

## SUMMARY

**Research Interests:** High- $z$  AGN; 21cm cosmology; astrostatistics; radio instrumentation.

**Publications:** 3 first, 1 first in prep, 1 shared first, 1 second, 9 co-author

**Science Talks:** 25 total, 3 invited

**Outreach Talks:** 13 total, 6 invited, 36+ hours of astronomy podcast episodes ([Astro\[sound\]bites Podcast](#) )

**Science Posters:** 15

**Mentees:** Research (1), Professional (13)

## EDUCATION

**Ph.D.**, Physics, **University of Melbourne** 2022–present

Dissertation: *Leveraging hydrodynamical simulations to quantify how observational biases affect high- $z$  discoveries with JWST*

Visiting PhD Student at ANU and Swinburne

Advisor: Stuart Wyithe

**M.Sc.**, Physics, **McGill University** 2022

Dissertation: *Constraining reionization density fields and ionospheric errors for radio interferometers*

Advisors: Adrian Liu and Jonathan Sievers

**B.A.**, Astrophysics, **UC Berkeley** 2018

## FIRST/SECOND AUTHOR PUBLICATIONS (3 first, 1 first in prep, 1 second, 1 shared first)

1. **S. Berger**, A. Gorce, & A. Liu, *Predicting the matter density field from 21-cm brightness temperature observations using Bayesian inference* — **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**<sup>\*</sup>,<sup>2</sup> *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, et al., *First Use of GPS Satellites for Beam Calibration of Radio Dish Telescopes* — 2025, **R&R at PASA**.
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.
6. W.G. Newton, **S. Berger**, & B. Haskell, *Observational constraints on neutron star crust-core coupling during glitches* — 2015, **MNRAS** **454**, 4

<sup>1</sup>Publishing by Sabrina Berger.

<sup>2</sup>Shared first authorship.

## NTH-AUTHOR PUBLICATIONS

### High-*z*

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**.

### Radio Astronomy

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 Search for Extra-Terrestrial Intelligence with the Five-hundred-meter Aperture Spherical radio Telescope* — 2020, **RAA FAST Special Issue** **20**, **078**.

## 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 Facebook** Summer 2021  
 Applied ML to predict GPS error classification to  $\sim 90\%$  accuracy. Internship project used in Facebook’s augmented reality products. Received high-performance feedback from three peers and a manager, leading to a return internship offer.

**Data Science Intern at NASA Ames** January–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.

## GRANTS

Co-PI, French-Australian Science and Innovation Collaboration Grant (€8000)  
*-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

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  
 Australian Graduate Research Training Program Fellowship (AUD \$~170K) 2022  
 ND Goldsworthy Scholarship (AUD \$~20K) 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
<b>CONFERENCE RESEARCH TALKS (19)</b>	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 <sup>3</sup> 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 <sup>4</sup> National Radio Science Meeting (virtual)	Jan 2023
	Assembly of the Order of the Octopus (SETI <sup>5</sup> ) 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
<b>SELECTED UNIVERSITY TALKS (6)</b>	Australian 3D View of Galaxies Seminar Series (virtual)	August 2025
	NRAO Socorro Lunch Talk (Socorro, New Mexico, USA)	May 2025
	<i>*Institut d’Astrophysique Spatiale–Orsay Seminar (Paris, France)</i>	May 2024
	Yale Data Science X Astronomy & Astrophysics Seminar (virtual)	Dec 2023
	<i>*University of Melbourne Student Awards Ceremony Speaker</i>	Aug 2023
	<i>*Indiana University Lunch Talk (virtual)</i>	Oct 2020
<b>POSTERS (15)</b>	Inaugural Cosmic Frontier Center Conference (UT Austin, Texas)	May 2025
	Australian Astronomical Society Meeting (Sydney, Australia)	July 2023
	First Light Conference @ MIT (virtual)	June 2023
	NTCO-CREATE Research Symposium (Montréal, Québec)	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

<sup>3</sup>Australian National Institute for Theoretical Astrophysics

<sup>4</sup>International Union of Radio Science

<sup>5</sup>Search for Extraterrestrial Intelligence

\* *Invited.*

UC Berkeley Undergraduate Astronomy Research Symposium July 2016  
 Conference on Science at Sanford Underground Research Facility (SDSMU) May 2015

**TEACHING  
EXPERIENCE  
(University tutor  
for 7 semesters)**

Tutor for *Special Relativity*, UniMelb (Undergrad Course) Sem. 2 2023  
 Tutor for *The Art of Scientific Computing*, UniMelb (Grad Course) Sem. 1/2 2023  
 Hackbright Coding Academy for Women Software Engineering Teacher 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 *Astrophysics*, McGill (Honors Undergrad/Grad Course) Fall 2021  
*Linux/GitHub Lecture*, McDonald Institute Summer for Particle Astrophys. May 2021  
 Tutor for *Signal Processing*, McGill Winter 2021/2022  
 Tutor for *Computational Phys.*, McGill (Honors Undergrad/Grad Course) Fall 2019  
*Python for Astronomy* Tutor, UC Berkeley Winter 2019  
 UC Berkeley Splash Course Teacher (SETI/Radio Astronomy) Feb 2019  
 Reader for *Stellar Astrophysics*, UC Berkeley Winter 2018  
 100+ Hours of Private Physics, Math, Python Tutor Jan 2016–  
 NIH Math Tutor for Community College Students 2016  
 ProjectASTRO Teacher at 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  
 Diablo Valley College Astronomy/Italian Tutor 2014–2015

**OUTREACH  
TALKS (13 total  
with 7 invited)**

\* *Accessibility in Astronomy Workshop Co-Leader at ChOIR (Maine, USA)* July 2025  
 \* *UniMelb Physics Colloquium on Antarctica Flyover* Feb 2025  
 \* *Notre Dame College, (Victoria, Australia) (virtual, 1 hour)* Nov 2024  
 Mental Health in Astronomy at MSSS<sup>6</sup> (ANU) Sep 2024  
 Skype a Scientist at Clyde Creek Primary School (virtual, 1 hour) Aug 2024  
 Notre Dame College (Victoria, Australia) (virtual, 1 hour) May 2024  
 \* *Mental Health in Physics to McGill summer students* July, 2022  
 Champlain College (Sherbrooke, Québec, Canada) (1 hour) March 2022  
 Fischer Middle School\* (San Jose, California) (30 min) May 2021  
 \* *Women of Science Week at Vanier College (virtual) (1 hour)* Oct 2020  
 Vanderbilt University Virtual Star Talk (virtual) (15 min) Sept 2020  
 \* *Machine Learning in Astronomy at Saratoga High School (1 hour)* Feb 2020  
 \* *Khan Lab School (Mountain View, California) (30 min)* April 2019

**RESEARCH  
MENTORSHIP  
(1 student)**

Arianna Lasinski (Undergrad at University of Toronto), *GNSS Beam Calibration* 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

\* *Invited.*

<sup>6</sup>Mt. Stromlo Student Seminars

<b>LEADERSHIP AND INREACH</b>	<a href="#">Astro[<a href="#">sound</a>]<a href="#">bites</a> Podcast</a> Host/Co-host	April 2022–June 2025
	-More than 30K downloads as of June 2025 -36 episodes including: - <a href="#">Breaking the Stigma Around Community College (Part I/II)</a> , co-authored associated <a href="#">astrobite</a> - <a href="#">Indigenous Astronomy (Part I/II)</a> - <a href="#">The Pulsar Boomerang</a>	
	UniMelb Women in Physics Industry Panelist	April 2025
	<a href="#">Reionization in Australia Conference LOC</a>	Dec 2024-
	UniMelb Black Hole Journal Club Founder/Organizer	Dec 2024-
	ANITA <sup>7</sup> Student Representative	2023- 2025
	-LOC and SOC for 2024/2025 ANITA Conferences	
	<i>*UMontréal Astromatic Machine Learning in Astrophysics Workshop Judge</i>	<i>Aug 2022</i>
	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 Phys. Hackathon Co-Lead Organizer	Aug–Dec 2020
	-Hackathon attended by >190 hackers around the world	
	-Event covered in <a href="#">McGill Reporter</a>	
	McGill Phys. Matters Outreach Coordinator	Jan–Dec 2020
	McGill Cosmology Journal Club Organizer	Jan–Aug 2020
	Canadian Undergraduate Physics Conference Judge	Nov 2019
	President (Vice-Pres. in 2016) of Society of Phys. Students (UC Berkeley)	2016–2018
	Editor at UC Berkeley Undergraduate Scientific Journal	2015– 2016
<b>OTHER RESEARCH EXPERIENCE</b>	UC Berkeley Summer Undergraduate Research Fellow	2018
	-Research Topic: <i>FRB pipelines</i> with Casey Law/Dan Werthimer/Vishal Gajjar	
	NSF <sup>8</sup> REU <sup>9</sup> , University of Chicago	2017
	-Research Topic: <i>Rocky exoplanet modeling</i> with Leslie Rogers	
	Italian National Institute of Nuclear Physics Research Exchange Program	2017
	Undergraduate Research Apprenticeship Program, UC Berkeley	2016
	NSF REU, American Museum of Natural History, NYC	2015
	-Research Topic: <i>Missing satellites problem</i> with Jana Grcevich	
<b>OUTREACH TRAINING</b>	NSF REU, Texas A&M Commerce	2014
	-Research Topic: <i>Neutron star theory</i> with William Newton	
	Scientell ASTRO 3D Presentation Skills Training Course at USyd	July 2023
	<sup>†</sup> <a href="#">AAS Outreach Workshop – On-the-Spot Feedback</a>	March–May 2021
	<sup>†</sup> AAS Astronomy Ambassadors Workshop	Jan 2019
<b>PROFESSIONAL MEMBERSHIPS</b>	LSST Junior Associate (full data access), Australian Society of Astronomy (ASA)	
<b>LANGUAGES</b>	Fluent in English (Native) and Italian (B2)	
<b>OTHER</b>	Recipient of CorePower Yoga Black, Indigenous, and People of Color Scholarship	

<sup>7</sup> Australian National Institute for Theoretical Astrophysics

<sup>8</sup> National Science Foundation

<sup>9</sup> Research Experience for Undergraduates

\* *Invited.*

<sup>†</sup> By application only and funded.