

CURRICULUM VITAE

GIANNI SIMS

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EDUCATION

PhD in Physics

Florida Atlantic University, Boca Raton, FL

August 2021 - Present

B.S. Astrophysics Major with Philosophy Minor

The Pennsylvania State University, State College, PA

August 2017 - May 2021

High School Diploma in Vocal

Fiorello H. LaGuardia High School of Music and Art and Performing Arts, New York, NY

June 2017

RESEARCH EXPERIENCE

Florida Atlantic University – Boca Raton, FL

Research Assistant with Dr. Vicki Sarajedini

May 2022 – Present

Thesis Title: Seeding Supermassive Black Holes

- The formation of supermassive black holes (SMBHs) is a key open problem in galaxy evolution, with light and heavy seeding models predicting distinct black hole occupation fractions (BHOFs). We use multiwavelength observations from the LSST Deep Drilling Fields to measure the AGN occupation fraction and estimate the BHOF at $z < 1$. By applying a hierarchical Bayesian model, we find that the corrected AGN fraction peaks near $10^{11} M_{\odot}$ and declines at lower masses, favoring heavy seed scenarios for massive galaxies. These results provide new observational constraints on SMBH seeding and highlight the value of combining deep extragalactic surveys with probabilistic modeling.

Key References:

- Greene, J. E. "Low-mass black holes as the remnants of primordial black hole formation," *Nature Communications*, vol. 3, no. 1, p. 1304, 2012.
- Greene, J. E., Strader, J., and Ho, L. C. "Intermediate-mass black holes," *Annual Review of Astronomy and Astrophysics*, vol. 58, no. 1, pp. 257–312, 2020.
- Miller, B. P., Gallo, E., Greene, J. E., Kelly, B. C., Treu, T., Woo, J.-H., and Baldassare, V. "X-ray constraints on the local supermassive black hole occupation fraction," *The Astrophysical Journal*, vol. 799, no. 1, p. 98, 2015.
- Ricarte, A., and Natarajan, P. "The observational signatures of supermassive black hole seeds," *Monthly Notices of the Royal Astronomical Society*, vol. 481, no. 3, pp. 3278–3292, 2018.

- Volonteri, M., Lodato, G., and Natarajan, P. "The evolution of massive black hole seeds," *Monthly Notices of the Royal Astronomical Society*, vol. 383, no. 3, pp. 1079–1088, 2008.
- Weaver, J. R., Kauffmann, O. B., Ilbert, O., McCracken, H. J., Moneti, A., Toft, S., Brammer, G., Shuntov, M., Davidzon, I., Hsieh, B.-C., et al. "Cosmos2020: a panchromatic view of the universe to $z = 10$ from two complementary catalogs," *The Astrophysical Journal Supplement Series*, vol. 258, no. 1, p. 11, 2022.
- Zou, F., Brandt, W. N., Chen, C.-T., Leja, J., Ni, Q., Yan, W., Yang, G., Zhu, S., Luo, B., Nyland, K., et al. "Spectral energy distributions in three deep-drilling fields of the *verita* c. rubin observatory legacy survey of space and time: Source classification and galaxy properties," *The Astrophysical Journal Supplement Series*, vol. 262, no. 1, p. 15, 2022.
- Zou, F., Brandt, W. N., Ni, Q., Zhu, S., Alexander, D. M., Bauer, F. E., Chen, C.-T. J., Luo, B., Sun, M., Vignali, C., et al. "Identification and characterization of a large sample of distant active dwarf galaxies in xmm-sz," *The Astrophysical Journal*, vol. 950, no. 2, p. 136, 2023.

The Pennsylvania State University – University Park, PA October 2018 – May 2021
Undergraduate Research Assistant with Dr. Martin Bojowald

- Gathered information on loop quantum gravity
- Summarize, interpret, and gathered information
- Consulted and theorized findings with research professor
- Calculated the equations of motions from Poisson's brackets
- Treating quantum fluctuations as small perturbations and create space-time model mathematically describe quantum fluctuation
- Currently pre-published a copy of the research paper

The Intrepid Museum – New York, NY December 2016 – June 2017
Research Intern with Dr. Jennifer Haghpanah

- Team member of a college-level research group.
- Conducted experiments and recorded research.
- Participated in planning meetings.
- Performed online research: into food chemistry comparing two proteins used in food (Bovine Albumin Serum and Casein) and effects on spices.

WORK EXPERIENCE

Onaketa Tutors August 2022 - Present
Mid-Level Math Tutor

- Tutoring mid-level math courses online towards under-served students of color.
- Mentoring under-served students of color to encourage their goal in mastering STEM topics.

Florida Atlantic University – Boca Raton, FL August 2021 - Present
Laboratory Teaching Assistant

- teaching General Physics Lab 1 (Physics 2048L) and General Physics Lab 2 (Physics 2049L) courses
- provide 30 minute lecture before students perform experiments
- grade various assignments including lab reports and quizzes
- assessing student performances

The Pennsylvania State University – University Park, PA August 2020 - May 2021
Resident Assistant

- assist and engage with residents to develop a meaningful community
- educate residents about their role to abide by university regulations and policies
- Understand, abide by, and enforce all University regulations and policies in a fair and consistent manner.
- Conduct rounds of the assigned housing area in accordance with protocol.

The Pennsylvania State University – University Park, PA June 2020 - August 2020
LEAP Mentor

- Mentors plan social and academic virtual programming for their pride throughout the summer.
- Attend weekly virtual staff meetings, participate in evening and weekend virtual activities, attend one information session and attend mandatory Summer Mentor Training from June 25-28.

The Intrepid Museum – New York, NY May 2019 - August 2019
Membership Intern

- Assisting Membership team with day to day activities, including members-only events, Box Office assistance, and programs during Museum festivals.
- Working with IA Coordinator on data cleanup in our database, Tessitura.

The Intrepid Museum – New York, NY June 2018 - July 2018
Special Events Intern

- Assist with the coordination of office organizational projects including inventory management while updating current team templates, event folders and digital files
- Provide administrative support for the Event Sales Managers in the following areas: telephone calls, emails and filing
- Conduct research on venues, new vendors, potential clients, trends and other subjects as needed

The American Museum of Natural History – New York, NY November 2015 - August 2017
SALTZ Intern

SALTZ Intern

- Presented and explained museum artifacts to visitors.
- Conducted experiments and explained outputs to visitors.

PROFESSIONAL DEVELOPMENT

LSST Data Science Fellowship Program May 2025 - Present
LSST Data Science Fellow

- Being taught essential skills for dealing with the large data set produced by the Vera C. Rubin Observatory's LSST.
- Having a wide range of essential skills including managing and building code, statistical analysis, machine learning, scalable programming, data management, image processing, and visualization.
- The program consists of six one-week schools over two years each at a different host university.

Lead Student Networking Session at the NSBP-NSHP Conference November 20 2025

- At the National Society of Black Physicists (NSBP) Conference, students can network by getting to know each other
- Helped advertise mentoring opportunities in the NSBP organization

Exhibitor for STEMNoire Conference

June 26 2025 - June 29 2025

- I represented the National Society of Black Physicists organization
- engaging with other attendees by sharing resources and answering questions about the organization

HONORS AND AWARDS

ARISTA National Honors Society, Fiorello H. LaGuardia High School of Music and Art and Performing Arts 2017

Japanese Honors Society, Fiorello H. LaGuardia High School of Music and Art and Performing Arts 2015

One-time GTA award, Florida Atlantic University December 2022

Black in Astro Travel Grant, Black in Astro June 2023, May 2024

PUBLISHED WORKS

Källan Berglund, Martin Bojowald, Manuel Diaz, and Gianni Sims, *Quasiclassical Solutions for Static Quantum Black Holes* January 2024

MEDIA AND PUBLIC ENGAGEMENT

Sims, G. (2025). Featured in *Black Space Week: Black In Astro community feature*. *Nature Astronomy*. <https://doi.org/10.1038/s41550-025-02581-z> (June 2025)

SCIENTIFIC TALKS

Conferences Attended

NEXUS Workshop through the National Society of Black Physicists (August 2022)

Advancing Graduate Leadership Conference (August 2022)

The Conference for Undergraduate Underrepresented Minorities in Physics (January 2021)

The Conference for Undergraduate Women in Physics (January 2020)

The National Society of Black Physicists (November 2019, November 2021, November 2022, November 2023, November 2024, November 2025)

American Astronomical Society (June 2023, January 2025)

Black in Astro Space Week, Virtual (June 2023, June 2024)

STEMNoire Conference (June 2025)

Conferences Presented

American Astronomical Society (June 2023, January 2025)

Black in Astro Space Week, Virtual (June 2023, June 2024)
The National Society of Black Physicists (November 2023)

Colloquium

Panelist for the Colloquium from the Physics and Astronomy for Women's Club (PAW+) and the Climate Committee (September 2020)
Guest Speaker at the University of Pittsburgh (February 12, 2026)
Guest Speaker at the College of the Holy Cross (March 27, 2026)

EXTRA-CURRICULAR

Student Council Member of the National Society of Black Physicists May 2024 - Present
Member of Black in Astro June 2023 - Present
Member of the American Astronomical Society June 2023 - Present
Member of The National Society of Black Physicists, member of NeXus September 2021- Present
Professional Development Chair of The Physics and Astronomy for Women Club (PAW +), The Pennsylvania State February 2020 - May 2021
Member of Creative Writing Club, The Pennsylvania State January 2019 - May 2021
Co-President of The Scientific Method Club Workshop Leader, LaGuardia High School September 2015 - June 2017

VOLUNTEER

Volunteer for Pumpkin Drop Event, Florida Atlantic University October 2025
APS IF funded study, "Journey to a PhD through the lens of Black women in Physics", American Physical Society, American Physical Society August 2023- November 2023
Science Olympiad Volunteer, Florida Atlantic University October 2021
Middle School Math Tutor, New York Cares January 2020
Beautifier of Inwood Park, New York Cares July 2018, May 2019
Career Fair Helper, Penn State August 2017
Expeditior, Susan G. Komen September 2016
Meal Server, New York Cares March 2016 - April 2016

TECHNICAL SKILLS

Python, Mathematica, C/C++, \LaTeX