

# SAMANTHA SCIBELLI

Jansky Postdoctoral Fellow — National Radio Astronomy Observatory

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Research interests: astrochemistry, low-mass star formation, radio astronomy, astrobiology

## EDUCATION

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

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

## RESEARCH APPOINTMENTS

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**National Radio Astronomy Observatory (NRAO)** Charlottesville, VA  
*Jansky Postdoctoral Fellow August 2023 - present*

**University of Arizona, Steward Observatory** Tucson, AZ  
*Graduate Research Assistant & NSF Fellow August 2017 - August 2023*

**NASA Jet Propulsion Laboratory (JPL), Astrophysics Department** Pasadena, CA  
*NASA Sally Ride Fellow January 2017 - July 2017*  
*NASA UI Intern August 2015 - December 2015*

**Harvard-Smithsonian Center for Astrophysics** Cambridge, MA  
*NSF REU Intern June 2016 - August 2016*

**Stony Brook University, Physics and Astronomy Department** Stony Brook, NY  
*Undergraduate Researcher December 2014 - January 2017*  
*Exploration in STEM Researcher June 2015 - August 2015*

**Stony Brook University, Laser Teaching Center** Stony Brook, NY  
*Undergraduate Researcher February 2014 - May 2014*  
*Summer Research Intern July 2013 - August 2013*

**Rensselaer Polytechnic Institute, Physics and Astronomy Department** Troy, NY  
*Visiting Student Researcher November 2010 - August 2014*

## RECENT FELLOWSHIPS, HONORS AND AWARDS

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2023: Jansky Fellowship, National Radio Astronomy Observatory

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

## SELECTED TELESCOPE TIME OBTAINED, AS PI

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### Atacama Large Millimeter/submillimeter Array, ALMA (4):

- ALMA Cycle 11 (2024.1.00970.S): *Mapping the Spatial Distribution of Complex Molecules in L1544 with ALMA Band 1*, 26.1 hr 12m & 133.6 hr ACA
- ALMA Cycle 11 (2024.1.01125.S): *Phosphorous in the Earliest Stages of Low-mass Star Formation* 2.0 hr 12m & 5.2 hr ACA \*PI for accompanying ~\$20,000 SOS grant
- ALMA Cycle 11 (2024.1.00848.S): *Tracing the Complex Chemical Evolution in the Natal Prestellar* 16.5 hr 12m & 84.9 hr ACA time
- ALMA ACA Supplemental Call, Cycle 7: *Spatial Distribution of COMs within a Starless Core*, 19.8 hrs

### Green Bank Telescope, GBT (> 3):

- GBT, 2024B: *A Quest for More GLUCOSE: the GBT L1544 Unbiased Complex Organics SurvEy*, 556 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

### Stratospheric Observatory For Infrared Astronomy, SOFIA (1)

- 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) \*PI for accompanying ~\$40,000 grant

### Institut de Radioastronomie Millimetrique, IRAM (> 2)

- IRAM 30m, Spring 2024: *Phosphorous in the Earliest Stage of Low-mass Star Formation*, 22 hrs
- IRAM 30m, Fall 2019: *High Resolution 1mm Continuum Study of the B10 Star Forming Region*, 17 hrs

### Yebes Observatory (3)

- Yebes 40m, Spring 2024: *Cataloging the Complex Chemistry towards the Highly-Deuterated Prestellar Core IRAS 16293 E*, 30 hrs
- Yebes 40m, Spring 2023: *Completing the Census of Starless Cores with COM Detections in the Perseus Molecular Cloud*, 72 hrs
- Yebes 40m, Spring 2022: *COM Survey of ‘Typical’ Starless Cores in the Taurus, Perseus and Aquila Molecular Clouds*, 72 hrs

### Arizona Radio Observatory, ARO (> 6)

- ARO 12m, Spring 2024: *The Search for Triply Deuterated Methanol (CD<sub>3</sub>OH) in IRAS 16293 E*, 90 hrs
- ARO 12m, Fall 2023: *Investigating Gas-phase COMs toward the Prestellar Core IRAS 16293 E*, 35 hrs
- ARO 12m, Fall 2019: *N-Bearing Complex Organic Molecules: A Survey of Prestellar Cores*, 350 hrs
- ARO 12m, Spring 2019: *Survey of Highly Complex Organic Molecules in Young Prestellar Cores*, 350 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

## CONFERENCES AND TALKS

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### Invited Talks (14):

- Towards New Frontiers, March 10th, 2025, ESO, Garching, Germany (\*Review Talk)
- IPAG/IRAM Seminar, December 12th, 2024, Grenoble, France

- ACS AstroCheminar, October 15th, 2024, Virtual Talk
- Centro de Astrobiología (CAB) Seminar, September 10th, 2024, Spain
- Astronomy Department Colloquium, August 22nd, 2024, University of Florida, Gainesville, FL
- Special Astrochemistry Colloquium, August 20th, 2024, Florida Tech, Melbourne, FL
- Radio Millimeter Submillimeter (RMS) Seminar, Feb. 9th 2024, CfA, 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, 2023, Charlottesville, Virginia
- The NASA Astrobiology Program's Prebiotic Chemistry and Early Earth Environments (PCE3) Seminar Series, 1st December 2022, Virtual
- 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

**Selected Contributed Talks (> 30):**

- AAS 245th Winter Meeting, 12-16 Jan. 2025, National Harbor, MD
- Fractionation II: from the Solar System to galaxies, Nov. 4-7, 2024, Florence, Italy
- 53rd Young European Radio Astronomers Conference (YERAC), Sep. 3-6, 2024, Madrid, Spain
- COSPAR 45th Scientific Assembly Session, July 14-21, 2024, Busan, South Korea
- EAS Annual Meeting held at Padova Congress, Italy, from July 1-5, 2024
- Annual NRAO/GBO Postdoc Symposium, March. 19th 2024, Green Bank Observatory, WVA
- Institute for Theory and Computation (ITC) Lunch Seminar, Feb. 8th 2024, Center for Astrophysics, Cambridge, MA
- 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
- Origins Seminar, May 9, 2022, Steward Observatory
- The 37th Annual New Mexico Symposium, Nov. 18, 2021, Virtual
- Arizona Astrobiology Research Symposium, Nov. 12th, 2021, Virtual
- ARCS Virtual Site Visit, Sep. 15th 2021, Virtual
- Wider and Deeper at Green Bank: The New Argus-144 Instrument, Sep. 22-24, 2020, Virtual
- Origins Seminar, July 13th, 2020, Virtual
- Astrochemical Frontiers, June 15 - 19, 2020, Virtual Zoom Conference
- 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

## TEACHING EXPERIENCE

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### University of Virginia / NRAO:

- Co-Instructor for ASTR 5340: Introduction to Radio Astronomy (Fall 2024)
  - Responsible for teaching half of the lectures in semester-long graduate level class
- Instructor for AAA.org course on ‘Introduction to Astrochemistry’ (Spring 2024)
  - Designed five 2-hour lectures (undergraduate level)

### University of Arizona:

- 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

## COMMUNITY ENGAGEMENT

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### Scientific Mentoring

- Advisor for 2024 NRAO REU student Anissa Pokorny-Yadav and her project “Simple and Complex Carbon-Chain Molecules in Prestellar & Starless Cores in NGC1333” (report here)  
- Presented iPoster at AAS 245th Winter Meeting \*Chambliss Poster Winner!
- Science Mentor to high school students Ori Shi and Ollie Snow for their project “Confirmation of Methanol (CH<sub>3</sub>OH) toward Herbig Be Disk HD190073” (Fall 2023).

### **Academic Support & Outreach**

- External expert reviewer to the PhD of Andrés Megías Toledano (2025)
- AMP-UP Mentor (Fall 2023 & 2024) - For graduate student mentees applying for postdoctoral positions, I meet with, give advice to, and provide feedback on application material.
- Astronomy Camp Counselor (June 2018,2019,2021,2022,2023,2024) - I teach middle school and high school students about astronomy and get them interested in science and technology. I lead the SMT & 12m radio observing.
- NOIRLab Teen Astronomy Cafe Volunteer (throughout 2019–2023) - I assisted high school students in participating in hands on demonstrations and 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**

- Serving as Journal Referee for ApJ and A&A (ongoing)
- Co-organizer for the NRAO TUNA Lunch Talk Series (Fall 2023 - present)
- Co-organizer for the Annual NRAO/GBO Post-doc Symposium (March 2024)
- 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)

## **SCIENCE COMMUNICATION**

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### **Public Talks:**

- “The Power of Radio Telescopes: Probing Complex Molecules in the Earliest Stages of Star Formation”  
- Girls Exploring The Universe (GETU) Camp (June 12th, 2024)  
- McCormick Observatory Public Night at the University of Virginia (February 16th, 2024)

- “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)
- “Mysteries of Molecular Clouds: Observing with Radio Telescopes”
  - The Splendido Retirement Community (March 18th, 2022)
  - Knowledge Village (April 2021)

### Popular Science Writing:

- Blog entry, “Hot off the disk: New detections of complex molecules in warm planet-forming disks” published on Dec 20, 2024 in the Astrochemistry Report
- 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.

## PUBLICATIONS

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**21 total refereed articles** [[ADS LINK](#)], (8 first author, 1 under review)

### Major Contributions (11):

22. *Nascent chemical complexity in prestellar core IRAS 16293 E: complex organics and deuterated methanol*  
**Scibelli, S.**, Drozdovskaya, M. N., Caselli, P., et al., *submitted to A&A*.
21. *First detections of PN, PO and PO+ toward a shocked low-mass starless core*  
**Scibelli, S.**, Megías, A., Jiménez-Serra, et al., 2025 *accepted to ApJL*.
20. *NEATH IV: an early onset of complex organic chemistry in molecular clouds*  
Priestley, F. D., Clark, P. C., Ragan, S. E., **Scibelli, S.**, et al., 2025, MNRAS, 537, 3
19. *Molecular Distributions and Abundances in the Binary-Shaped Outflow of V Hya*  
Siebert, M., Sahai, R., **Scibelli, S.**, and Remijan, A., 2025, ApJ, 979, 119
18. *Survey of Complex Organic Molecules in Starless and Prestellar Cores in the Perseus Molecular Cloud*  
**Scibelli, S.**, Shirley, Y., Megías, A., and Jiménez-Serra, I., 2024, MNRAS, 533, 4
17. *3D Radiative Transfer Modeling and Virial Analysis of Starless Cores in the B10 region of the Taurus Molecular Cloud*  
**Scibelli, S.**, Shirley, Y., Schmiedeke, A., et al., 2023, MNRAS, 521, 3
16. *The Rapidly Evolving Asymptotic Giant Branch Star, V Hya: ALMA Finds a Multiringed 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 \*(UG 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, 485, 5880
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):

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:

- Featured on podcast ‘Astrochem Coffee’, September 2024 edition [available here]
- “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,” astrobites article, March 16, 2020
- “Hubble Detects Giant ‘Cannonballs’ Shooting from Star,” JPL news, October 6, 2016

## TECHNICAL SKILLS

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<b>Modeling and Analysis</b>	RADMC-3D, RADEX, SHAPE
<b>Software &amp; Tools</b>	Python, IRAF, Ds9, GILDAS, LaTeX, HTML, Fortran, C++