SAMANTHA SCIBELLI

University of Arizona, Steward Observatory, 933 N Cherry Avenue, Tucson, AZ 85721 USA
US Citizen ⋄ (+1)518-859-1566 ⋄ sscibelli@arizona.edu ⋄ website: https://samscibelli.github.io

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

EDUCATION

University of Arizona — *August 2017 - Present*
Ph.D. in Astronomy & Astrophysics — *Expected: May 2023*
Science Communication Certificate — *Expected: May 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

FELLOWSHIPS, HONORS AND AWARDS

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

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

15 total refereed articles [ADS LINK] (6 first or second author, 1 submitted, 1 in prep.)

Major Contributions:

17. *CO-depletion Analysis for Starless Cores in the B10 region of the Taurus Molecular Cloud*
Scibelli, S. et al., ***in prep***

16. *3D Radiative Transfer Modeling and Virial Analysis of Starless Cores in the B10 region of the Taurus Molecular Cloud*
Scibelli, S. et al., ***submitted to MNRAS***

15. *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.

14. *Detection of Complex Organic Molecules in Young Starless Core L1521E*
Scibelli, S., Shirley, Y., Vasyunin, A., et al., 2021 MNRAS, 504, 4

13. **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 *(student project)

12. *Prevalence of Complex Organic Molecules in Starless and Prestellar Cores within the Taurus Molecular Cloud*
Scibelli, S. & Shirley, Y., 2020, ApJ, 891, 1

11. *Biases in inferring dark matter profiles from dynamical and lensing measurements*
Scibelli, S., Perna, R., Keeton, C., 2019, MNRAS, 769

10. *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

9. *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

8. *Census of Blue Stars in SDSS DR8*
Scibelli, S., Newberg, H. J., Carlin, J.L., & Yanny, B., 2014, ApJS, 215, 24

Minor Contributions:

7. *Velocity-Coherent Substructure in TMC-1: Inflow and Fragmentation*
Smith, S., and 13 others including **Scibelli, S.**, 2022, arXiv:2211.10535 (MNRAS accepted)

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," astrobites article, March 16, 2020

· "Hubble Detects Giant 'Cannonballs' Shooting from Star," JPL news, October 6, 2016

CONFERENCES AND TALKS

Invited Talks (5):

Probing the Prebiotic Chemistry of Early-Stage Star and Planet Formation

· The NASA Astrobiology Program's Prebiotic Chemistry and Early Earth Environments (PCE3) Seminar Series, 1st December 2022, Virtual Zoom Talk

The Complex Chemistry and Evolution of Early-Stage Star and Planet Formation

· Carnegie Observatories Lunch Talk, 20th January 2023, Pasadena, California

· NRAO Colloquium, 16th November 2022, Socorro, New Mexico

Current Progress & Future Plans for GLUCOSE: The GBT L1544 Unbiased Complex Organics SurvEy

· K-Band Science Using the GBT, 19th – 21st Sep. 2022, Green Bank, West Virginia

Observational Constraints on the Chemical Complexity of Low-mass Starless and Prestellar Cores in the Taurus Molecular Cloud

· 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 (24):

The Complex Chemistry and Evolution of Low-mass Starless and Prestellar Cores in the Taurus Molecular Cloud

· 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

Observational Constraints on the Chemical Complexity of Low-mass Starless and Prestellar Cores

· 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

Detecting Complex Organic Molecules in Starless and Prestellar Cores in Taurus

· 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

Prevalent Organic Molecules towards Prestellar Cores in the Taurus Star Forming Region

· 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, Keterini, Greece, May 2018

Physical Properties of Free-Floating Evaporating Gas Globules (FrEGGs) in W5

· The 33rd Annual New Mexico Symposium, NRAO, Socorro, NM, Nov. 2017

A Detailed Analysis of the Physical Conditions in the IRDCs in the Region IGGC 1623

· SAO Summer Symposium, Center for Astrophysics, Cambridge, MA, Aug. 2016

Using HST/STIS data to Model High-Velocity Bullets from a Dying Star

· FLASH Talk, NOAO, January, 2019, Tucson, AZ

· Special Astrophysics Seminar, Jet Propulsion Laboratory, Pasadena, CA, Dec. 2015

The Natural Focusing of Light

· Physics and Nature Conference, Pace University, White Plains, NY, Nov. 2013

Poster Presentations (14):

The Chemical Complexity of Low-mass Starless and Prestellar Cores in the Taurus, Perseus, and Aquila Molecular Clouds

· European Astronomical Society Annual Meeting, June 27 - July 1, 2022, Virtual ePoster

Detecting Complex Organic Molecules in Starless Cores in the Taurus Molecular Cloud

· Science and Engineering Excellence Banquet, University of Arizona, Jan. 2020

Prevalent Organic Molecules towards Prestellar Cores in the Taurus Star Forming Region

· Star and Planet Formation (SPF2), Biosphere, Tucson, AZ, March 2018

A Detailed Analysis of the Physical Conditions in IRDCs in the Region IGGC 1623

· American Astronomical Society Meeting, Grapevine, TX, Jan. 2017

Using HST/STIS data to Model High-Velocity Bullets from a Dying Star

· Undergraduate Research and Creative Activities Symposium, Stony Brook, May 2016

Probing Dark Matter by Modeling Gravitational Lensing of Spiral Galaxies

· CUWiP Women in Physics Conference, Wesleyan University, CT, January 2016

· Exploration in STEM Symposium, Stony Brook, NY, Aug. 2015

· Undergraduate Research and Creative Activities Symposium, Stony Brook, April 2015

Optical Demonstration of Gravitational Lensing

· Undergraduate Research and Creative Activities Symposium, Stony Brook, April 2014

A Study of Evolving Caustics Formed by Evaporating Water Droplets

· Frontiers in Optics and Exhibit/Laser Science XXIX, Orlando, FL, Oct. 2013

· Symposium for Summer Research, Stony Brook, NY, Aug. 2013

Census of Blue Stars in the SDSS

· American Astronomical Society Meeting, Long Beach, CA, Winter 2013

· Astronomical Society Meeting (NY), Stony Brook University, Stony Brook, NY, 2012

· Astronomical Society Meeting (NY), Skidmore College, Saratoga, NY, 2011

RESEARCH APPOINTMENTS

University of Arizona, Steward Observatory Tucson, AZ
Graduate Research Assistant *August 2017 - Present*
My current work focuses on constraining the physical, kinematic, and chemical structure of low-mass prestellar cores to better understand their evolution.

NASA Jet Propulsion Laboratory (JPL), Astrophysics Department Pasadena, CA
NASA Sally Ride Fellow *January 2017 - July 2017*
I studied the physical properties and gas kinematics of free-floating evaporating gas globules (FrEGGs) in the W5 star forming region.

Harvard-Smithsonian Center for Astrophysics Cambridge, MA
NSF REU Intern *June 2016 - August 2016*
I reduced data using the *Herschel* HIPE software and worked with MOPRA radio telescope data. My research focused on understanding the properties of infrared dark clouds in the Inner Milky Way, and led to my interest in star formation.

NASA Jet Propulsion Laboratory (JPL), Astrophysics Department Pasadena, CA
NASA UI Intern *August 2015 - December 2015*
I reduced Hubble data from archived observations of ionized gas jets ejected from the dying sun-like star V Hydrae. I analyzed and modeled the data, which led to two published research articles.

Stony Brook University, Physics and Astronomy Department Stony Brook, NY
Undergraduate Researcher *December 2014 - January 2017*
I constructed a project modeling the kinematics and gravitational lensing properties of spiral galaxies. I found using both lensing and kinematics can help reduce bias and provide stronger constraints on the dark matter distributions.

Exploration in STEM Researcher *June 2015 - August 2015*
I was funded through the summer to continue my gravitational lensing project.

Stony Brook University, Laser Teaching Center Stony Brook, NY
Undergraduate Researcher *February 2014 - May 2014*
I constructed a educational and instructional research project which demonstrated the effects of gravitational lensing using a wine glass.

Summer Research Intern *July 2013 - August 2013*
A fully funded summer program in the optics lab at Stony Brook allowed me to study the evolution of caustics patterns formed by evaporating water droplets, with the foresight in mind that this would prepare me for a research project on gravitational lensing.

Rensselaer Polytechnic Institute, Physics and Astronomy Department Troy, NY
Visiting Student Researcher *November 2010 - August 2014*
I analyzed over 10,000 spectra by eye in the Sloan Digital Sky Survey to find that %10 of the objects were mis-classified by the electronic template fitting algorithm. Because of this work I was awarded several scholarships as an INTEL Science Talent Search 2013 finalist.

TEACHING EXPERIENCE

- 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

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

Mentoring & Outreach

- NOIRLab Teen Astronomy Cafe Volunteer (throughout 2019-present) - I assist high school students in participating in hands on demonstrations, working on interative computer activities while they listen to presentations from the scientists at NOIRLab and other institutions.
- Astronomy Camp Counselor (June 2018,2019,2021,2022) - 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.
- 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

Served as Journal Referee/Reviewer (ApJ; October 2021 & July 2022, A&A; April 2021)

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-present)

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-present)

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

TECHNICAL SKILLS

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