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)
- Galaxy regulation at low redshifts and quenching in MW-mass galaxies
- Theoretical and Observational comparisons of CGM gas properties and dynamics;
- Metal retention and flow in MW-mass galaxies; Synthetic observations in simulations

EDUCATION

University of Washington, Seattle *2016-Present*
PhD Astronomy
Ebb and Flow: The Physical Connection between Cosmic Gas Flows, Supermassive Black Holes Growth, and Galaxy Evolution
Advisors: Jessica Werk, Charlotte Christensen, Tom Quinn

University of Washington *2016-2018*
MSc Astronomy
Not So Heavy Metals: Black Holes Feedback Enriches the CGM
Advisors: Jessica Werk, Charlotte Christensen, Tom Quinn

Fisk University *2014-2016*
M.A. 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*
M.A. Physics
A Study of the M17 Nebula from the Giant Molecular Clouds to the Young Stellar Objects
Advisors: Matthew Povich, Alex Rudolph

ACADEMIC POSITIONS

University of Washington - Astronomy Department 8/2016 - Present
Research Assistent *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 8/2014 - 8/2016
Research Assitant *Nashville, TN*

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

Owens Valley Radio Observatory 6/2014 - 8/2014
Instrumental Research Intern *Big Pine, CA*

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

California Polytechnic University 8/2012 - 6/2014
Undergraduate Research Assistant *Pomona, CA*

· Analyzed CO measurements of the M17 nebula and compared to Spitzer and CHANDRA data to explore the young stellar objects and triggered star formation impacting gas in the region

University of Arizona 8/2012 - 6/2014
CAMPARE Summer Research Intern *Tucson, AZ*

· Mapped the interstellar gas of the M17 nebula using rotational emission line observations of carbon monoxide from the The Submillimeter Telescope (SMT)

GRANTS, SCHOLARSHIPS, AND AWARDS

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

NASA SMD High-End Computing Allocation 2/2021 –

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

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

TRAINING, OUTREACH, AND MENTORING ACTIVITIES

University of Washington 2016 - Present

Undergraduate Research Mentor 6/2021 –
Astronomy on Tap, Seattle, Lead Organizer & Presenter 10/2016 –
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 2014 - 2016

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 2011 - 2014

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 ARTCLES

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 Talks

KITP Fundamentals of Gaseous Halos	Virtual, 2021
N-Body Shop Excellence Conference	Virtual, 2021
Yale Galaxy Lunch,	Virtual,2020
AAS Meeting # 233	Seattle, 2019
CGM Workshop	Chicago, 2018
SACNAS National Conference	Washington D.C., 2015
Cal Poly Pomona Student Research Conference	Pomona, 2014

Invited Talks and Seminars

"Ebb and Flow: Connecting Cosmic Gas Flows, Supermassive Black Hole Growth, and Galactic Evolution", Invited Talk, Astronomy Seminar Series, University of California Irvine, May 2021

"Ebb and Flow: Connecting Cosmic Gas Flows, Supermassive Black Hole Growth, and Galactic Evolution", Invited Talk, Brown Bag Lunch, April 2021

"Ebb and Flow: Connecting Cosmic Gas Flows, Supermassive Black Hole Growth, and Galactic Evolution", Invited Talk, Galaxy Crawl Talk Series, University of Arizona, February 2021

"Ebb and Flow: Connecting Cosmic Gas Flows, Supermassive Black Hole Growth, and Galactic Evolution", Invited Talk, Galaxy Lunch, Yale University, November 2020

"Tracing Metal Flow in the CGM of Simulated Galaxies", Invited Talk, CGM Workshop, Max Plank Institute, October 2019

"Not So Heavy Metals: BH Feedback Enriches the CGM", Invited Talk, CAMPARE Research Symposium, Cal Poly Pomona, August 2019