

NATALIE NICOLE SANCHEZ

Theoretical and Computational Astrophysicist

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MAJOR RESEARCH INTERESTS

- Cosmological and zoom-in simulations of Milky Way-mass (MW) galaxies and their circumgalactic medium (CGM)
- Co-evolution of MW-mass galaxies, CGM, and supermassive black holes (SMBH)
- Metal retention and flow in MW-mass galaxies; Synthetic observations in simulations

EDUCATION

University of Washington, Seattle *2016-Present*

PhD Astronomy (*expected 2022*)

MSc Astronomy

2016-2018

Ebb and Flow: The Physical Connection between Cosmic Gas Flows, Supermassive Black Holes Growth, and Galaxy Evolution

Advisors: Jessica Werk, Charlotte Christensen, Tom Quinn

Fisk University

2014-2016

MA Physics

Cosmological Hydrodynamic Simulations of Preferential Accretion in the SMBH of Milky Way-size Galaxies

Advisors: Kelly Holley-Bockelmann, Jillian Bellovary

California Polytechnic University, Pomona

2014-2016

BSc Physics

A Study of the M17 Nebula from the Giant Molecular Clouds to the Young Stellar Objects

Advisors: Matthew Povich, Alex Rudolph

GRANTS, SCHOLARSHIPS, AND AWARDS

NSF AGEP Research University Alliance (*Funded*) 6/2021 - Present

NASA SMD High-End Computing Allocation 2/2021 - Present

Future Investigators in NASA Earth and Space Science and Technology (*FINESST*) Grant 9/2019 - Present

UW Astronomy Graduate Student Service Award (*Funded*) 10/2019

Honorable Mention in the Chambliss Astronomy Achievement Award Student Prize competition for the 227th AAS Meeting 1/2019

AAS International Travel Scholarship 8/2015

AAS Congressional Visits Day (*Funded*) 3/2015

President's Student Scholarship for Conference Presentations 4/2014

Dr. Vincent E. Parker Physics Scholarship,
Cal Poly Pomona Physics and Astronomy Department (*Funded*) 3/2014

SEES LSAMP Research Apprenticeship (*Funded*) 1/2014

ACADEMIC POSITIONS

University of Washington - Astronomy Department

Research Assistant

8/2016 - Present

Seattle, Washington

- Ran multiple N-body smooth hydrodynamic particle (SPH) simulations of MW-mass galaxies with genetically modified (GM) accretion histories
- Analyzed the impact of SMBH feedback and other physical processes on the circumgalactic and intergalactic medium of MW-mass galaxies and compared theoretical measurements to HST observations

Fisk-Vanderbilt Master-to-PhD Bridge Program

Research Assistant

8/2014 - 8/2016

Nashville, TN

- Analyzed cosmological SPH simulations to study the gas accretion into the central SMBH of MW-size galaxies

Owens Valley Radio Observatory

Instrumental Research Intern

6/2014 - 8/2014

Big Pine, CA

- Took 3mm continuum observations of the V409 Tau system using the Combined Array for Research in Millimeter Astronomy (CARMA)
- Assembled an updated generation of the CARMA 3-mm monolithic microwave integrated circuit (MMIC) receivers

California Polytechnic University

Undergraduate Research Assistant

8/2012 - 6/2014

Pomona, CA

- Analyzed CO maps of the M17 nebula and made comparisons to Spitzer and CHANDRA data to explore the young stellar objects and triggered star formation impacting gas in the region

University of Arizona

CAMPARE Summer Research Intern

Summer 2012

Tucson, AZ

- Generated maps of the interstellar gas in the M17 nebula using rotational emission line observations of carbon monoxide from the The Submillimeter Telescope (SMT)

TRAINING, OUTREACH, AND MENTORING ACTIVITIES

University of Washington

Undergraduate Research Mentor

6/2021 - Present

Astronomy on Tap, Seattle, Lead Organizer & Presenter

10/2016 - Present

N-Body Shop Excellence Conference, Lead Organizer

1/2021

Pre-Major in Astronomy Program (Pre-MAP) Instructor

9/2020 - 12/2020

Pre-MAP Academic Advisor

9/2018 - 8/2020

Pre-MAP Graduate Research Mentor

9/2016 - 8/2018

Instructor and Program Developer for "Protostars" Middle School Girls'

Summer Astronomy Camp

6/2017,18,19

Pacific Northwest Communicating Science Workshop

3/2017

Fisk-Vanderbilt Masters-to-PhD Bridge Program

Bridge Student Mentor

8/2015 - 6/2016

Graduate Research Assistant

8/2014 - 6/2016

Co-Founder, Vice-President, and Outreach Coordinator

SACNAS Chapter, Nashville, TN

2015 - 2016

Astronomy Instructor for Girl Scouts of Middle Tennessee

7/2015

Astrostatistics Workshop

6/2015

AAS Congressional Visits Day Participant

3/2015

Astronomy Ambassador

January 2015 Meeting #225

California Polytechnic State University

Physics Laboratory Assistant Coordinator

9/2013 - 5/2014

Undergraduate Research Assistant

9/2012 - 5/2014

Society of Physics Students President

2013-2014

Society of Physics Students Vice-President

2012-2013

REFEREED AND SUBMITTED JOURNAL ARTICLES

First Author Publications

One-Two Quench: A Double Minor Merger Scenario

N. Nicole Sanchez, Michael Tremmel, Jessica K. Werk, Andrew Pontzen, Charlotte Christensen, Thomas Quinn, Sarah Loebman, Akaxia Cruz, 2021ApJ, 911, 116S. April 2021

Not So Heavy Metals: Black Hole Feedback Enriches The Circumgalactic Medium

N. Nicole Sanchez, Jessica K. Werk, Michael Tremmel, Andrew Pontzen, Charlotte Christensen, Thomas Quinn, Akaxia Cruz, 2019ApJ, 882, 8S. September 2019

Cosmological Hydrodynamic Simulations of Preferential Accretion in the SMBH of Milky Way Size Galaxies

N. Nicole Sanchez, Jillian M. Bellovary, Kelly Holley-Bockelmann, Michael Tremmel, Alyson Brooks, Fabio Governato, Tom Quinn, Marta Volonteri, James Wadsley, 2018ApJ, 860, 20S. June 2018

Additional Publications

The Impact of Cosmic Rays on the Kinematics of the Circumgalactic Medium

Iryna S. Butsky, Jessica K. Werk, Kirill Tchernyshyov, Drummond B. Fielding, Joseph Breneman, Daniel Piacitelli, Thomas R. Quinn, **N. Nicole Sanchez**, Akaxia Cruz, Cameron B. Hummels, Joseph N. Burchett, Michael Tremmel, Submitted to ApJ, June 2021

Self-Interacting Dark Matter and the Delay of Supermassive Black Hole Growth

Akaxia Cruz, Andrew Pontzen, Marta Volonteri, Tom Quinn, Alyson Brooks, **N. Nicole Sanchez**, Ferah Munshi, Arianna Di Cintio, 2021MNRAS, 500, 2177C. January 2021

V409 Tau As Another AA Tau:

Photometric Observations of Stellar Occultations by the Circumstellar Disk

Joseph E. Rodriguez, Joshua Pepper, Keivan G. Stassun, Robert J. Siverd, Phillip Cargile, David A. Weintraub, Thomas G. Beatty, B. Scott Gaudi, Eric E. Mamajek, **N. Nicole Sanchez**, 2015AJ, 150, 32R. May 2015

SELECTED TALKS

Contributed & Invited[†] Talks

UC Irvine Astronomy Seminar Series[†]

Virtual, May 2021

MIT Brown Bag Lunch[†]

Virtual, April 2021

KITP Fundamentals of Gaseous Halos

Virtual, Spring 2021

University of Arizona Galaxy Crawl Talk Series[†]

Virtual, February 2021

N-Body Shop Excellence Conference

Virtual, January 2021

Yale Galaxy Lunch[†]

Virtual, November 2020

CGM Workshop[†]

Max Plank Institute, Berlin, October 2019

CAMPARE Research Symposium[†]

Cal Poly Pomona, August 2019

AAS Meeting # 233

Seattle, January 2019

CGM Workshop

Northwestern University, Chicago, June 2018

SACNAS National Conference

Washington D.C., October 2015

Cal Poly Pomona Student Research Conference

Pomona, March 2014