

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 JWST, HST and various public archives (Spitzer, Herschel, ALMA, GALEX, 2MASS, UKIDSS, SDSS).

Education

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

Employment

Sep. 2018— current	Department of Astronomy, University of Massachusetts-Amherst <i>Graduate Student, 2 semesters Teaching Assistant, 10 Research Assistant</i>
March 2017—Sep. 2018	Department of Physics & Astronomy, West Virginia University <i>Undergraduate research assistant</i>

Publications

- 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. [\[ADS\]](#)
- 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. [\[ADS\]](#)
- 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. [\[ADS\]](#)
- Alberts, S., Adams, J., **Gregg, B.** et al. “Significant Molecular Gas Deficiencies in Star-forming Cluster Galaxies at $z \sim 1.4$ ” *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

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| 2023 | JWST Cycle 2, GO-3503, Co-I (PI: Angela Adamo)
<i>Mapping the rapidly evolving interstellar medium of emerging young star clusters</i> |
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Honors & Awards

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| 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

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| 2024 | Contributed Talk: “ <i>JWST's view of PAH and ionized gas emission at parsec scales: Calibrating the 3.3 μm PAH as a SFR indicator</i> ”. The Physics and Impact of Astrophysical Dust: from Star Formation Through Cosmology. Aspen, CO. March 2024. |
| 2023 | Contributed Talk: “ <i>Closing the gap: Calibrating the relation between 3.3 micron PAH emission and Star Formation Rate</i> ”. JWST Turns One: The Birth and Growth of Galaxies. Sesto, Italy. July 2023. |

Workshops

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

Software Experience:

Python, numpy, scipy, matplotlib, astropy, photutils, SExtractor, CIGALE, GALFIT, SAOImage ds9, CASA, LATEX

Observation/ Reduction Experience:

HST, JWST, ALMA, VLA