Benjamin Alan Gregg

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UAT keywords: Interstellar medium, star forming regions, JWST

Profile & Research Interests

Graduate student at the University of Massachusetts-Amherst, finishing PhD in Astronomy. Thesis involves analyzing Cycle 1 data from the James Webb Space Telescope (JWST), the new NASA flagship infrared space telescope, to study star formation and feedback processes across various nearby galaxy environments by observing the stellar, dust, and ionized gas emission around embedded, newly formed star clusters. Interested in understanding the complex interplay of star formation and its fuel source (molecular gas) in galaxies and how the local environment and feedback affect the star formation process and the composition of the interstellar medium (ISM) and how this regulates the evolution of galaxies over time. Highly experienced in analyzing multiwavelength image data from various telescopes/archives (JWST, HST, Spitzer, Herschel, ALMA, GALEX, 2MASS, UKIDSS, SDSS).

Education

2018	B.S., *Physics* Summa cum laude Minors: Mathematics, Astronomy	West Virginia University	Morgantown, WV
2025	In progress: Ph.D., *Astronomy* Graduation date: 9/01/2025 Advisor: Daniela Calzetti	University of Massachusetts-Amherst	Amherst, MA

Employment

Sep. 2018— current	Department of Astronomy, University of Massachusetts-Amherst *Graduate Student*, 2 semesters *Teaching Assistant*, 12 *Research Assistant*
March 2017—Sep. 2018	Department of Physics & Astronomy, West Virginia University *Undergraduate research assistant*

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:

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

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.

Selected Technical Skills

General Skills:
Science, Physics, Astronomy, Mathematics, Statistics, scientific writing, data analysis, coding (Python), analytical reasoning

System/Software Experience:
Linux, macOS, LATEX, numpy, scipy, matplotlib, astropy, photutils, SExtractor, CIGALE, GALFIT, SAOImage ds9, CASA

Observation/Reduction Experience:
HST, JWST, ALMA, VLA