ANTONIO J. PORRAS-VALVERDE

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EDUCATION

Vanderbilt University August 2018 - May 2023
Dept. of Physics and Astronomy. Doctor of Philosophy in Astrophysics *Nashville, TN*

· Advisors: Prof. Kelly Holley-Bockelmann and Andreas Berlind
· Dissertation title: Understanding the Role of Angular Momentum and Supermassive Black Holes in Shaping Present-Day Galaxies

Fisk University August 2016 - August 2018
Dept. of Life and Physical Sciences. Master of Arts in Physics *Nashville, TN*

· Advisors: Prof. Andreas Berlind and Kelly Holley-Bockelmann

University of North Carolina August 2012 - May 2015
Dept. of Mathematics. Bachelor of Arts in Mathematics *Chapel Hill, NC*

· Advisor: Prof. Laura Miller, fluid dynamics research project

PRIMARY RESEARCH INTERESTS

Black hole seeding, accretion, and feedback, galaxy formation and evolution

APPOINTMENTS

Yale University July 2025 - Present
NSF Astronomy & Astrophysics Postdoctoral Fellow *New Haven, CT*

· Connected horizon-scale magnetic suppression to galaxy formation, reproducing local and high-redshift black hole populations.

Yale University August 2023 - July 2025
Heising-Simons Postdoctoral Fellow *New Haven, CT*

· Quantified SMBH growth channels and showed BH mass scatter constrains AGN feedback through galaxy quenching signatures.

Vanderbilt University August 2018 - May 2023
Graduate Research Assistant *Nashville, TN*

· Demonstrated halo mass drives galaxy morphology and studied galaxy-halo connection using Dark Sage

Flatiron Institute Center for Computational Astrophysics August 2021 - May 2022
Pre-doctoral Fellowship *New York, NY*

· Provided constrains for the scatter in the stellar-to-halo mass relation

National Radio Astronomy Observatory Summer 2016
Undergraduate Researcher, REU Student *Charlottesville, VA*

· Analyzed VLA data to estimate the star formation rate for NGC 6240

National Radio Astronomy Observatory Summer 2015
Undergraduate Researcher, REU Student *Socorro, NM*

· Studied binary supermassive black holes using VLBA

University of North Carolina Summer 2014
Undergraduate Researcher, REU Student *Chapel Hill, NC*

· Modelled jellyfish swimming and published in the journal of fluid dynamics: Pump or coast: the role of resonance and passive energy recapture in medusan swimming performance

University of Toledo Summer 2012
Undergraduate Researcher, REU Student *Toledo, OH*

· Studied diffuse molecular clouds in the interstellar medium

GRANTS AND AWARDS

NSF Astronomy & Astrophysics Postdoctoral Fellowship ($330,000) July 2025

Simons Foundation ($1.2M) May 2025

IAU Office for Astronomy Development (€21,000) August 2022

Heising-Simons Foundation Travel Award ($2,000) August 2022

APS Travel Award for Excellence in Graduate Research ($1,000) August 2018

Vanderbilt University Graduate Student Travel award ($500) Summer 2019

Vanderbilt University McMinn Summer Research Award ($2000) Summer 2018

HONORS

International Astronomical Union Development Prize June 2024

Vanderbilt Basic Sciences' Hispanic and Latin Heritage Month Award October 2022

NSF Graduate Research Fellowship Program, Honorable Mention April 2016

STUDENTS

Shashank Dattathri (Yale University), PhD candidate August 2024 - Present

Riddhi Patel (Fisk University), Master's student October 2025 - Present

Christian Aju (U. San Carlos de Guatemala), Senior undergraduate student August 2022 - Present

Jerry Li (Yale University), Senior undergraduate student January 2024 - Present

Luis Otero (Lycoming College), Junior undergraduate student June 2025 - Present

Julia Levy (Yale University), Senior undergraduate student January 2025 - June 2025

Tina Teik (Yale University), Senior undergraduate student August 2024 - December 2024

TEACHING EXPERIENCE

Central America-Caribbean Bridge Program June 2016 - present

· Give computational, professional development, and research workshops.

Yale University November 2024
Guest lecture on Malena Rice's class *New Haven, CT*

· Presented on how simulations and semi-analytic models can be used in research

Yale University October 2023
Guest lecture on Meg Urry's class *New Haven, CT*

· Presented on black hole formation and growth modeling

Vanderbilt University August 2018 - May 2020
Teaching Assistant *Nashville, TN*

· Instructed introduction to astronomy lab class for about 20 students. Held weekly office hours.

Carrboro Elementary School October 2015 - May 2016
Teaching Assistant *Carrboro, NC*

· Work forty hours a week grading assignments and providing instructional support to students in third and fourth grade bilingual class.

M and M Tutoring Services October 2015 - May 2016
Spanish and Calculus Tutor *Chapel Hill, NC*

· Work three hours a week tutoring high school students in Spanish, Pre-Calculus, and Calculus.

Estes Hills Elementary School January 2016 - May 2016
After school Tutor *Chapel Hill, NC*

· Work eight hours a week helping underrepresented minorities in third through fifth grade improve in math and vocabulary skills.

COLLOQUIA AND INVITED TALKS

NSBP/NSHP Student Leadership Development Summit August 2025

· Keynote speaker, "Vision Mapping and Funding: Crafting your Leadership Legacy"

Yale University April 2025

· Astronomy Colloquium, "Forging Giants: how galactic growth ties to supermassive black hole mass assembly"

University of Toledo April 2025

· Colloquium, "Building impact from the ground up"

NSF Astronomy & Astrophysics Postdoctoral Fellowship Symposium January 2025

· Keynote speaker, "Building impact from the ground up"

University of Massachusetts Amherst November 2024

· Colloquium, "Forging Giants: how galactic growth ties to supermassive black hole mass assembly"

National Radio Astronomy Observatory October 2023

· National Astronomy Consortium. Keynote speaker, "Finding community through surrounding networks"

ADDITIONAL TALKS

Conference Talks

Cambridge University September 2025

· Massive Black Holes across Cosmic Time. Poster, "Tracing the mass assembly of SMBHs"

University of Texas at Austin May 2025

· Inaugural Cosmic Frontier Center. Poster, "Tracing the mass assembly of SMBHs"

Yale University October 2024

· Inaugural Tinsley workshop. Talk, "Mass Assembly of SMBHs from semi-analytic predictions"

Center for Computational Astrophysics December 2023

· Black Holes on Broadway. Talk, "Exploring the mass assembly histories for M87* and Sagitarius A*-like black holes"

BEXCO Busan August 2022

· 31th International Astronomical Union General Assembly in Busan, South Korea. Poster, "Why do SAMs and Sims Disagree on Stellar Mass - Halo Mass Scatter?"

University of Western Australia February 2020

· European Southern Observatory 2nd ESO-Australia. Talk, "Morphology and Color comparison in the Stellar-to-Halo mass relation"

University of California at Santa Cruz August 2019

· 2019 Santa Cruz Galaxy Workshop. Poster, "Exploring the angular momentum connection to galaxy morphology in the SAM Dark Sage"

Universitat Wien August 2018

· 30th International Astronomical Union General Assembly in Vienna, Austria. Poster, "Role of Halo Spin and Environment in Shaping Galaxy Morphology"

American Astronomical Society

· 245th Meeting in January 2025, Washington D.C. Talk, "A connection between the scatter in black hole mass and the stellar mass function for central quenched galaxies"

· 235th Meeting in January 2020, Honolulu, HI. Talk, "Central American - Caribbean Bridge in Astrophysics" and poster, "Stellar-to-halo mass relation: comparing galaxy quenching and morphological transformations using cosmological simulations."

· 233th Meeting in January 2019, Seattle, WA. Talk, "Dissecting the Anatomy of Bulge and Disk Dominated Galaxies through DARK SAGE."

· 229th Meeting in January 2017. Poster, "High Resolution 33 GHz Observations of Embedded Star Formation in NGC 6240"

· 227th Meeting in January 2016. Poster, "Observing Recently Merged Galaxy 1015+364 at 2.3 and 8.5 GHz"

Seminar Talks

Black Hole Initiative March 2024

· Lunch talk, "Tracing the mass assembly history of local central SMBHs"

Yale University November 2023

· Cosmology Seminar talk, "Why do semi-analytic models predict higher scatter in the stellar mass-halo mass relation than cosmological simulations?"

Space Telescope Science Institute December 2022

· Lunch talk, "What causes such large stellar mass scatter within the stellar-to-halo mass relation in semianalytic model Dark Sage?"

Harvard ITC, Center for Astrophysics November 2022

· Lunch talk, "What causes such large stellar mass scatter within the stellar-to-halo mass relation in semianalytic model Dark Sage?"

Stanford KIPAC October 2022

· Tea talk, "Why do SAMs and Sims Disagree on the Stellar Mass - Halo Mass Scatter?"

Massachusetts Institute of Technology February 2022

· Brown Bag Lunch talk, "What causes such large stellar mass scatter within the stellar-to-halo mass relation in semianalytic model Dark Sage?"

Kansas University November 2021

· Space Seminar, "What causes such large stellar mass scatter within the stellar-to-halo mass relation in semianalytic model Dark Sage?"

Princeton University October 2021

· Galread Seminar, "Angular momentum and Morphological Sequence of Massive Galaxies through Dark Sage"

Flatiron Institute Center for Astrophysics May 2021

· Galaxy Evolution Theory group, "Exploring galaxy quenching using the stellar-to-halo mass relation"

University of Western Australia January 2020

· Seminar, "Stellar-to-Halo mass relation: galaxy quenching vs. morphological transformations"

University of Costa Rica June 2019

· Physics symposium: "Disección de la anatomía de una secuencia morfológica masiva de galaxias a través del modelo semianalítico Dark Sage"

Public Talks

Instituto Tecnologico de Costa Rica November 2025

· Virtual, "Como modelar la co-evolucion de agujeros negros y sus galaxias en simulaciones cosmologicas"

Leitner Family Observatory & Planetarium October 2024

· Spanish night star tour

Yale University September 2024

· Postdoctoral Association Talk, "The Secret Lives of Black Holes and their Host Galaxies"

Universidad de Nacional Autonoma de Santo Domingo August 2023

· Virtual talk, "Que puedo hacer con una carrera en astrofisica?"

Universidad Nacional Autonoma de Honduras June 2021

· Virtual, IV Semana de Astronomía y Astrofísica, "Un breve vistazo a la formación y evolución de galaxias"

Academia Nacional de las Ciencias de Costa Rica May 2019

· "La Busqueda de vida en planetas Extrasolares"

Dyer Observatory April 2019

· "The quest to search for life on extrasolar planets"

Dyer Observatory May 2018

· "Why is the Milky Way the way it is?"

LEADERSHIP AND SERVICE

Review Panelist

Science Review Panel member for Yale TAC proposals 2023-2025

Grant Review Panelist for NASA 2023-2024

Science Review Panel member for NASA August 2021

Scientific Organizing Committees

The Inaugural Tinsley Workshop at Yale University October 2024

National Radio Astronomy Observatory NAC Workshop (Virtual) October 2020-2022

Astrofisica Centroamericana y del Caribe General Assembly (Virtual) December 2020

Miscellaneous Service

Papers Refereed (ApJ) 2025-Present

Central America-Caribbean Bridge in Astrophysics Inc. Co-founder 2018-Present

Fisk-Vanderbilt Social Justice Committee August 2021-August 2022

Vanderbilt University, web-administrator and journal club host August 2019 - May 2022

Astrofsica en Centroamerica y el Caribe, Founding member May 2017 - December 2021

National Radio Astronomy Observatory NAC coordinator August 2018 - 2020

TRAININGS

North Carolina State University January 2022

· Building Future Faculty Fellowship

Stanford Postdoctoral Recruitment Initiative in Science and Medicine August 2022

· Postdoctoral training workshop

OUTREACH

AAS Committee on the Status of Women in Astronomy 2020 - Present
Blog writer highlighting Cenca Bridge students who are women

Astrobitos blog writer December 2018 - 2020

PEER-REVIEWED PUBLICATIONS

6. **Antonio J. Porras-Valverde** and John C. Forbes. On the Signature of Black Holes on the Quenched Stellar Mass Function. 2025. ApJ, 984, 96. doi:10.3847/1538-4357/adcc2d

5. Shashank Dattathri, Priyamvada Natarajan, **Antonio J. Porras-Valverde**, Colin J. Burke, Nianyi Chen, Tiziana Di Matteo, Yueying Ni. The redshift evolution of the $M_{\rm BH} - M_*$ scaling relation: new insights from cosmological simulations and semi-analytic models. 2025. ApJ, 984, 122. doi:10.3847/1538-4357/adbeef

4. **Antonio J. Porras-Valverde**, John C. Forbes, Rachel S. Somerville, Adam R. H. Stevens, Andreas A. Berlind, Kelly Holley-Bockelmann, and Shy Genel. Why Do Semianalytic Models Predict Higher Scatter in the Stellar MassHalo Mass Relation Than Cosmological Hydrodynamic Simulations? 2024. ApJ, 976, 1. doi:10.3847/1538-4357/ad7b0f

3. **Antonio J. Porras-Valverde**, Kelly Holley-Bockelmann, Andreas A. Berlind, and Adam R. H. Stevens. Angular momentum and Morphological Sequence of Massive Galaxies through Dark Sage. 2021. ApJ, 923, 2. doi:10.3847/1538-4357/ac31a5

2. Alexander P. Hoover, **Antonio J. Porras**, and Laura A. Miller. Pump or coast: The role of resonance and passive energy recapture in medusan swimming performance. 2019. Journal of Fluid Mechanics, 863, 1031-1061. doi:10.1017/jfm.2018.1007

1. **A. J. Porras**, S. R. Federman, D. E. Welty, and A. M. Ritchey. OH+ in Diffuse Molecular Clouds. 2014. ApJ, 781, L8. doi:10.1088/2041-8205/781/1/l8

PUBLICATIONS UNDER REVIEW

3. **Antonio J. Porras-Valverde**, Angelo Ricarte, Priyamvada Natarajan, Rachel S. Somerville, Austen Gabrielpillai, and L. Y. Aaron Yung. Tracking the assembly of supermassive black holes: a comparison of diverse models across cosmic time. *Accepted at ApJ*

2. **Antonio J. Porras-Valverde**, Priyamvada Natarajan, Angelo Ricarte, Kung-Yi Su, Hyerin Cho, Ramesh Narayan, Ben S. Prather. Bridging scales: Modeling suppressed Bondi accretion on black holes and its impact on galaxy growth. *Accepted at ApJ*

1. Kung-Yi Su, Angelo Ricarte, Priyamvada Natarajan, **Antonio J. Porras-Valverde**, Hyerin Cho, Ramesh Narayan, Claude-Andr Faucher-Gigure, Philip F. Hopkins, Ben S. Prather. Bridging scales: How much do supermassive black holes grow in the suppressed Bondi regime? *Accepted at ApJL*