SAMANTHA SCIBELLI

Jansky Postdoctoral Fellow — National Radio Astronomy Observatory
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Research interests: astrochemistry, low-mass star formation, radio astronomy, astrobiology

EDUCATION

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

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

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 ($20,000)

2022-2023: Advancing Science in America ARCS Foundation 'Lawson Scholar' ($10,000 +tuition)
2021-2022: Advancing Science in America ARCS Foundation 'Lawson Scholar' ($10,000 +tuition)
2021: Graduate Student Group Award 2021; SO Diversity, Equity and Inclusion Task Force
2020: Green Bank Observatory Blumberg Astrobiology Travel Grant ($1,750)
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

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 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 (CD3OH) 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

Invited Talks (18):

· EAS SS8a: Astrochemical Horizons: From Galaxies to Comets, Cork, Ireland, June 24th, 2025

· Astrochemistry Seminar, NASA GSFC, Greenbelt, MD, June 5th, 2025

· Keynote Speaker for GBO Summer Student 'Radio Bootcamp', May 29th, 2025

· Commencement Keynote Speaker for Stony Brook University Women in Science and Engineering (WISE) Honors College, May 22nd, 2025

· 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 Astrobiologia (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):

· Stony Brook University Astronomy Department Lunch Talk, May 23rd, 2025

· VICO/CICO Spring Workshop, May 20-22, 2025 Charlottesville, Virginia

· Annual NRAO/GBO Postdoc Symposium, May 19-21 2024, Virtual

· 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, 2023 Charlottesville, Virginia

· Kavli-IAU Astrochemistry Symposium, July 10-14, 2023, 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

· The Olympian Symposium 2018: gas and stars from milli- to mega- parsecs,
Mediterranean Village Hotel & Spa, Paralia, Keterini, Greece, May 2018

TEACHING EXPERIENCE

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

SCIENTIFIC MENTORING

University of Virginia / NRAO:

- Advisor for 2025 CASSUM summer student Anissa Pokorny-Yadav and her project "Line Modeling of Carbon and Sulfur Species in Prestellar Core IRAS 16293E"
- Advisor for 2025 SOS ALMA funded NRAO summer student Nate Morin and his project "The Influence of Shocks on Phosphorus Chemistry in NGC 1333"
- Advisor for UVa Student Sam Meyers and their project "Searching for biologically relevant precursors prebiotic species in the prestellar core IRAS 16293E"
  - Earned ASTR 4993 'Tutorial' credit during the Spring semester of 2025.
- 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!
  - PI-ed follow-up IRAM 30m proposal that was A-ranked (project code: 025-25)!
- Science Mentor to high school students Ori Shi and Ollie Snow for their project "Confirmation of Methanol (CH3OH) toward Herbig Be Disk HD190073" (Fall 2023).

COMMUNITY ENGAGEMENT

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)
- Subject-matter Expert Reviewer in a NASA peer review (2025)

- 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, were 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

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 Astrochemsitry 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

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, ApJL, 985, 2

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 Multiring 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 CH2DOH 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

Modeling and Analysis	RADMC-3D, RADEX, SHAPE
Software & Tools	Python, IRAF, Ds9, GILDAS, LaTex, HTML, Fortran, C++