

SUMMARY

Research Interests: Astrostatistics and computational astrophysics; high- z quasars, 21cm cosmology, and radio instrumentation.
Publications: 4 as first author (1 in prep), 10 as co-author
Science Talks: 31+ given, 2 scheduled, 7/32 invited
Outreach/Inreach Talks: 13 total, 7/13 invited, 50+ hours of astronomy podcast episodes ([Astro\[sound\]bites Podcast](#))
Science Posters: 15
Mentees: Research (2), Professional (13)

EDUCATION

- PhD**, Physics, **University of Melbourne** Dec 2022–May 2026 (expected)
Dissertation: *Bridging Theory and Observation: What Simulations Reveal About High- z Discoveries with JWST*
Visiting PhD Student at ANU and Swinburne
Advisor: Stuart Wyithe
- MSc**, Physics, **McGill University** 2022
Dissertation: *Constraining reionization density fields and ionospheric errors for radio interferometers*
Advisors: Adrian Liu and Jonathan Sievers
- BA**, Astrophysics, **University of California, Berkeley** 2018
Transferred from Diablo Valley College

FIRST AUTHOR PUBLICATIONS

1. **S. Berger**, A. Gorce, & A. Liu, *Predicting the matter density field from 21cm brightness temperature observations using Bayesian inference with JAX* — **in prep**.
2. **S. Berger**, M. Marshall, S. Wyithe, T. Di Matteo, Y. Ni, S. Wilkins, & M. Yue, *Biases in stellar masses of JWST high- z quasar host galaxies caused by quasar subtraction* — 2025, **submitted MNRAS**.
3. B. Metha and **S. Berger** (Shared first authorship), *A "Rosetta Stone" for Studies of Spatial Variation in Astrophysical Data: Power Spectra, Semivariograms, and Structure Functions* — 2025, **PASP, 137, 7**
4. **S. Berger**, A. Lasinski[†], V. MacKay et al., *First Use of GPS Satellites for Beam Calibration of Radio Dish Telescopes* — 2025, **submitted to PASA** (minor revisions).
5. **S. Berger**, M. Marshall, S. Wyithe, T. Di Matteo, Y. Ni, & S. Wilkins, *Simulated host galaxy analogs of high- z quasars observed with JWST* — 2024, **MNRAS 530, 4**.

2ND AUTHOR PUBLICATIONS

1. W.G. Newton, **S. Berger**, & B. Haskell, *Observational constraints on neutron star crust-core coupling during glitches* — 2015, **MNRAS 454, 4**

¹Publishing as Sabrina Berger.

[†]Indicates a student I mentored.

CO-AUTHORED PUBLICATIONS

1. Roper et al. (incl. **S. Berger**), *Synthesizer: Synthetic Observables For Modern Astronomy* — 2025, **submitted JOSS**.
2. Wilkins et al. (incl. **S. Berger**), *First Light and Reionization Epoch Simulations (FLARES) — XV: The physical properties of super-massive black holes and their impact on galaxies in the early universe* — 2025, **OJAp**, **8**.
3. Cassanelli et al. (incl. **S. Berger**), *A fast radio burst localized at detection to an edge-on galaxy using very-long-baseline interferometry* — 2024 **Nature Astronomy** **8**, **1429–1442**.
4. Cassanelli et al. (incl. **S. Berger**), *Localizing FRBs through VLBI with the Algonquin Radio Observatory 10 m Telescope* — 2022, **AJ** **163**, **65**.
5. The CHIME/FRB Collaboration et al. (incl. **S. Berger**), *The First CHIME/FRB Fast Radio Burst Catalog* — 2021, **ApJS** **257**, **59**.
6. M. Rafiei-Ravandi et al. (incl. **S. Berger**), *CHIME/FRB catalog 1 results: statistical cross-correlations with large-scale structure* — 2021, **ApJ** **922**, **42**.
7. V. Gajjar et al. (incl. **S. Berger**), *Absence of Bursts between 4 and 8 GHz from FRB 20200120E Located in an M81 Globular Cluster* — 2021, **RNAAS** **5**, **166**.
8. D. Michilli et al. (incl. **S. Berger**), *An analysis pipeline for CHIME/FRB full-array baseband data* — 2021, **ApJ** **910**, **147**.
9. FAST Collaboration et al. (incl. **S. Berger**), *Opportunities to SETI with the Five-hundred-meter Aperture Spherical radio Telescope* — 2020, **RAA FAST Special Issue** **20**, **078**.

GRANTS

- Co-PI, French-Australian Science and Innovation Collaboration Grant (USD~\$20K)
-*Deciphering the mysteries of how the first galaxies formed with Square Kilometre Array-Low and Artificial Intelligence* 2025
- Mary H. Brown Fund for *Mental Health in Physics Seminars* (CAD \$1.5K) 2021

FELLOWSHIPS AND SCHOLARSHIPS

- Astronomical Society of Australia Student Travel Grant (AUD \$1K) 2025
- Alan Kenneth Head Travel Grant (AUD \$5K) 2024
- Astronomical Society of Australia Student Travel Grant (AUD \$1.5K) 2024
- University of Melbourne Women in Physics Scholarship (AUD \$1K) 2023
- Melbourne Research Scholarship/Australian RTP (AUD \$290K, including tuition) 2022
- ND Goldsworthy Scholarship (AUD \$21K) 2023
- highest-ranked international students in physics
- Rowden White Scholarship (AUD \$6.5K) 2022
- NSERC NTCO-CREATE Fellowship (CAD \$15K) 2021
- McGill Graduate Mobility Award (CAD \$1.5K) 2021
- Berkeley Physics Undergraduate Research Scholar (USD \$1000) 2017 & 2018
- UC Berkeley Academic Opportunity Fund (USD \$250) 2017
- European Space Agency Young Researcher's Award (€200) 2017

SOFTWARE

Programming Languages: Python (10+ years), Bash, C++, and Java

ML & Stats Tools: numpyro, PyMC3, JAX, Scikit-Learn, and pytorch

HPC: Slurm, MPI, GPU-accelerated workflows

GitHub: <https://github.com/sabrinaastronomy>

INDUSTRY EXPERIENCE	Physicist Intern at Meta (Facebook)	Summer 2021
	Applied machine learning models to classify GPS error with > 90% accuracy; integrated into Facebook's augmented reality products. Received excellent peer and manager performance reviews, leading to a return internship offer.	
	Data Science Intern at NASA Ames	Jan–May 2019
	Applied conditional Generative Adversarial Networks (cGANs) to clean data from the Transiting Exoplanet Survey Satellite (TESS) pipeline. Produced results comparable to those from traditional data cleaning methods.	
CONFERENCE RESEARCH TALKS (20, 1 scheduled)	High-redshift galaxy formation at the interface between simulations and observations (Kerala, India)	<i>scheduled</i> Jan 2026
	sys2025: Systematic and Measurement Errors across the Sciences - Astrostatistics and Data Science (Huntsville, Alabama)	Nov 2025
	Exploring the first billion years of the Universe (Port Douglas, Australia)	Sep 2025
	Australian Astronomical Society Meeting (virtual)	July 2025
	SKA Cosmic Dawn/EoR Meeting 2024 (virtual)	July 2024
	Astro3D Legacy Science Meeting (Sydney, Australia)	June 2024
	COSMO 21–Statistical Challenges in 21cm Cosmology (Chania, Greece)	May 2024
	Massive Black Holes in the Early Universe (Kinsale, Ireland)	May 2024
	Nagoya-Melb. Joint Research Workshop on Cosmology (Nagoya, Japan)	Feb 2024
	ANITA ² Meeting (Monash University)	Feb 2024
	JWST@Sesto (virtual)	July 2023
	Shedding new light on the first billion years of the Universe (virtual)	July 2023
	Astro3D Science Meeting (Perth, Western Australia)	June 2023
	Faculty of Science Research Summit (UniMelb)	Feb 2023
	URSI ³ National Radio Science Meeting (virtual)	Jan 2023
	Assembly of the Order of the Octopus Meeting (virtual)	July 2021
	ESA Extreme Habitable Worlds Conference (Noordwijk, Netherlands)	Dec 2017
	Gulf Coast Undergraduate Research Symposium (Rice University)	Oct 2016
	Emerging Researcher National Conference in STEM (Washington D.C.)	Feb 2015
	APS Conference for Undergraduate Women in Physics (UC Santa Cruz)	Jan 2015
	APS Far West Meeting (University of Nevada, Reno)	Oct 2014
SELECTED UNIVERSITY TALKS (11 given, 1 scheduled, 7/11 invited)	* <i>Galaxies SIG Talk for Habitable Worlds Observatory (virtual)</i>	<i>scheduled, Dec 2025</i>
	* <i>UC Berkeley GalForm Meeting</i>	<i>Nov 2025</i>
	* <i>Stanford KIPAC Seminar</i>	<i>Nov 2025</i>
	Princeton Galaxy Reading Group	Nov 2025
	MIT MATS Talk (USA)	Nov 2025
	* <i>Macquarie University Astro Seminar</i>	<i>Oct 2025</i>
	Australian 3D View of Galaxies Seminar Series (virtual)	Aug 2025
	NRAO Socorro Lunch Talk	May 2025
	* <i>Paris Institut d'Astrophysique Spatiale–Orsay Seminar</i>	<i>May 2024</i>
	Yale Data Science X Astronomy & Astrophysics Seminar (virtual)	Dec 2023
	* <i>University of Melbourne Student Awards Ceremony Speaker</i>	<i>Aug 2023</i>
	* <i>Indiana University Lunch Talk (virtual)</i>	<i>Oct 2020</i>
POSTERS (15)	Inaugural Cosmic Frontier Center Conference (University of Texas, Austin)	May 2025
	Australian Astronomical Society Meeting (Sydney, Australia)	July 2023

²Australian National Institute for Theoretical Astrophysics

³International Union of Radio Science

* *Invited.*

First Light Conference @ MIT (virtual)	June 2023
NTCO-CREATE Research Symposium (Montréal, Canada)	Jul 2022
International HPC Summer School (Kobe, Japan)	Jul 2019
NRAO Radio Frontiers in the Next Decade (Charlottesville, Virginia)	June 2019
AAS #233 (Seattle, Washington)	Jan 2019
NRAO Radio Frontiers in the Next Decade (Portland, Oregon)	June 2018
Emerging Researchers in Exoplanet Science (Penn State University)	June 2018
Berkeley Physics Undergraduate Research Symposium (UC Berkeley)	April 2018
Berkeley Physics Undergraduate Research Symposium (UC Berkeley)	April 2017
APS Conference for Undergraduate Women in Physics (UCLA)	Jan 2017
AAS #229 (Grapevine, TX)	Jan 2017
UC Berkeley Undergraduate Astronomy Research Symposium	July 2016
Conference on Science at Sanford Underground Research Facility (SDSMU)	May 2015

TEACHING EXPERIENCE (University tutor, 7 semesters)	Tutor for <i>Special Relativity</i> , UniMelb (Undergrad Course)	Sem. 2 2023
	Tutor for <i>The Art of Scientific Computing</i> , UniMelb (Grad Course)	Sem. 1/2 2023
	Instructor in Software Engineering for Hackbright Coding Academy	2021–2022
	–Delivered 25 hours of lectures on Python concepts each month.	
	–Provided one-on-one tutoring, mentorship, and project feedback.	
	–Helped 150+ women and non-binary students of all ages learn Python for the first time.	
	Tutor for <i>Astrophysics</i> , McGill (Honors Undergrad/Grad Course)	Fall 2021
	<i>Linux/GitHub Lecture</i> , McDonald Institute Summer for Particle Astrophys.	May 2021
	Tutor for <i>Signal Processing</i> , McGill	Winter 2021/2022
	Tutor for <i>Computational Phys.</i> , McGill (Honors Undergrad/Grad Course)	Fall 2019
	Tutor for <i>Python for Astronomy</i> , UC Berkeley	Winter 2019
	Instructor for Splash Course on Radio Astronomy, UC Berkeley	Feb 2019
	Reader for <i>Stellar Astrophysics</i> , UC Berkeley	Winter 2018
	100+ Hours of Private Physics, Math, Python Tutor	Jan 2016–
	Tutor for NIH Math Community College Students	2016
	Teacher for ProjectASTRO, Ford Elementary School	Sept 2016–June 2017
	–Developed curriculum and instructed a fifth-grade class in astronomy biweekly	
	Volunteer at Chabot Space and Science Center	2014–2015
	Tutor in Astronomy/Italian, Diablo Valley College	2014–2015

OUTREACH (o) & INREACH (i) TALKS (13 total with 7 invited)	* <i>Accessibility in Astronomy Workshop Co-Leader at choir (Maine)</i>	(i) July 2025
	* <i>UniMelb Physics Colloquium on Antarctica Flyover</i>	(i) Feb 2025
	* <i>Notre Dame College, (Victoria, Australia) (virtual, 1 hour)</i>	(o) Nov 2024
	Mental Health in Astronomy at MSSS ⁴ (ANU)	(i) Sept 2024
	Skype a Scientist at Clyde Creek Primary School (virtual, 1 hour)	(o) Aug 2024
	Notre Dame College (Victoria, Australia) (virtual, 1 hour)	(o) May 2024
	* <i>Mental Health in Physics to McGill summer students</i>	(i) July, 2022
	Champlain College (Sherbrooke, Québec, Canada) (1 hour)	(o) March 2022
	Fischer Middle School (San Jose, California) (30 min)	(o) May 2021
	* <i>Women of Science Week at Vanier College (virtual) (1 hour)</i>	(o) Oct 2020
	Vanderbilt University Virtual Star Talk (virtual) (15 min)	(o) Sept 2020
	* <i>Machine Learning in Astronomy at Saratoga High School (1 hour)</i>	(o) Feb 2020
	* <i>Khan Lab School (Mountain View, California) (30 min)</i>	(o) April 2019

**RESEARCH
MENTORSHIP**
(2 students)

Claire Mckee (Master's thesis at University of Melbourne)

* *Invited.*

⁴[Mt. Stromlo Student Seminars](#)

	Topic: AGN in in Rubin/LSST (co-supervised with Rachel Webster)	2025-
	Arianna Lasinski (Undergrad at University of Toronto),	
	Topic: <i>GNSS Beam Calibration</i> (co-supervised with Jonathan Sievers)	2022-
NON-RESEARCH MENTORSHIP (13 students)	UniMelb Physics Group Mentor (6 undergrads)	2023
	InGenius Prep Physics Mentor (paid, 2 undergrads)	Aug 2020–Sept 2021
	CAMPARE-HERA Astronomy Minority Partnership Mentor (Iman Fahmy, now a PhD student at UWashington)	2020–2021
	McGill Graduate Association of Physics Mentoring (3 physics undergrads)	2019–2021
	Canadian Science Fair Mentor for Girls (one middle school student)	April–June 2020
LEADERSHIP AND SERVICE	* <i>Guest on the LIUniverse Podcast with Dr. Charles Liu</i>	Sept 2025
	UniMelb Black Hole Journal Club Founder/Organizer	Dec 2024-
	Reionization in Australia Conference LOC	Dec 2024–Sep 2025
	- Co-lead organizer for a conference (~ 80 attendees) on the <i>First Billion Years in the Universe</i> , held in Port Douglas, Australia.	
	-Led the organization and co-wrote the associated astrobite	
	Astro[sound]bites Podcast Host/Co-host	2022– 2025
	-More than 30K downloads as of June 2025	
	-36 episodes including:	
	- Breaking the Stigma Around Community College (Part I/II) , co-authored associated astrobite	
	- Indigenous Astronomy (Part I/II)	
	- The Pulsar Boomerang	
	UniMelb Women in Physics Industry Panelist	April 2025
	ANITA ⁵ Student Representative	2023–2025
	-LOC and SOC for 2024/2025 ANITA Conferences	
	* <i>UMontréal Astromatic Machine Learning in Astrophysics Workshop Judge</i>	Aug 2022
	McGill Faculty of Science Outreach and Communication Panelist	Jan 2022
	McGill Machine Learning in Astrophysics Journal Club Founder/Organizer	2021–2022
	McGill Graduate Assoc. of Phys.	Jan 2021–Sept 2022
	-Served as Mental Health Officer and Task Force Member, Website Developer	
	-Organized three talks and a workshop, secured \$1500 in funding (>100 attendees)	
	McGill Physics Hackathon Co-organizer	Aug–Dec 2020
	-Lead organizer for 2020 McGill Physics Hackathon attended by 190 people around the world	
	-Covered in the McGill Reporter	
	-Organized eight coding workshops attended by more than 200 people	
	McGill Phys. Matters Outreach Coordinator	Jan–Dec 2020
	McGill Cosmology Journal Club Organizer	Jan–Aug 2020
	Canadian Undergraduate Physics Conference Judge	Nov 2019
	* <i>Speed Dating with Scientists at <i>Notte dei Ricercatori</i> (<i>Night of the Researchers</i>)</i>	
	(University of Bologna)	2017
	President (Vice-Pres. in 2016) of Society of Phys. Students (UC Berkeley)	2016–2018
	Editor at UC Berkeley Undergraduate Scientific Journal	2015–2016
OTHER RESEARCH EXPERIENCE	Breakthrough Listen Undergrad Researcher and 2018 UC Berkeley SURF ⁶	2015–2018
	-Research Topic: <i>FRB pipelines</i> with Vishal Gajjar, Dan Werthimer, and Casey Law. See Li+2020 and Gajjar+2021 .	

⁵Australian National Institute for Theoretical Astrophysics

⁶Summer Undergraduate Research Fellowship

	NSF ⁷ REU ⁸ , University of Chicago	2015–2017
	-Research Topic: Rocky exoplanet modeling with Leslie Rogers. Wrote a Python package for self-consistent rocky exoplanet models with thermal effects (Github).	
	DOE/Italian National Institute of Nuclear Physics Research Exchange Program	2017
	-Research Topic: A study of jet reconstruction algorithms for highly-boosted top quarks with Matteo Negrini.	
	Undergraduate Research Apprenticeship Program, UC Berkeley	2016
	-Research Topic: Cryogenic instrumentation for CMB polarization experiment with POLARBEAR .	
	NSF REU, American Museum of Natural History, NYC	2015
	-Research Topic: Missing satellites problem with Jana Grcevich.	
	NSF REU, Texas A&M Commerce	2014
	-Research Topic: Neutron star theory with William Newton. See Newton+2015 .	
OUTREACH TRAINING	Scientell ASTRO 3D Presentation Skills Training Course at USyd	July 2023
	[†] AAS Outreach Workshop – On-the-Spot Feedback	March–May 2021
	[†] AAS Astronomy Ambassadors Workshop	Jan 2019
PROFESSIONAL MEMBERSHIPS	LSST Junior Associate (full data access), Astronomical Society of Australia (ASA)	
LANGUAGES	Fluent in English (Native) and Italian (B2)	
OTHER	Recipient of CorePower Yoga POC Teacher Training Scholarship	
REFERENCES	<ul style="list-style-type: none"> • Stuart Wyithe — Director/Professor, Research School of Astronomy & Astrophysics, Australian National University Stuart.Wyithe@anu.edu.au • Adélie Gorce — Research Faculty, Institut d’Astrophysique Spatiale (IAS), Université Paris-Saclay adelie.gorce@universite-paris-saclay.fr • Adrian Liu — Professor, Trottier Space Institute, McGill University acliu@physics.mcgill.ca • Rachel Webster — Professor, School of Physics, University of Melbourne r.webster@unimelb.edu.au • Emma Ryan-Weber — Professor, School of Science, Swinburne University of Technology eryanweber@swin.edu.au 	

⁷National Science Foundation

⁸Research Experience for Undergraduates

* *Invited.*

[†] By application only and funded.

**EXPANDED
OUTREACH,
LEADERSHIP,
AND SERVICE**

I build inclusive research communities through

1. **Astronomy Podcasting (astro[sound]bites Host):** Between 2022-2025, I co-hosted and managed [astro\[sound\]bites](#), the podcast spinoff of *Astrobites* which now has over 30,000 downloads worldwide. The show expands access to astrophysics by translating cutting-edge research into an accessible and conversational audio format. I have hosted over 36 episodes (more than 50 hours of astronomy research discussions). I also co-lead and researched conversations on topics beyond research, such as [community college](#) pathways to astrophysics careers, [Indigenous astronomy](#), and [mental health](#) in astrophysics.
2. **Mentoring:** Since 2020, I have mentored 15 students both in research and professional development. One mentee is now a PhD. student at the University of Washington (Iman Fahmy), while another (Arianna Lasinski) co-authored one of my first-author publications and is applying to graduate school with my continued guidance.
3. **Journal Clubs (Founder/Organizer):** In 2024, I founded and continue to organize the Black Hole Journal Club at the University of Melbourne, which attracts more than 25 astrophysicists weekly and was recently described by attendees as “the favorite part of my week because it feels like a fun, inclusive, and supportive place to learn”. I also founded the Machine Learning in Astrophysics Journal Club while at McGill University, which enabled discussion on publications of the latest AI applications in astronomy.
4. **Mental Health Literacy in Academia:** In parallel, I have delivered three talks to promote mental health literacy in academia. As Mental Health Officer for the McGill Graduate Association of Physics, I secured \$1500 in funding to organize a series of talks by physicists sharing their mental health journeys and worked to improve wellbeing resources and awareness across the department.
5. **Teaching:** I have taught Python programming to more than 150 women and non-binary students through an American software engineering bootcamp. Several of my former students now work at major technology companies. I have also taught seven semesters of physics and computing courses across three universities, emphasizing active learning and inclusive pedagogy.
6. **Conference & Hackathon Organization:**
Conferences – I have served on the LOC or SOC for three Australian conferences since 2023, including as co-lead organizer for a high-redshift conference, which brought together more than 80 astronomers from around the world to Australia. I coordinated events to promote student inclusion and assisted with all aspects of conference logistics and planning. I also led and organized an astrobite on the conference.
Hackathon – I co-lead the organization of the 2020 McGill Physics Hackathon, which was attended by 190 hackers worldwide. I led the coordination of eight coding workshops before the hackathon ranging from Python fundamentals to machine learning, attended by over 200 participants.
7. **Public Engagement & Training:** I have delivered 8 outreach talks (4 invited) across the USA, Canada, and Australia. I also completed science communication training through the Scientell ASTRO 3D Presentation Skills Course (2023), AAS On-The-Spot-Feedback Outreach Workshop (2021), and AAS Astronomy Ambassadors Workshop (2019). As the McGill Physics Outreach Coordinator during the COVID-19 pandemic, I organized outreach events for McGill Physics and established an international collaboration between Dyer Observatory at Vanderbilt University and McGill University to host virtual discussions about space and astronomy for public audiences.