

# SAMANTHA SCIBELLI

Jansky Postdoctoral Fellow — National Radio Astronomy Observatory

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Research interests: Low-mass Star Formation, Radio Astronomy, Astrochemistry, Astrobiology

## EDUCATION

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University of Arizona	<i>August 2017 - August 2023</i>
Ph.D. in Astronomy & Astrophysics	<i>August 16, 2023</i>
Science Communication Certificate	<i>May 12, 2023</i>
M.S. in Astronomy & Astrophysics	<i>August 17, 2019</i>
Advisor: Dr. Yancy Shirley	

Stony Brook University, Stony Brook, NY	<i>August 2013 - January 2017</i>
Bachelor of Science, Physics, second Major Astronomy	<i>Magna Cum Laude</i>
Women in Science and Engineering (WISE) Scholar	

## RESEARCH APPOINTMENTS

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<b>National Radio Astronomy Observatory (NRAO)</b>	Charlottesville, VA
<i>Jansky Postdoctoral Fellow</i>	<i>August 2023 - present</i>

<b>University of Arizona, Steward Observatory</b>	Tucson, AZ
<i>Graduate Research Assistant &amp; NSF Fellow</i>	<i>August 2017 - August 2023</i>

<b>NASA Jet Propulsion Laboratory (JPL), Astrophysics Department</b>	Pasadena, CA
<i>NASA Sally Ride Fellow</i>	<i>January 2017 - July 2017</i>

<b>Harvard-Smithsonian Center for Astrophysics</b>	Cambridge, MA
<i>NSF REU Intern</i>	<i>June 2016 - August 2016</i>

<b>NASA Jet Propulsion Laboratory (JPL), Astrophysics Department</b>	Pasadena, CA
<i>NASA UI Intern</i>	<i>August 2015 - December 2015</i>

<b>Stony Brook University, Physics and Astronomy Department</b>	Stony Brook, NY
<i>Undergraduate Researcher</i>	<i>December 2014 - January 2017</i>

<i>Exploration in STEM Researcher</i>	<i>June 2015 - August 2015</i>
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<b>Stony Brook University, Laser Teaching Center</b>	Stony Brook, NY
<i>Undergraduate Researcher</i>	<i>February 2014 - May 2014</i>

<i>Summer Research Intern</i>	<i>July 2013 - August 2013</i>
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<b>Rensselaer Polytechnic Institute, Physics and Astronomy Department</b>	Troy, NY
<i>Visiting Student Researcher</i>	<i>November 2010 - August 2014</i>

## FELLOWSHIPS, HONORS AND AWARDS

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2023: College of Science Graduate Student Teaching Award  
2022-2023: P.E.O Scholar Award (PSA) for outstanding doctoral research  
2022-2023 & 2021-2022: Advancing Science in America ARCS Foundation ‘Lawson Scholar’  
2021: Graduate Student Group Award 2021; SO Diversity, Equity and Inclusion Task Force  
2020: Green Bank Observatory Blumberg Astrobiology Travel Grant  
2019: Ed and Jill Bessey Scholarship in Astrobiology, University of Arizona  
2017-2022: National Science Foundation Graduate Research Fellowship (NSF GRFP) Recipient  
2016: Sigma Pi Sigma Physics Honor Society, Stony Brook University  
2015: Researcher of the Month, Stony Brook University  
2013: INTEL Science Talent Search (STS) Finalist

## SELECTED TELESCOPE TIME OBTAINED, AS PI

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Yebes 40m, Spring 2022: *COM Survey of ‘Typical’ Starless Cores in the Taurus, Perseus and Aquila Molecular Clouds*, 72 hrs  
GBT, Special Call 2021: *QBand Chemical Complexity Survey of Prestellar Core L1544*, (>600 hrs)  
GBT, 2020 B: *High Resolution C18O ARGUS Mapping toward Prestellar Cores in Taurus*, 20 hrs  
SOFIA (joint with GBT), Cycle 9: *Far-IR Dust and Magnetic Field Alignment Study of the Collapse Candidate Starless Core L63*, 2.82 hrs (5.38 hrs on GBT)  
GBT, 2020 B: *High Resolution C18O ARGUS Mapping toward Prestellar Cores in Taurus*, 20 hrs  
ARO 12m, Spring 2020: *Complementary Zero-spacing Map for ALMA ACA Observations*, 74 hrs  
ARO SMT, Spring 2020: *Novel  $J = (3-2)$  Molecular Mapping of the Dense B10 Region of Taurus*, 120 hrs  
ALMA ACA Supplemental Call, Cycle 7: *Spatial Distribution of COMs within a Starless Core*, 19.8 hrs  
ARO 12m, Fall 2019: *N-Bearing Complex Organic Molecules: A Survey of Prestellar Cores*, 350 hrs  
IRAM 30m, Fall 2019: *High Resolution 1mm Continuum Study of the B10 Star Forming Region*, 17 hrs  
ARO 12m, Spring 2019: *Survey of Highly Complex Organic Molecules in Young Prestellar Cores*, 350 hrs  
ARO SMT, Fall 2018: *Mapping Inflow/Outflow Tracers in Massive Star-Forming Clumps*, 48 hrs  
ARO 12m, Spring 2018: *A Deeper Look at Acetaldehyde in Prestellar Cores*, 210 hrs  
ARO 12m, Fall 2017: *A Comprehensive Search for Methanol in Prestellar Cores*, 80 hrs

## PUBLICATIONS

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**17 total refereed articles** [ADS LINK] (9 first, second or third author)

### Major Contributions:

17. *3D Radiative Transfer Modeling and Virial Analysis of Starless Cores in the B10 region of the Taurus Molecular Cloud*  
**Scibelli, S.**, Shirley, Y., et al., 2023 MNRAS, 521, 3
16. *The Rapidly Evolving Asymptotic Giant Branch Star, V Hya: ALMA Finds a Multiringing Circus with High-velocity Outflows*  
Sahai, R., Huang, P.-S., **Scibelli, S.**, et al. 2022, ApJ, 929, 59
15. *Detection of Complex Organic Molecules in Young Starless Core L1521E*  
**Scibelli, S.**, Shirley, Y., Vasyunin, A., et al., 2021 MNRAS, 504, 4
14. *\*A survey of CH<sub>2</sub>DOH towards starless and pre-stellar cores in the Taurus molecular cloud*  
Ambrose, H., Shirley, Y., & **Scibelli, S.** 2021, MNRAS, 891, 1 \*(student project)

13. *Prevalence of Complex Organic Molecules in Starless and Prestellar Cores within the Taurus Molecular Cloud*  
**Scibelli, S.** & Shirley, Y., 2020, ApJ, 891, 1
12. *Biases in inferring dark matter profiles from dynamical and lensing measurements*  
**Scibelli, S.**, Perna, R., Keeton, C., 2019, MNRAS, 769
11. *High-Velocity Bullets from V Hydrae, an AGB Star in Transition: Ejection History and Spatio-Kinematic Modeling*  
**Scibelli, S.**, Sahai, R., & Morris, M. R., 2019, ApJ, 870, 117
10. *High-speed Bullet Ejections during the AGB-to-Planetary Nebular Transition: HST Observations of the Carbon Star, V Hydrae*  
Sahai, R., **Scibelli, S.**, & Morris, M. R., 2016, ApJ, 827, 92
9. *Census of Blue Stars in SDSS DR8*  
**Scibelli, S.**, Newberg, H. J., Carlin, J.L., & Yanny, B., 2014, ApJS, 215, 24

**Minor Contributions:**

8. *Alignment of dense molecular core morphology and velocity gradients with ambient magnetic fields*  
Pandhi, A., and 17 others including **Scibelli, S.**, 2023, MNRAS, 525, Issue 1, pp.364-392
7. *Velocity-Coherent Substructure in TMC-1: Inflow and Fragmentation*  
Smith, S., and 13 others including **Scibelli, S.**, 2023, MNRAS, 519, Issue 1, pp.285-299
6. *A survey of deuterated ammonia in the Cepheus star-forming region L1251*  
Galloway-Sprietsma, M., and 6 others including **Scibelli, S.**, 2022, MNRAS, 515, 5219
5. *Methanol Mapping in Cold Cores: Testing Model Predictions*  
Punanova, A., and 7 others including **Scibelli, S.**, 2022, ApJ, 927, 213
4. *Relative alignment between dense molecular cores and ambient magnetic field: the synergy of numerical models and observations*  
Chen, C.-Y., and 28 others including **Scibelli, S.**, 2020, MNRAS, 494, 1971
3. *Velocity-coherent Filaments in NGC 1333: Evidence for Accretion Flow?*  
Chen, M. C.-Y., and 13 others including **Scibelli, S.**, 2020, ApJ, 891, 84
2. *Droplets. II. Internal Velocity Structures and Potential Rotational Motions in Pressure-dominated Coherent Structures*  
Chen, H. H.-H., and 8 others including **Scibelli, S.**, 2019, ApJ, 886, 119
1. *Droplets. I. Pressure-dominated Coherent Structures in L1688 and B18*  
Chen, H. H.-H., and 24 others including **Scibelli, S.**, 2019, ApJ, 877, 93

**Media & Press:**

- “Many Complex Organic Compounds –Evolved Building Blocks of Life — Are Formed Where Stars Are Being Born,” Many Worlds Column, December 14, 2022
- “Ingredients for Life Appear in Stellar Nurseries Long Before Stars are Born,” UofA News, June 11, 2020

- “COMs in Cores: Complex Chemistry in Dense Cores in the Taurus Star-Forming Region,” astrobit.es article, March 16, 2020
- “Hubble Detects Giant ‘Cannonballs’ Shooting from Star,” JPL news, October 6, 2016

## CONFERENCES AND TALKS

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### Invited Talks (8):

- Radio Millimeter Submillimeter (RMS) Science Seminar, Feb. 9th 2024, Center for Astrophysics, Cambridge, MA
- GBT Large Program Special Session at AAS 243rd Annual Winter Meeting, 7-11 Jan. 2024, New Orleans, LA
- NRAO/UVa Joint Colloquium Series, September 28, 2022, Charlottesville, Virginia
- The NASA Astrobiology Program’s Prebiotic Chemistry and Early Earth Environments (PCE3) Seminar Series, 1st December 2022, Virtual Zoom Talk
- Carnegie Observatories Lunch Talk, 20th January 2023, Pasadena, California
- NRAO Colloquium, 16th November 2022, Socorro, New Mexico
- K-Band Science Using the GBT, 19th – 21st Sep. 2022, Green Bank, West Virginia
- EAS Symposium SS15: Molecules in starless and pre-stellar cores: tools to understand low- and high-mass star-formation, June 28 - July 2, 2021, Virtual Zoom Conference

### Contributed Talks (28):

- Astrobiology Session at AAS 243rd Annual Winter Meeting, 7-11 Jan. 2024, New Orleans, LA
- VICO/CICO Spring Workshop, December 6-8, Charlottesville, Virginia
- Kavli-IAU Astrochemistry Symposium, July 10-14, Traverse City, Michigan
- The 38th Annual New Mexico Symposium, Feb. 17, 2023, Socorro, New Mexico
- Dissertation Presentation for AAS 241st Annual Meeting, 8-12 Jan. 2023
- From Clouds to Planets II: The Astrochemical Link, Oct. 3-7, 2022, Berlin, Germany
- NRAO TUNA Lunch Series Talk, September 22, 2022, Charlottesville, Virginia
- COSPAR 44th Scientific Assembly Session, July 21, 2022, Athens, Greece
- Astrophysics Seminar, June 6, 2022, Jet Propulsion Laboratory, Pasadena, CA
- Leiden Astrochemistry Seminar, May 12, 2022, Virtual Zoom Talk
- Origins Seminar, May 9, 2022, Steward Observatory
- The 37th Annual New Mexico Symposium, Nov. 18, 2021, Virtual Zoom Conference
- Arizona Astrobiology Research Symposium, Nov. 12th, 2021, Virtual Zoom Conference
- ARCS Virtual Site Visit, Sep. 15th 2021, Virtual Zoom Meeting
- Wider and Deeper at Green Bank: The New Argus-144 Instrument, Sep. 22-24, 2020, Virtual Zoom Conference

- Origins Seminar, July 13th, 2020, Virtual Zoom Call
- Astrochemical Frontiers, June 15 - 19, 2020, Virtual Zoom Conference
- From Collapsing Cores to Forming Disks, March 10-13, 2020, NRAO headquarters, Charlottesville, VA [POSTPONED DUE TO COVID-19]
- The 35th Annual New Mexico Symposium, Feb. 2020, NRAO, Socorro, NM
- The Physics and Chemistry of the Interstellar Medium, 2-6 Sep. 2019, Avignon, France
- Astrochemistry: Past, Present, Future, Caltech, July 2018, Pasadena, CA
- NRAO TUNA Talk, Dec. 2018, Charlottesville, VA
- The Olympian Symposium 2018: gas and stars from milli- to mega- parsecs, Mediterranean Village Hotel & Spa, Paralia, Katerini, Greece, May 2018
- The 33rd Annual New Mexico Symposium, NRAO, Socorro, NM, Nov. 2017
- SAO Summer Symposium, Center for Astrophysics, Cambridge, MA, Aug. 2016
- FLASH Talk, NOAO, January, 2019, Tucson, AZ
- Special Astrophysics Seminar, Jet Propulsion Laboratory, Pasadena, CA, Dec. 2015
- Physics and Nature Conference, Pace University, White Plains, NY, Nov. 2013

## TEACHING EXPERIENCE

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- Teaching Assistant for ASTR 300B: Radiation & Matter (Fall 2022)
- Teaching Assistant for ASTR 196: Astronomical Problem Solving (Fall 2022)
- Teaching Assistant for ASTR 202: Life in the Universe (Spring 2021)
- Teaching Assistant for ASTR 170B1: The Physical Universe (Fall 2020)
  - Designed a ‘Science Journalism’ module and taught mini-lectures for class

## SCIENCE COMMUNICATION

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### Public Presentations:

- Public talk, “Space Brews: Probing the Origins of Complex Molecules with Radio Telescopes”, given at ‘Space Drafts’ (Tucson’s version of Astronomy On Tap) (April 19th, 2022)
- Public talk, “Mysteries of Molecular Clouds: Observing with Radio Telescopes,” given for the Splendido Retirement Community (March 18th, 2022)
- Public talk for Knowledge Village (April 2021) - I presented a virtual talk about how I got interested in science and what I do as a graduate student to groups of middle-schoolers.

### Popular Science Writing:

- News article, “Scientists: Too many satellites will hurt research,” published on Dec 10, 2020 in Green Valley News, describes how satellite communication networks will negatively affect radio astronomy.

- News article, “UA graduate student studies the chatty life of covert squirrel,” published in The Daily Wildcat, Dec 10, 2020.
- “A Witch to the Stars” memoir published July 15, 2020 on terrain.org describes my childhood and how I became interested in astronomy research.

## COMMUNITY ENGAGEMENT

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### Mentoring & Outreach

- AMP-UP Mentor (2023) - I meet with, give advice to, and provide feedback on application material for a graduate student applying for postdoctoral positions.
- Astronomy Camp Counselor (June 2018,2019,2021,2022,2023) - I’ve been employed as counselor to teach middle school and high school students about astronomy and get them interested in science and technology in general. I am in charge of SMT & 12m radio observing.
- NOIRLab Teen Astronomy Cafe Volunteer (throughout 2019-2023) - I assist high school students in participating in hands on demonstrations, working on interactive computer activities while they listen to presentations from the scientists at NOIRLab and other institutions.
- TechPrep Mentor, Stony Brook University (Summer 2015) - I was employed as STEM summer camp counselor for middle school girls on Long Island.
- Volunteer as Mystery Women for Explore Your Opportunities (EYO) Conference (April 2014/2015) - I helped to educate 7th grade girls about STEM through interactive learning techniques in Bronx, NY.

### Leadership & Service

Co-organizer for the NRAO TUNA Lunch Talk Series (Fall 2023 - present)

Serving as Journal Referee (ApJ; Oct. 2021 & July 2022, A&A; April 2021 & Aug. 2023)

Co-organizer for Steward Observatory Diversity, Equity and Inclusion Initiative (SO DEI), aimed at creating a more equitable department by implementing actionable changes through five major task forces. (2020-2023)

Co-organizer for Steward Observatory’s Diversity Journal Club (DJC), similar to a science journal club, where we discuss topics such as gender equity and diversity in the classroom (2018-2023)

Served on the Steward Observatory Graduate Admissions Committee (2019/2020 season)

## TECHNICAL SKILLS

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### Modeling and Analysis Software & Tools

RADMC-3D, RADEX, SHAPE  
Python, IRAF, Ds9, GILDAS, LaTeX, HTML, Fortran, C++