Amanda M. Cook

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cookamanda.github.io

Education

Ph.D. Astronomy and Astrophysics, University of Toronto, Toronto ON 2025
Thesis Title: "*Fast Radio Burst Statistics in Space and Time*"
Thesis Supervisors: Prof. Gwendolyn Eadie, Prof. Bryan Gaensler, Prof. Paul Scholz

B.Sc. First Class Honours in Mathematics and Physics McGill University, Montreal QC 2019
Thesis Title: *"Survey for Repeating Radio Transients with CHIME/FRB"*
Thesis Supervisors: Prof. Victoria Kaspi, Dr. Ziggy Pleunis

Awards

Banting Postdoctoral Fellowship – National, $140,000, Research, 2025-2027
Marcel Grossmann Award *as member of CHIME/FRB* – International, Research 2024
Walter C. Sumner Fellowship – National, $16,000, Research, 2022-2024
NSERC Brockhouse Prize, *as member of CHIME/FRB* – National, Research 2022
NSERC PGS-D – National, $82,000, Research 2022-2025
AAS Lancelot M. Berkley award, *as member of CHIME/FRB* – International, Research 2022
Dunlap Institute 'You got us through 2022' Award – for my service as the president of the UofToronto Graduate Astronomy Students Association 2022
Ontario Graduate Scholarship – Provincial, $15,000, Research 2021
Dunlap Student Training Grant *to attend Penn State Astrostats Summer School* 120 USD 2021
Dunlap Institute Seed Funding *as a member of LUVS* – Institutional, $67,182, Research 2021
Dunlap Institute Seed Funding *as a member of LUVS* – Institutional, $26,046, Research 2020
Governer General's Innovation Award, *as member of CHIME/FRB* – National, Research 2020
Student Internship Stipend, JPL/Caltech – Institutional, $8000, Research 2018
Student Poster Award, Canadian Undergraduate Research Conference – Communication 2017
Undergraduate Student Research Award, NSERC – National, $4500, Research 2017
Undergraduate Research Award, McGill University – Institutional, $1625, Research 2017
Supplement de NSERC USRA, Fonds de recherche du Québec – Provincial, $2000, Research 2017
Higher Education Award, Enbridge – Institutional, $6900, Academic 2015
Rutherford Scholarship, Government of Alberta – Provincial, $2500, Academic 2015

First Author Publications

[1] **Cook, A. M.**, Li, D., Eadie, G. M., Stenning, D. C., Scholz, P., Bingham, D., Craiu, R., Gaensler, B. M., and 7 colleagues (2024). *k-Contact Distance for Noisy Nonhomogeneous Spatial Point Data with application to Repeating Fast Radio Burst sources*, Submitted to Annals of Applied Statistics (16-10-2024), eprint arXiv:2410.12146. The peer review process for statistics papers takes 18 months on average.

[2] **Cook, A. M.**, Scholz, P., Pearlman, A. B., Abbott, T. C., Cruces, M., Gaensler, B. M., Dong, F. A., Michilli, D., and 15 colleagues (2024). *Contemporaneous X-ray Observations of 30 Bright Radio Bursts from the Prolific Fast Radio Burst Source FRB 20220912A*, The Astrophysical Journal, Volume 974, Issue 2, id.170 (2 citations)

[3] **Cook, A. M.**, Bhardwaj, M., Gaensler, B. M., Scholz, P., Eadie, G. M., Hill, A. S., Kaspi, V. M., Masui, K. W., and 20 colleagues (2023). *An FRB Sent Me a DM: Constraining the Electron Column of the Milky Way Halo with Fast Radio Burst Dispersion Measures from CHIME/FRB*, The Astrophysical Journal, Volume 946, Issue 2, id.58, 14 pp. (50 citations)

[4] **Cook, A.** (2018) Exploration of Fermi-LAT Data: An Analysis of Pulsar J1930+1852, McGill Science Undergraduate Research Journal, 13, 12-15 (B.Sc. work)

COLLAB. PUBLICATIONS

[1] **CHIME/FRB Collaboration** (2023). CHIME/FRB Discovery of 25 Repeating Fast Radio Burst Sources, The Astrophysical Journal, Volume 947, Issue 2, id.83, 31 pp. (92 citations)
Individual Contribution: I defined the sample for publication by developing a method to characterize probability of chance coincidence of each of the candidate repeaters. This quantifies the likelihood that each cluster of bursts with positions consistent within errors would be physically unrelated to one another. For CHIME, a telescope with uneven exposure on the sky and significant uncertainties in burst localization, this is a non-trivial problem with consequences for modelling and follow-up efforts. This work included the practical implementation of the methodology and writing sections of the paper.

[2] **CHIME/FRB Collaboration** (2021). The First CHIME/FRB Fast Radio Burst Catalog, The Astrophysical Journal Supplement Series, Volume 257, Issue 2, id.59, 41 pp. (406 citations)
Individual Contribution: I maintained and developed software within CHIME/FRB's realtime pipeline, including the 'known source sifter' which identifies any associated sources with each detected pulse, and the L4 pipeline, which coordinates, for each detected pulse, the actions taken by the system (intensity/baseband callbacks, community notifications) according to the science priorities of the team. In addition, I helped classify signals to discriminate between real and non-astrophysical during regular monitoring shifts for the experiment. I also measured physical parameters (burst widths, fluences, etc) for a subset of the bursts.

[3] **CHIME/FRB Collaboration** (2020). A bright millisecond-duration radio burst from a Galactic magnetar, Nature, Volume 587, Issue 7832, p.54-58 (654 citations)
Individual Contribution: I crafted the argument confirming the FRB's measured DM was consistent with having originated from the magnetar, using free electron models of the Galaxy and the magnetar's X–ray absorbing column density. This evidence was essential to our paper claiming we had detected the first FRB with known progenitor—a Galactic magnetar.

NTH AUTHOR PUBLICATIONS

[1] Mckinven, R., Bhardwaj, M., Eftekhari, T., Kilpatrick, C. D., Kirichenko, A., and 39 colleagues including **Cook, A. M.** (2025). A pulsar-like polarization angle swing from a nearby fast radio burst, Nature, Volume 637, Issue 8044, pp. 43-47 (18 citations)

[2] Pearlman, A. B., Scholz, P., Bethapudi, S., Hessels, J. W. T., Kaspi, V. M., and 24 colleagues including **Cook, A. M.** (2025). Multiwavelength constraints on the origin of a nearby repeating fast radio burst source in a globular cluster, Nature Astronomy, Volume 9, p. 111-127 citations: 18

[3] Abbott, T. C., Zwaniga, A. V., Brar, C., Kaspi, V. M., Petroff, E., and 10 colleagues including **Cook, A. M.** (2025). frb-voe: A Real-time Virtual Observatory Event Alert Service for Fast Radio Bursts, The Astronomical Journal, Volume 169, Issue 1, id.39, 7 pp.

[4] Ibik, A. L., Drout, M. R., Gaensler, B. M., Scholz, P., Sridhar, N., and 23 colleagues including **Cook, A. M.** (2024). A Search for Persistent Radio Sources toward Repeating Fast Radio Bursts Discovered by CHIME/FRB, The Astrophysical Journal, Volume 976, Issue 2, id.199, 30 pp. (4 citations)

[5] Lin, H.-H., Scholz, P., Ng, C., Pen, U.-L., Bhardwaj, M., and 44 colleagues including **Cook, A. M.** (2024). Do All Fast Radio Bursts Repeat? Constraints from CHIME/FRB Far Sidelobe FRBs, The Astrophysical Journal, Volume 975, Issue 1, id.75, 25 pp. (13 citations)

[6] Shin, K., Leung, C., Simha, S., Andersen, B. C., Fonseca, E., and 29 colleagues including **Cook, A. M.** (2024). Investigating the sightline of a highly scattered FRB through a filamentary structure in the local Universe, eprint arXiv:2410.07307 (3 citations)

[7] Curtin, A. P., Sirota, S., Kaspi, V. M., Tendulkar, S. P., Bhardwaj, M., and 10 colleagues including **Cook, A. M.** (2024). Constraining Near-simultaneous Radio Emission from Short Gamma-Ray Bursts Using CHIME/FRB, The Astrophysical Journal, Volume 972, Issue 1, id.125, 19 pp. (4 citations)

[8] Bhardwaj, M., Michilli, D., Kirichenko, A. Y., Modilim, O., Shin, K., and 23 colleagues including

Cook, A. M. (2024). Host Galaxies for Four Nearby CHIME/FRB Sources and the Local Universe FRB Host Galaxy Population, The Astrophysical Journal Letters, Volume 971, Issue 2, id.L51, 27 pp. (28 citations)

[9] **CHIME/FRB Collaboration** (2024). Updating the First CHIME/FRB Catalog of Fast Radio Bursts with Baseband Data, The Astrophysical Journal, Volume 969, Issue 2, id.145, 17 pp. (19 citations)

[10] Dong, F. A., Clarke, T., Curtin, A. P., Kumar, A., Stairs, I., and 16 colleagues including **Cook, A. M.** (2024). The discovery of a nearby 421 s transient with CHIME/FRB/Pulsar, eprint arXiv:2407.07480 (9 citations)

[11] Pandhi, A., Pleunis, Z., Mckinven, R., Gaensler, B. M., Su, J., and 21 colleagues including **Cook, A. M.** (2024). Polarization Properties of 128 Nonrepeating Fast Radio Bursts from the First CHIME/FRB Baseband Catalog, The Astrophysical Journal, Volume 968, Issue 2, id.50, 34 pp. (16 citations)

[12] Ibik, A. L., Drout, M. R., Gaensler, B. M., Scholz, P., Michilli, D., and 16 colleagues including **Cook, A. M.** (2024). Proposed Host Galaxies of Repeating Fast Radio Burst Sources Detected by CHIME/FRB, The Astrophysical Journal, Volume 961, Issue 1, id.99, 17 pp. (31 citations)

[13] Dong, F. A., Crowter, K., Meyers, B. W., Pleunis, Z., Stairs, I., and 11 colleagues including **Cook, A. M.** (2023). The second set of pulsar discoveries by CHIME/FRB/Pulsar: 14 rotating radio transients and 7 pulsars, Monthly Notices of the Royal Astronomical Society, Volume 524, Issue 4, pp.5132-5147 (20 citations)

[14] Sand, K. R., Breitman, D., Michilli, D., Kaspi, V. M., Chawla, P., and 29 colleagues including **Cook, A. M.** (2023). A CHIME/FRB Study of Burst Rate and Morphological Evolution of the Periodically Repeating FRB 20180916B, The Astrophysical Journal, Volume 956, Issue 1, id.23, 19 pp. (13 citations)

[15] Curtin, A. P., Tendulkar, S. P., Josephy, A., Chawla, P., Andersen, B., and 19 colleagues including **Cook, A. M.** (2023). Limits on Fast Radio Burst-like Counterparts to Gamma-Ray Bursts Using CHIME/FRB, The Astrophysical Journal, Volume 954, Issue 2, id.154, 16 pp. (16 citations)

[16] Michilli, D., Bhardwaj, M., Brar, C., Gaensler, B. M., Kaspi, V. M., and 25 colleagues including **Cook, A. M.** (2023). Subarcminute Localization of 13 Repeating Fast Radio Bursts Detected by CHIME/FRB, The Astrophysical Journal, Volume 950, Issue 2, id.134, 12 pp. (31 citations)

[17] Bhardwaj, M., Gaensler, B. M., Kaspi, V. M., Landecker, T. L., Mckinven, R., and 21 colleagues including **Cook, A. M.** (2021). A Nearby Repeating Fast Radio Burst in the Direction of M81, The Astrophysical Journal Letters, Volume 910, Issue 2, id.L18, 14 pp. (200 citations)

[18] Scholz, P., **Cook, A. M.**, Cruces, M., Hessels, J. W. T., Kaspi, V. M., and 33 colleagues (2020). Simultaneous X-Ray and Radio Observations of the Repeating Fast Radio Burst FRB 180916.J0158+65, The Astrophysical Journal, Volume 901, Issue 2, id.165, 9 pp. (50 citations)

SHORT NOTICE PUBLICATIONS /ALERTS

Astronomer's Telegram #17021 & GCN Circular #39216: *CHIME/FRB source FRB 20250206A detected less than 1 minute after LVK binary merger S250206dm, however the probability of spatial coincidence is order 0.1%* 2025

OBSERVING PROPOSALS (AS PI)

'Simultaneous XMM-Newton and Radio observations of Repeating FRBs' Submitted as PI to *XMM-Newton* AO-21. Time Awarded: 42ks 2021

FRB 20220912A High-Urgency Target of Opportunity, Submitted as PI to *Swift*. Awarded two visits, 24 hours apart to provide simultaneous exposure to CHIME/FRB. 2022

PRESENTATIONS

*Presenter indicated by ***

INVITED

[1] ***Cook, A. M.***, Scholz, P., Stenning, D., Bingham, D., Eadie, G., *Towards Solving the Fast Radio Burst Enigma: Probability of Event Chance Coincidence for Inhomogeneous Noisy Spatial Point Processes*, Computational and Methodological Statistics (Dec 2025) Kings College, London, (20

minutes), International Conference

[2] ***Cook, A. M.***, Scholz, P., Stenning, D., Bingham, D., Eadie, G., *Towards Solving the Fast Radio Burst Enigma: Probability of Event Chance Coincidence for Inhomogeneous Noisy Spatial Point Processes*, Joint Statistical Meeting (Aug 2025), Nashville, Tennessee (20 minutes), International Conference

[3] ***Cook, A. M.*** Fast Radio Bursts: A Cosmic Mystery. Astronomy on Tap, Toronto, Canada, November 2024, Public Talk

[4] **Cook, A. M.**, Scholz, P., Stenning, D., Bingham, D., *Eadie, G.*,*Towards Solving the Fast Radio Burst Enigma: Probability of Event Chance Coincidence for Inhomogeneous Noisy Spatial Point Processes*, Joint Statistical Meeting 2023 (20 minutes), International Conference

[5] ***Cook, A. M.***, Bhardwaj, M., Gaensler, B.M., Scholz, P., Eadie, G., Constraining the Plasma in the Milky Way's Halo with CHIME/FRB, 'FLASH Talk', UC Santa Cruz, May 2024, (45+15 minutes), Institutional Seminar

[6] **Cook, A. M.**, Scholz, P., Stenning, D., Bingham, D., *Eadie, G.*, *Towards Solving the Fast Radio Burst Enigma: Probability of Event Chance Coincidence for Inhomogeneous Noisy Spatial Point Processes*, Joint Statistical Meeting 2023 (20 minutes), International Conference

[7] ***Cook, A. M.***, Bhardwaj, M., Gaensler, B.M., Scholz, P., Eadie, G., Constraining the Plasma in the Milky Way's Halo with CHIME/FRB, Plenty of Room at the Bottom; Fast Radio Bursts in our Backyard Cornell University, October 2022, 20 minutes, International Workshop

[8] ***Cook, A. M.***, Gaensler, B.M., Scholz, P., Eadie, G., Constraining the Plasma in the Milky Way's Halo with CHIME/FRB, Caltech Tea Talk, Nov 2021, Invited speaker (45+15 minutes), Institutional Seminar

CONTRIBUTED

[1] ***Cook, A. M.*** & CHIME/FRB Collaboration. CHIME/FRB's Fourth Repeater Catalogue. FRB 2024, Khao Lak, Thailand. November 2024, Flash Talk (3+2 minutes), International Conference

[2] ***Cook, A. M.***, Bhardwaj, M., Gaensler, B.M., Scholz, P., Eadie, G., Constraining the Plasma in the Milky Way's Halo with CHIME/FRB, Multiphase Madness, Harvard–Smithsonian Center for Astrophysics, August 2024 (15+5 minutes), International Workshop

[3] ***Cook, A. M.***, Scholz, P., Stenning, D. C., Bingham, D., Eadie, G., Towards Solving the Fast Radio Burst Enigma: Probability of Event Chance Coincidence for Inhomogeneous Noisy Spatial Point Processes., May 2024, Hot Wiring the Transient Universe VII (10+3 minutes), International Workshop

[4] ***Cook, A. M.***, Scholz, P., Stenning, D., Bingham, D., Eadie, G., Towards Solving the Fast Radio Burst Enigma: Probability of Event Chance Coincidence for Inhomogeneous Noisy Spatial Point Processes., October 2023, Astrostats in Canada and Beyond (20 minutes), National Workshop

[5] ***Cook, A. M.***, Bhardwaj, M., Gaensler, B.M., Scholz, P., Eadie, G., Constraining the Plasma in the Milky Way's Halo with CHIME/FRB, Gas Evolution in and Around Galaxies, Stanley Idaho, August 2023 (20 minutes), International Workshop

[6] ***Cook, A. M.***, Gaensler, B.M., Scholz, P., Eadie, G., Constraining the Plasma in the Milky Way's Halo with CHIME/FRB, FRB 2021 (12+3 minutes), International Conference

[7] Chen S., **Cook, A. M.**, *Taylor, J.* , Tohuvavohu A. (2020) Preliminary design for a small UV space telescope. Poster Presentation, CASCA 2020, National Conference

[8] ***Cook, A. M.***, Amsellem, A., Pearlman, A. B., Arzoumanian, Z., Enoto, T., Gendreau, K., Horiuchi, S., Kocz, J., Kuiper, T., Majid, W. A., Naudet, C., Prince, T. (2019) Radio and X-ray Monitoring of the Recently Reactivated Magnetar PSR J1622-4950, Oral Presentation, 233rd Meeting of the American Astronomical Society, International Conference (BSc work)

[9] ***Cook, A. M.*** (2017) Exploration of Fermi-LAT Data: An Analysis of Pulsar J1930+1852, Poster Presentation Canadian Undergraduate Physics Conference, National Conference (BSc work)

Other Experience

Visiting Astrostatistics Researcher, Canadian Statistical Sciences Institute (CANSSI) 2023
Supervised by Prof. David Stenning, Prof. Derek Bingham
- Collaborated on astrostastics methodology with experts at Simon Fraser University
- Wrote paper submitted to the Annals of Applied Statistics
- Visit was sponsored by a 'Collaborative Research Team' grant from CANSSI

Undergraduate Researcher in High Energy Astrophysics, University of Kyoto 2019
Supervised by Prof. Teruaki Enoto
- Developed periodicity search pipeline for archival NICER observations of neutron stars which had a reported period from radio observations but had not yet been seen to emit periodically in X-ray emission.

Student Intern, Caltech & NASA Jet Propulsion Labs 2018
"X-ray Monitoring of Magnetar PSR J1622-4950"/"All-Sky Survey for Radio Transients"
Supervised by Dr. Walid Majid
- Conducted multi-wavelength analysis of magnetar following its reactivation in radio emission using X-ray data from NICER and gamma-ray data from Fermi-LAT. Analysis included periodicity searches and maximum likelihood region modeling
- Assisted a team developing an efficient processing pipeline to search for FRBs in archival data from the Deep Space Network

Undergraduate Researcher, McGill University 2017
"Gamma-ray Astrophysics with Fermi-LAT"
Supervised by Prof. Ken Ragan
- Investigated astrophysical objects and systems of interest to VHE observatories using Fermi-LAT data and analysis tools. Analysis included pulsar timing, spectral energy distribution modelling and maximum likelihood fitting of gamma-ray photon event data.

Teaching

Graduate Teaching Assistant, University of Toronto 2019-2023
As a Teaching Assistant:
- Creating and leading weekly tutorials and coding workshops
- Holding office hours and offering assistance with lab report completion

As the Head Tutorial TA for the largest course in North America:
- developed tutorial content for students
- developed material about effective online teaching during the 2020 pandemic
- managed a team of more than a dozen TAs and led weekly preparation meetings

Course topics include practical/observational astronomy, stellar astrophysics, radiation, and cosmology for third year students in the astronomy specialist program and observational astronomy for non-astronomy students (AST 326, AST 301, AST 320, AST 101, AST 201, AST 101).

Grader, (MATH 325) McGill University 2018
Supervised by Prof. Antony Humphries

Service

Referee since 2024
I regularly accept requests to serve as a peer reviewer for leading astronomy journals, including *Astronomy & Astrophysics* and the *Astrophysical Journal*

Collaboration Member, CHORD/FRB Since 2024
Roles/Responsibilities include:
- Pipeline Developer: Writing the analysis pipeline that will be used to process baseband data from CHORD/FRB

Co-Chair Annual Fast Radio Burst Conference "FRB 2025" 2024–2025
In a duo of co-chairs, chosen to host the next edition of the annual FRB conference. This will be a five-day international hybrid meeting in July 2025 with an expected attendance of 200. Includes oversight of a scientific and local organizing committee with 25 total members.

Collaboration Member, CHIME/FRB Since 2019

Roles/Responsibilities include:

- System Admin: Address issues escalated by system monitors and assist the system/science experts to help resolve system issues.
- Pipeline Expert: maintenance and continued development of number of pipelines and software 'actors' within the telescope, including the 'known source sifter' which identifies any associated sources with each detected pulse in real time, the L4 pipeline, which coordinates, for each detected pulse, the actions taken by the system (intensity/baseband callbacks) according to the science priorities of the team and stores a database of astrophysical events
- Convener of biweekly "Counterparts Working Group" (2020-2024) and "Probes Working Group" (since 2024) meetings, oversee relevant projects

Chandra Peer Review Time Allocation Committee Member Center for Astrophysics 2024
Reviewing proposals for target of opportunity observations for Chandra Cycle 26

Instrumentation Summer School Admissions Committee Dunlap Institute 2023
Reviewed candidate's application material and made admissions rankings, allocated available travel funds.

Local Organizing Committee Member Dunlap Institute & CHIME/FRB 2023
"Multi-wavelength follow-up of fast radio bursts in the era of routine (sub)arcsecond localizations", a two-day hybrid meeting in April 2023 with invited plenary talks and discussion groups.

Public Outreach Volunteer Dunlap Institute/University of Toronto 2019-2024
Highlights include:

- Astro On Tap Speaker
- Invited guest speaker at Cawthra High School STEM conference
- Filmed three episodes of 'Cosmos on your Couch', a YouTube series aimed at non-astronomers
- Hosted a panel of experts to speak about the Ethics of Space Colonization at the Dunlap Institute's 2021 'Planet Party'. This event drew 2.3k viewers.
- Multiple appearances as a panelist for becoming an astronomer for students at the high school to senior undergraduate level.

Executive Committee, *President*, Graduate Astronomy Students Association, DADDAA 2021-2022

- Assisted in organizing opportunities for graduate students to meet candidates and collating the student's feedback for three astronomy faculty hires.
- Negotiated a $5.3k (19%) stipend increase for graduate students, the largest in department history
- Acted as advocate for graduate student interests and as a liaison between graduate students and astronomy department executives. Priorities included student mental health and ensuring PhD success in the final months of and return from large-scale COVID-19 isolation
- Acted as department student representative for prospective and incoming graduate students

Executive Committee, *Secretary*, Graduate Astronomy Students Association, DADDAA 2020-2021

Editor, Delta Epsilon, McGill Journal of Undergraduate Mathematics 2017-2019

Graduate Student Mentor University of Toronto 2020-2022

- Provided support and mentorship for three undergraduate students and a graduate student.

Public Outreach Volunteer Astro McGill 2017-2019

COMPETENCES

Languages English (*native*), French (*B2*)

Techniques Python, R, LaTeX, bash, git, basic mathematica, and Matlab