

Sabrina Berger-Marcelo¹

Website: <https://sabrinaastronomy.github.io/>
Citizenship: USA

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

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| PhD , Physics, University of Melbourne | Dec 2022–May 2026 (expected) |
| Dissertation: <i>Bridging Theory and Observation: What Simulations Reveal About High-z Discoveries with JWST</i> | |
| Visiting PhD Student at ANU and Swinburne | |
| Advisor: Stuart Wyithe | |

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| MSc , Physics, McGill University | 2022 |
| Dissertation: <i>Constraining reionization density fields and ionospheric errors for radio interferometers</i> | |
| Advisors: Adrian Liu and Jonathan Sievers | |

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| BA , Astrophysics, University of California, Berkeley | 2018 |
| Transferred from <i>Diablo Valley College</i> | |

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.

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| CO-AUTHORED PUBLICATIONS | <ol style="list-style-type: none"> 1. Roper et al. (incl. S. Berger), <i>Synthesizer: Synthetic Observables For Modern Astronomy</i> — 2025, submitted JOSS. 2. Wilkins et al. (incl. S. Berger), <i>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</i> — 2025, OJAp, 8. 3. Cassanelli et al. (incl. S. Berger), <i>A fast radio burst localized at detection to an edge-on galaxy using very-long-baseline interferometry</i> — 2024 Nature Astronomy 8, 1429–1442. 4. Cassanelli et al. (incl. S. Berger), <i>Localizing FRBs through VLBI with the Algonquin Radio Observatory 10 m Telescope</i> — 2022, AJ 163, 65. 5. The CHIME/FRB Collaboration et al. (incl. S. Berger), <i>The First CHIME/FRB Fast Radio Burst Catalog</i> — 2021, ApJS 257, 59. 6. M. Rafiei-Ravandi et al. (incl. S. Berger), <i>CHIME/FRB catalog 1 results: statistical cross-correlations with large-scale structure</i> — 2021, ApJ 922, 42. 7. V. Gajjar et al. (incl. S. Berger), <i>Absence of Bursts between 4 and 8 GHz from FRB 20200120E Located in an M81 Globular Cluster</i> — 2021, RNAAS 5, 166. 8. D. Michilli et al. (incl. S. Berger), <i>An analysis pipeline for CHIME/FRB full-array baseband data</i> — 2021, ApJ 910, 147. 9. FAST Collaboration et al. (incl. S. Berger), <i>Opportunities to SETI with the Five-hundred-meter Aperture Spherical radio Telescope</i> — 2020, RAA FAST Special Issue 20, 078. |
| GRANTS | <p>Co-PI, French-Australian Science and Innovation Collaboration Grant (USD~\$20K) <i>-Deciphering the mysteries of how the first galaxies formed with Square Kilometre Array-Low and Artificial Intelligence</i> 2025</p> <p>Mary H. Brown Fund for <i>Mental Health in Physics Seminars</i> (CAD \$1.5K) 2021</p> |
| FELLOWSHIPS AND SCHOLARSHIPS | <p>Astronomical Society of Australia Student Travel Grant (AUD \$1K) 2025</p> <p>Alan Kenneth Head Travel Grant (AUD \$5K) 2024</p> <p>Astronomical Society of Australia Student Travel Grant (AUD \$1.5K) 2024</p> <p>University of Melbourne Women in Physics Scholarship (AUD \$1K) 2023</p> <p>Melbourne Research Scholarship/Australian RTP (AUD \$290K, including tuition) 2022</p> <p>ND Goldsworthy Scholarship (AUD \$21K) 2023 -highest-ranked international students in physics</p> <p>Rowden White Scholarship (AUD \$6.5K) 2022</p> <p>NSERC NTCO-CREATE Fellowship (CAD \$15K) 2021</p> <p>McGill Graduate Mobility Award (CAD \$1.5K) 2021</p> <p>Berkeley Physics Undergraduate Research Scholar (USD \$1000) 2017 & 2018</p> <p>UC Berkeley Academic Opportunity Fund (USD \$250) 2017</p> <p>European Space Agency Young Researcher's Award (€ 200) 2017</p> |
| SOFTWARE | <p>Programming Languages: Python (10+ years), Bash, C++, and Java</p> <p>ML & Stats Tools: numpyro, PyMC3, JAX, Scikit-Learn, and pytorch</p> <p>HPC: Slurm, MPI, GPU-accelerated workflows</p> <p>GitHub: https://github.com/sabrinaastronomy</p> |

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

²Australian National Institute for Theoretical Astrophysics

³International Union of Radio Science

* *Invited.*

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| 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 |

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| 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 |

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| 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)</i> (1 hour) | (o) Oct 2020 |
| | Vanderbilt University Virtual Star Talk (virtual) (15 min) | (o) Sept 2020 |
| | * <i>Machine Learning in Astronomy at Saratoga High School</i> (1 hour) | (o) Feb 2020 |
| | * <i>Khan Lab School (Mountain View, California)</i> (30 min) | (o) April 2019 |

RESEARCH MENTORSHIP (2 students)

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

^{*} Invited.

⁴Mt. Stromlo Student Seminars

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| NON-RESEARCH MENTORSHIP (13 students) | Topic: AGN in Rubin/LSST (co-supervised with Rachel Webster) Arianna Lasinski (Undergrad at University of Toronto), Topic: <i>GNSS Beam Calibration</i> (co-supervised with Jonathan Sievers) | 2025-2022 |
| | 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 |
| LEADERSHIP AND SERVICE | Canadian Science Fair Mentor for Girls (one middle school student) | April–June 2020 |
| | * Guest on the LIUniverse Podcast with Dr. Charles Liu | 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 | |
| NON-TEACHING VOLUNTEER WORK | - 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 | |
| TEACHING ASSISTANT WORK | * UMontréal Astromatic Machine Learning in Astrophysics Workshop Judge | 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 | |
| TEACHING WORK | McGill Phys. Matters Outreach Coordinator | Jan–Dec 2020 |
| | McGill Cosmology Journal Club Organizer | Jan–Aug 2020 |
| | Canadian Undergraduate Physics Conference Judge | Nov 2019 |
| | * Speed Dating with Scientists at Notte dei Ricercatori (Night of the Researchers) | |
| | (University of Bologna) | 2017 |
| UNDERGRADUATE RESEARCH EXPERIENCE | President (Vice-Pres. in 2016) of Society of Phys. Students (UC Berkeley) | 2016–2018 |
| | Editor at UC Berkeley Undergraduate Scientific Journal | 2015–2016 |
| | Breakthrough Listen Undergrad Researcher and 2018 UC Berkeley SURF ⁶ | 2015–2018 |
| POSTGRADUATE RESEARCH EXPERIENCE | - 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

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| 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: <i>Missing satellites problem</i> with Jana Grcevich. | |
| NSF REU, Texas A&M Commerce | 2014 |
| -Research Topic: Neutron star theory with William Newton. See Newton+2015 . | |

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| 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**
- **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-led 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-led 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.