of Disk Thickness in M51 from Hα, Paα, and Mid-infrared Power Spectra" *The Astrophysical Journal*, Volume 986, Issue 1, 13. June 2025. [ADS]

Elmegreen, B., Adamo, A., Bajaj, V., … **Gregg, B.** et al. "Power Spectra of JWST images of Local Galaxies: Searching for Disk Thickness" *The Open Journal of Astrophysics*, Volume 8, 21. Feb 2025. [ADS]

Calzetti, D., Adamo, A., Linden, S., **Gregg, B.** et al. "JWST-FEAST: Feedback in Emerging extrAgalactic Star clusTers: Calibration of Star Formation Rates in the Mid-infrared with NGC 628" *The Astrophysical Journal*, Volume 971, Issue 1, 118. Aug 2024. [ADS]

Pedrini, A., Adamo, A., Calzetti, D., Bik, A., **Gregg, B.** et al. "FEAST: Feedback in Emerging extragAlactic Star ClusTers: JWST Spots Polycyclic Aromatic Hydrocarbon Destruction

in NGC 628 during the Emerging Phase of Star Formation" *The Astrophysical Journal*, Volume 971, Issue 1, 32. Aug 2024. [ADS]

Heyer, M., **Gregg, B.**, Calzetti, D. et al. "The Dense Gas Mass Fraction and the Relationship to Star Formation in M51" *The Astrophysical Journal*, Volume 930, Issue 2, 170. May 2022. [ADS]

Alberts, S., Adams, J., **Gregg, B.** et al. "Significant Molecular Gas Deficiencies in Star-forming Cluster Galaxies at z∼1.4" *The Astrophysical Journal*, Volume 927, Issue 2, 235. March 2022. [ADS]

Agarwal, D., Lorimer, D., Fialkov, A., … **Gregg, B.** et al. "A fast radio burst in the direction of the Virgo Cluster" *Monthly Notices of the Royal Astronomical Society*, Volume 490, Issue 1. Nov 2019. [ADS]

Observational Programs

2025 ALMA Cycle 12, 2025.1.00789.S, Co-I (PI: Helena Faustino Vieira)
Bridging the Gap between Molecular Gas and Emerging Young Stellar Clusters in NGC628

2023 JWST Cycle 2, GO-3503, Co-I (PI: Angela Adamo)
Mapping the rapidly evolving interstellar medium of emerging young star clusters

Honors & Awards

2024 NASA Massachusetts Space Grant Consortium Graduate Research Fellowship
4 awards. Summer 2019, Fall 2021, Summer 2022, Summer 2024. $24,100 total awarded.

2024 Mary Dailey Irvine Travel Grant
2 awards. Summer 2023, Spring 2024. $1,600 total awarded.

2024 NASA Massachusetts Space Grant Consortium Travel Grant, $500

2023 American Astronomical Society International Travel Grant, $2499

2018 Presidential Honors scholar WVU

2018 Outstanding Senior Award, Department of Physics & Astronomy WVU

2018 NASA West Virginia Space Grant Consortium Research Fellowship
2 awards. Fall 2017 and Spring 2018.

2016 Sigma Pi Sigma National Physics Honors society member

Talks

2024 Contributed Talk: "*JWST's view of PAH and ionized gas emission at parsec scales: Calibrating the 3.3 μm PAH as a SFR indicator*". The Physics and Impact of Astrophysical Dust: from Star Formation Through Cosmology. Aspen, CO. March 2024.

2023 Contributed Talk: "*Closing the gap: Calibrating the relation between 3.3 micron PAH emission and Star Formation Rate*". JWST Turns One: The Birth and Growth of Galaxies. Sesto, Italy. July 2023.

Workshops

2020 North American ALMA Science Center (NAASC) face-to-face visit for archival data reduction support. 1 week. Charlottesville, VA. March, 2020.

Teaching & Mentoring

2022 Secondary Instructor/ Lab lead. *Why do Stars come in Multi-Colors?* UMass-Amherst Department of Astronomy. Summer outreach course for public school STEM teachers. Led the instruction of multiple lab sessions and assisted in the instruction of the course.

2018/19 Lab/Lecture Teaching Assistant. *Astronomy 100: Exploring the Universe.* UMass-Department of Astronomy. 2 semesters total. Led the preparation and instruction of multiple lab sessions per week, graded, held office hours, proctored exams.

2018 Teaching Assistant. *Astronomy 330: Modern Cosmology.* UMass- Department of Astronomy. 1 semester.

2018 Counselor/Mentor. *The Pulsar Search Collaboratory.* West Virginia University at Green Bank Observatory. A national scientific outreach summer program and training camp run for high school students. 1.5 weeks. Led/mentored a group of students through the program.

Professional References

Daniela Calzetti
Distinguished Professor, University of Massachusetts Amherst
calzetti@astro.umass.edu, 413-545-2057

Angela Adamo
Associate Professor, Stockholm University
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Mark Heyer
Research Assistant Professor, University of Massachusetts Amherst
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