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## EDUCATION

2024      PhD, Astronomy, Boston University  
2020      MA, Astronomy, Boston University  
2018      BS, Physics, Rochester Institute of Technology

## POSITIONS

2025–pres.    Assistant Professor  
                 Department of Physics, Adelphi University  
2026-pres.    Affiliate Faculty  
                 Department of Physics, Northeastern University  
2024–2025    Future Faculty Postdoctoral Fellow  
                 Department of Physics, Northeastern University

## PUBLICATIONS

### Refereed Journal Articles

- 2026    Void Galaxies and Active Galactic Nucleus Activity in ZOBOV-identified TNG300 Voids from  $z = 3$  to  $z = 0$ . Curtis, O., **McDonough, B.**, Brainerd, T. *The Astrophysical Journal*, 998, 325. DOI: [10.3847/1538-4357/ae2f48](https://doi.org/10.3847/1538-4357/ae2f48)
- 2025    Measuring Scaling Relations: Fitting Technique Matters. **McDonough, B.**, Curtis, O., Brainerd, T. *The Astrophysical Journal Letters*, 986, L32. DOI: [10.3847/2041-8213/ade13c](https://doi.org/10.3847/2041-8213/ade13c)
- 2025    Density Profiles of TNG300 Voids across Cosmic Time. Curtis, O., **McDonough, B.**, Brainerd, T. *The Astrophysical Journal*, 985(2), 244. DOI: [10.3847/1538-4357/adcebf](https://doi.org/10.3847/1538-4357/adcebf)
- 2025    Effects of intrinsic and environmental factors on the distribution of star formation in TNG100 galaxies. **McDonough, B.**, Curtis, O., Brainerd, T. *The Astrophysical Journal*, 978(1), 67. doi: [10.3847/1538-4357/ad9747](https://doi.org/10.3847/1538-4357/ad9747)
- 2024    Properties of voids and void galaxies in the TNG300 simulation. Curtis, O., **McDonough, B.**, Brainerd, T. *The Astrophysical Journal*, 962(1), 58. doi: [10.3847/1538-4357/ad18b4](https://doi.org/10.3847/1538-4357/ad18b4)
- 2023    Resolved star formation in TNG100 central and satellite galaxies. **McDonough, B.**, Curtis, O., Brainerd, T. *The Astrophysical Journal*, 958(1), 19. doi: [10.3847/1538-4357/acfe0b](https://doi.org/10.3847/1538-4357/acfe0b)
- 2023    The discovery of a supermassive black hole at the center of the Milky Way galaxy. (Editor's Pick)

- McDonough, B.**, & Withers, P.  
*American Journal of Physics*, 91(5), 386–386. doi:[10.1119/5.008622](https://doi.org/10.1119/5.008622)
- 2022 The Distribution of Satellite Galaxies in the IllustrisTNG100 Simulation.  
**McDonough, B.**, & Brainerd, T. G.  
*The Astrophysical Journal*, 933(2), 161. doi:[10.3847/1538-4357/ac752d](https://doi.org/10.3847/1538-4357/ac752d)
- 2020 Modeling the Infrared Reverberation Response of the Circumnuclear Dusty Torus in AGNs: An Investigation of Torus Response Functions.  
 Almeyda, T., Robinson, A., Richmond, M., Nikutta, R., & **McDonough, B.**  
*The Astrophysical Journal*, 891(1), 26. doi:[10.3847/1538-4357/ab6aa1](https://doi.org/10.3847/1538-4357/ab6aa1)

## Pending Manuscripts

\* Underlines indicate a mentored student

- In press A High-Mass Size Deficit for Void Galaxies in the Complete SDSS DR7.  
 Curtis, O., **McDonough, B.**, Brainerd, T. *Resub. to The Astrophysical Journal following review*
- Under Review Lensing-Reconstructed Dark Matter-Intracluster Medium Coherence as a Probe of Cluster Dynamical State: Application to HSTFF, RELICS, and CLASH Clusters. Cerini, G., Saha, S., McCleary, J., Habjan, E., Cappelluti, N., Natarajan, P., Khizroev, S., Rhodes, J., Huff, E., Chidester, N., Amit, M., Robertson, A., **McDonough, B.**, Bellomi, E., Lau, E.T., ZuHone, J.  
*Sub. to The Astrophysical Journal*
- Under Review Understanding the regulation of star formation within TNG100 galaxies on kpc-scales using machine learning I: Global versus local. **McDonough, B.**, Iyengar, S., Brew-Smith, A., Bluck, AFL, Piotrowska, J. *Sub. to The Astrophysical Journal*
- In prep Mass–Gas Power Ratios May Probe Dark Matter Self-Interactions.  
Habjan, E., McCleary, J., **McDonough, B.**, Cerini, G., Robertson, A. To be submitted to *The Astrophysical Journal*
- In prep Painting dust onto TNG300 I: Large-scale distribution of circumgalactic dust. **McDonough, B.** & McCleary, J. To be submitted to *The Astrophysical Journal*

## Conference Proceedings and Unrefereed Articles

\* Underlines indicate a mentored student

- 2025 Magnetic fields of satellite galaxies stronger than comparable centrals in TNG100. **McDonough, B.**, Poulin, A.  
*Research Notices of the AAS*, 9(4), 93. DOI: [10.3847/2515-5172/adce74](https://doi.org/10.3847/2515-5172/adce74)
- 2024 The Distribution of Satellites in the TNG100 Simulation based on Time Spent in Halo. **McDonough, B.**, DSouza, R.,  
*Research Notices of the AAS* 8(5), 148. DOI: [10.3847/2515-5172/ad50d7](https://doi.org/10.3847/2515-5172/ad50d7)
- 2020 Red Satellite Galaxies: Best Tracers of Host Mass Distribution in the Illustris-TNG100 Simulation. **McDonough, B.**, & Brainerd, T.  
*American Astronomical Society meeting abstracts #236* (Vol. 236, p. 245.01).
- 2020 Energetic Proton Precipitation in Jupiter’s Inner Magnetosphere Using Juno Observations. Shen, X., **McDonough, B.**, Li, W., & Ma, Q.  
*AGU fall meeting abstracts* (Vol. 2020, SM052–0006).

- 2019 Monsters on the move: A search for supermassive black holes undergoing gravitational wave recoil. Jadhav, Y., Robinson, A., Lena, D., & **McDonough, B.** *American astronomical society meeting abstracts #233* (Vol. 233, p. 116.02).

### **Web-Based Publications**

- 2022 Applying UDL in Lab and Discussion Sections. **McDonough, B.**  
*BU Center for Teaching and Learning*
- 2021 Including Diverse Role Models in STEM Curricula. **McDonough, B.**  
*BU Center for Teaching and Learning*

A total of 13 journal article summaries and general articles for *Astrobit*es, including:

- 2020 How to Quench a Galaxy. **McDonough, B.**
- 2019 Modeling Supernovae Feedback as a Galactic Fountain. **McDonough, B.**
- 2019 Hide and Seek with Satellite Galaxies. **McDonough, B.**

## **TEACHING EXPERIENCE**

### **Adelphi University**

- Physics for Science Majors I (Fall 2025)
- Physics for Science Majors II (Spring 2026)
- Physics for Science Majors II, Lab (Spring 2026)
- College Physics I, Lab (Fall 2025)
- Numerical Methods for Scientists and Engineers (Spring 2026)

### **Boston University**

- The Solar System (**Instructor of Record**: Summer 2023; Head TF: Spring 2023; TF: Spring 2022, Fall 2019, 2022)
- Cosmic Controversies (Head TF: Spring 2023, Fall 2022; TF: Spring 2019)
- Alien Worlds (Fall 2020)
- Cosmology (Fall 2023)
- Principles of Astronomy I - majors course (Head TF: Fall 2022)
- Principles of Astronomy II - majors course (Head TF: Spring 2023; TF: Spring 2020)

### **Rochester Institute of Technology**

- College Physics I (TA: Spring 2015)
- Introduction to Special Relativity (Learning Assistant: Fall 2016)
- University Physics I (LA: Fall 2015, Spring 2016, 2017)
- University Physics II (LA: Fall 2017, Spring 2018)

## **AWARDS**

- 2024 Susan K. Jackson Award. *College of Arts and Sciences, BU*
- 2020 Outstanding Teaching Fellow Award. *Department of Astronomy, BU*
- 2018 Physics Undergraduate Research Scholar. *College of Science, RIT*
- 2018 John Wiley Jones Outstanding Student in Science Award *College of Science, RIT*
- 2017 RIT Physics Achievement Award. *School of Physics and Astronomy, RIT*
- 2017 Outstanding TA/LA Award. *School of Physics and Astronomy, RIT*

## **AWARDED GRANTS AND FELLOWSHIPS**

- 2024 Future Faculty Postdoctoral Fellowship, *ADVANCE Office, NEU*
- 2024 Dean's Postdoctoral Travel Awards (\$1000), *College of Science, NEU*
- 2023 Professional Development Grant, *BU GWiSE*
- 2022 Summer Consultant (\$1000). *Center for Teaching and Learning, BU*
- 2022 Professional Development Grant, *BU GWiSE*
- 2021 Graduate Fellowship (\$5000). *Massachusetts Space Grant Consortium*
- 2021 Professional Development Grant, *BU GWiSE*
- 2020 Professional Development Grant, *BU GWiSE*
- 2018 Dean's Fellowship, *College of Arts and Sciences, BU*
- 2017 REU in Multimessenger Astrophysics. *RIT, National Science Foundation*

## **INVITED TALKS**

- 2024 Intrinsic and environmental effects on the distribution of star formation in TNG100 central and satellite galaxies. Feb. 9. *Smith College Department of Physics, Northampton, MA*
- 2022 Resolved star formation in TNG100 galaxies: A kpc-scale test of feedback Models. Dec. 12. *Hernquist Group, Harvard-Smithsonian Center for Astrophysics, Harvard, Cambridge, MA*
- 2022 Testing Feedback Models: Resolved Star Formation in Simulated TNG100 Galaxies. Oct. 14. *Astronomy Seminar at Tufts University, Medford, MA*
- 2020 The Distribution of Satellite Galaxies in the Illustris-TNG Simulation. Mar. 2. *Brown Bag Lunch, Massachusetts Institute of Technology Kavli Institute, Cambridge, MA*

## **CONFERENCES**

### **Invited**

- 2024 The discovery of a supermassive black hole at the center of the Milky Way galaxy. (Jan. 6–9) *American Association of Physics Teachers Winter Meeting, New Orleans, LA*

### **Contributed**

- 2026 Automating the process of adding quiz questions to learning management systems using LLMs. (Jul. 19-22) McDonough, B. *American Association of Physics Teachers Summer Meeting, Pasadena, CA.*
- 2025 Poster: Post-Processed Dust Density in TNG100 (Jul. 14-18) *Cosmic Cartography with Roman: Advances in Galaxy Structures, Distributions, Dark Matter, and Dark Energy, Space Telescope Science Institute, Baltimore, Md.*  
DOI: [10.5281/zenodo.17502226](https://doi.org/10.5281/zenodo.17502226)
- 2024 Applying Universal Design for Learning in Physics: Language & Symbols. (Jul. 6–10) *American Association of Physics Teachers Summer Meeting, Boston, MA.*  
DOI: [10.5281/zenodo.13936836](https://doi.org/10.5281/zenodo.13936836)
- 2024 Effects of Intrinsic and Environmental Processes on the distribution of star formation in TNG100 galaxies. (Apr. 15–19) *STScI's Annual Spring Symposium:*

*Recipes to Regulate Star Formation at All Scales: From the Nearby Universe to the First Galaxies, Baltimore, MD*

- 2024 Effects of intrinsic and environmental factors on the distribution of star formation in TNG100 galaxies. (Jan. 7–11) *243rd meeting of the American Astronomical Society, New Orleans, LA*
- 2023 Poster: Applying UDL in Lab and Discussion Sections. (Mar. 13–15) *Universal Design for Learning - Implementation and Research Network Summit, Online*. DOI: [10.5281/zenodo.13936875](https://doi.org/10.5281/zenodo.13936875)
- 2020 Poster: Red Satellite Galaxies: Best Tracers of Host Mass Distribution in the Illustris-TNG100 Simulation. (June 1–3) *236th meeting of the American Astronomical Society, Online*
- 2018 Determining the Size and Structure of the AGN Dusty Torus. (Jan. 12–14) *Conference for Undergraduate Women in Physics, RIT, NY*

### **Workshops Facilitated**

- 2024 Exploring ILLUSTRIS-TNG simulations to derive observationally-comparable star formation rates. (Apr. 19) *STScI's Annual Spring Symposium: Recipes to Regulate Star Formation at All Scales: From the Nearby Universe to the First Galaxies, Baltimore, MD*

### **MENTORING & ADVISING EXPERIENCE**

- 2026 Joseph Poplardo, *Calhoun High School*. HS student.
- 2026- Aleeza Ahmed, *Adelphi University*. Undergraduate student.
- 2026- Niharika Nirankari, *Adelphi University*. Undergraduate student.
- 2026- Maylin Cage, *Adelphi University*. Undergraduate student.
- 2026- Krystal Patel, *Adelphi University*. Undergraduate student.
- 2026 Mariane Diby, *Adelphi University*. Undergraduate student.
- 2024- Eric Habjan, *Northeastern University*. PhD student.
- 2025-2026 Sathvika Iyengar, *Northeastern University*. Postbaccalaureate.
- 2024-2026 Alexander Poulin, *Northeastern University*. Undergraduate student.
- 2024-2025 Ansa Brew-Smith, *Northeastern University*. Undergraduate student.
- 2023-2024 Reuben Dsouza, *Boston University*. Undergraduate student.

### **SERVICE**

#### **University**

- 2026 Student Spaceflight Experiment Program Mentor, Adelphi University
- 2026-Pres. Student Advising

#### **Software**

ScaleRPy: for measuring scaling relations using the ridge line technique  
<https://github.com/bryannemcd/ScaleRPy>

#### **Journals**

*AIP Advances*, anonymous peer reviewer  
*American Journal of Physics*, anonymous peer reviewer

*Journal of Emerging Investigators*, Associate Editor and Reviewer (2023-2025)

### **Leadership**

Writing group for cosmology & astrophysics, *Northeastern University, Boston, MA*  
Organizer and lead (2024-present)

Graduate Women in Science and Engineering, *Boston University, Boston MA*  
Communications Director (2022-2024)  
President (2021–2022)  
Vice President (2020–2021)  
Social Co-Chair (2019–2020)  
Book Club Coordinator (2022–2024)

Women as Leaders in Astronomy, *Boston University, Boston, MA*  
Co-organizer (2020–2022)

Society of Physics Students, *Rochester Institute of Technology, Rochester, NY*  
Executive Board Member (2016–2018)

Reporter (student magazine), *Rochester Institute of Technology, Rochester, NY*  
Print Managing Editor (2016–2018)

House of General Science, *Rochester Institute of Technology, Rochester, NY*  
Executive Board Member (2014–2016)

College of Science, *Rochester Institute of Technology, Rochester, NY*  
Student Advisory Board (2014–2015)

### **Outreach**

“Research Opportunities in Galaxy Evolution Using Simulations” talk for the Society of Physics Students. (Oct. 2024), *Northeastern University, Boston MA*

Skype a Scientist, K-12 outreach calls (2019–2022), *Online*

Public Open Nights at the Observatory, volunteer (2018–2019, 2021), *Boston University, Boston, MA*

Astrobit.es, writer and editor (2019–2021), *Online*

Moon Landing 50th: One Giant Anniversary, volunteer (July 2019), *Museum of Science, Boston, MA*

ImagineRIT, exhibitor (2015, 2016, 2017, 2018), *Rochester Institute of Technology, Rochester, NY*

### **Open Educational Resources**

Active Learning Worksheets to Pair with Openstax Astronomy (2023).

<https://oercommons.org/courseware/lesson/107811>

### **ADDITIONAL TRAINING**

#### **Courses and Workshops**

2024 Open Science 101, NASA (online).

2024 Inclusive Astronomy Education: Bridging Gaps for Diverse Learners (Jan. 6), New Orleans, LA. *Workshop led by Big Astronomy*

2021 XSEDE Summer HPC Boot Camp (June 8–11), Virtual  
*Introduction to major tools used in parallel computing*

2021 Teaching and Learning in the Diverse Classroom, CornellX (online).

*Self-paced online course, completed with learning community at BU Center for Teaching and Learning*

2015 STEM Education: Research and Practice, Rochester Institute of Technology  
*2-credit course in STEM pedagogy*

**Conferences**

2023 SACNAS National Diversity in STEM Conference (Oct. 26–28), *Portland, OR*

2022 UDL in Higher Education Digicon - A UDL Makerspace (Oct. 18-20), *Virtual*

2022 Universal Design for Learning - Implementation and Research Network Summit  
(Mar. 31–Apr. 1), *Virtual*