

# Bridget Clare Andersen

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## EDUCATION

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- McGill University, Montréal, Quebec** (Exp.) Aug 2024  
Ph.D. in Physics  
Advisor: Victoria Kaspi  
Thesis Title: “Unveiling Fast Radio Burst Origins Using the CHIME Outrigger Telescopes”
- McGill University, Montréal, Quebec** Aug 2021  
M.Sc. in Physics  
Advisor: Victoria Kaspi  
Thesis Title: “Radio Transient Calibration Techniques for CHIME/FRB”
- University of Virginia (UVA), Charlottesville, Virginia** May 2018  
B.Sc. in Astronomy-Physics, B.A. in Computer Science  
Advisor: Scott Ransom  
Thesis Title: “A Fourier Domain ‘Jerk’ Search for Binary Pulsars”

## RESEARCH INTERESTS

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- Energetic transients and compact objects, with a focus on fast radio bursts (FRBs) and pulsars
- Radio telescope design and commissioning
- Radio astronomy techniques: flux calibration and very long baseline interferometry (VLBI)
- Pulsar detection algorithms and precision timing techniques

## AWARDS AND DISTINCTIONS

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- **Fonds de Recherche du Québec – Nature et Technologie (FRQNT) Doctoral Scholarship** — Provincial, 96,000 CAD Sept 2022
- **NSERC Brockhouse Prize**, as member of CHIME/FRB — National, Recognizing Outstanding Canadian Research Teams 2022
- **AAS Lancelot M. Berkley award**, as member of CHIME/FRB — International, Meritorious Work in Astronomy 2022
- **Governer General’s Innovation Award**, as member of CHIME/FRB — National, Innovative Canadian Research Team 2020
- **Chalk-Rowles Fellowship** — McGill University, 10,000 CAD Sept 2019
- **D. Nelson Limber Prize** — UVA, Top Graduating Astronomy Student May 2018
- **Raven Society Member** — UVA, Recognized for Academic Excellence and Leadership May 2018
- **Goldwater Scholar** — National, 7,500 USD May 2017
- **Sigma Pi Sigma Physics Honor Society** — UVA, Undergraduate Scholarship in Physics Sept 2016
- **Echols Scholar** — UVA, Excellence and Intellectual Leadership 2015 – 2018

## RESEARCH EXPERIENCE

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- Ph.D. Thesis, McGill University** 2021 – Present  
Graduate Research Assistant  
Advisors: Victoria Kaspi, J. Xavier Prochaska, Kiyoshi Masui, Emmanuel Fonseca
- **CHIME/FRB Outriggers:** Led commissioning of “outrigger” telescope in Green Bank, West Virginia, from the ground up to enable milliarcsecond-level FRB localizations with CHIME/FRB for host association.

Installed analog chain, built on-site digital compute cluster (F- and X-engines), completed system integration and quality checks, and validated VLBI localization accuracy.

- **Simulating PATH & Nearby Host Galaxy Sample:** Led sandbox simulations of the [Probabilistic Association of Transients to their Hosts \(PATH\)](#) Bayesian framework to tune priors for FRB host galaxy association. Used results to identify 24 new host galaxies in the local Universe from CHIME/FRB detections, a 30% increase in the number of FRB hosts published as of Oct 2024. Two first-author papers in preparation.
- **Exotic Pulsar Discovery with CHIME:** Discovered and timed J2108+45, a binary pulsar with a massive non-degenerate O/B/Be-star companion, only the sixth of its kind. Published [first author paper](#).

### **M.Sc. Thesis, McGill University**

2018 – 2021

*Graduate Research Assistant, Advisors: Victoria Kaspi and Patrick (Jojo) Boyle*

- Implemented automated real-time flux calibration software pipeline for FRBs detected by CHIME/FRB, processing  $\sim 2$  TB of calibrator source data per day.
- Developed technique for correcting complicated instrumental bandpass effects originating from CHIME's novel cylindrical design and FFT beamforming scheme.
- Published [first author paper](#) based on thesis.

### **Senior Thesis, National Radio Astronomy Observatory, Charlottesville, Virginia**

2017 – 2018

*Undergraduate Researcher, Advisor: Scott Ransom*

- Extended [PRESTO](#) binary pulsar search algorithm to account for double derivative (or “jerk”) of pulse frequency throughout pulsar orbit, increasing search sensitivity to highly accelerated and faint binary systems.
- Used jerk search algorithm to detect a new millisecond pulsar binary in old archival data, Ter5am.
- Published [first author paper](#) based on thesis.

### **NSF REU, Harvard-Smithsonian Center for Astrophysics (CfA)**

Summer 2017

*Undergraduate Researcher, Advisor: Ian Stephens*

- Tested interferometric techniques for estimating protostellar disk and envelope masses using the Submillimeter Array and James Clerk Maxwell Telescope.
- Published [first author paper](#) based on work.

### **UVA Occultation Observation Team**

2017 – 2018

*Principal Observer, Advisor: Michael Skrutskie*

- Traveled to South Africa (2017) and Senegal (2018) to lead optical stellar occultation observations of Kuiper Belt object 2014 MU<sub>69</sub>, in preparation for the [2019 New Horizons spacecraft flyby](#).
- Observation campaign efforts were covered by multiple media outlets, including the [New York Times](#).

### **NSF REU, National Radio Astronomy Observatory, Socorro, New Mexico**

Summer 2016

*Undergraduate Researcher, Advisors: Sarah Burke-Spolaor and Paul Demorest*

- Pipeline improvements and candidate visualization for the [realfast](#) FRB search using the Very Large Array.
- Visualization tools were used for the first localization of an FRB to its host galaxy, [FRB 121102](#).

## **FIRST AUTHOR PUBLICATIONS**

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- 1) **Bridget C. Andersen**, Chitrang Patel, Charanjot Brar, [and 11 others]. *Flux Calibration of CHIME/FRB Intensity Data*. Published: AJ 166, 138. (2023) [[arXiv:2305.11302](#), [ADS:2023AJ....166..138A](#)]
- 2) **Bridget C. Andersen**, E. Fonseca, J. W. McKee [and 25 others]. *CHIME Discovery of a Binary Pulsar with a Massive Non-Degenerate Companion*. Published: ApJ 943, 57. (2023) [[arXiv:2209.06895](#), [ADS:2023ApJ...943...57A](#)]
- 3) **Bridget C. Andersen**, Ian W. Stephens, Michael M. Dunham [and 8 others]. *The Mass Evolution of Protostellar Disks and Envelopes in the Perseus Molecular Cloud*. Published: ApJ 873, 54. (2019) [[arXiv:1902.05956](#), [ADS:2019ApJ...873...54A](#)]
- 4) **Bridget C. Andersen**, Scott M. Ransom. *A Fourier Domain “Jerk” Search for Binary Pulsars*. Published: ApJL 863L, 13. (2018) [[arXiv:1807.07900](#), [ADS:2018ApJ...863L..13A](#)]

## SUPPORTING AUTHOR PUBLICATIONS

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For full list of **25 publications**, see [ADS record](#). Here are selected publications where significant analysis and/or writing was contributed:

- 1) CHIME/FRB Collaboration, **Bridget C. Andersen**, [and 57 others]. *CHIME/FRB Discovery of 25 Repeating Fast Radio Burst Sources*. Published: ApJ, 947, 83C. (2023) [[arXiv:2301.08762](#), [ADS:2023ApJ...947...83C](#)]
- 2) CHIME/FRB Collaboration, **Bridget C. Andersen**, [and 60 others]. *Sub-second periodicity in a fast radio burst*. Published: Nature 607, 256. (2022) [[arXiv:2107.08463](#), [ADS:2022Natur.607..256C](#)]
- 3) Adam E. Lanman, **Bridget C. Andersen**, Pragma Chawla, [and 30 others]. *A Sudden Period of High Activity from Repeating Fast Radio Burst 20201124A*. Published: ApJL 927, 59L. (2022) [[arXiv:2109.09254](#), [ADS:2022ApJ...927...59L](#)]
- 4) CHIME/FRB Collaboration, Mandana Amiri, **Bridget C. Andersen**, [and 72 others]. *The First CHIME/FRB Fast Radio Burst Catalog*. Published: ApJS 257, 59. (2021) [[arXiv:2106.04352](#), [ADS:2021ApJS..257...59C](#)]
- 5) CHIME/FRB Collaboration, **Bridget C. Andersen**, [and 69 others]. *A bright millisecond-duration radio burst from a Galactic magnetar*. Published: Nature 587, 54-58. (2020) [[arXiv:2005.10324](#), [ADS:2020Natur.587...54C](#)]
- 6) CHIME/FRB Collaboration, Mandana Amiri, **Bridget C. Andersen**, [and 70 others]. *Periodic activity from a fast radio burst source*. Published: Nature 582, 351-355. (2020) [[arXiv:2001.10275](#), [ADS:2020Natur.582..351C](#)]
- 7) P. Chawla, **Bridget C. Andersen**, M. Bhardwaj [and 37 others]. *Detection of Repeating FRB 180916.J0158+65 Down to Frequencies of 300 MHz*. Published: ApJL 896, L41. (2020) [[arXiv:2004.02862](#), [ADS:2020ApJ...896L..41C](#)]
- 8) E. Fonseca, **Bridget C. Andersen**, M. Bhardwaj, [and 38 others]. *Nine New Repeating Fast Radio Burst Sources from CHIME/FRB*. Published: ApJL 891, L6. (2020) [[arXiv:2001.03595](#), [ADS:2020ApJ...891L...6F](#)]
- 9) CHIME/FRB Collaboration, **Bridget C. Andersen**, [and 55 others]. *CHIME/FRB Discovery of Eight New Repeating Fast Radio Burst Sources*. Published: ApJL 885, L24. (2019) [[arXiv:1908.03507](#), [ADS:2019ApJ...885L..24C](#)]

## INVITED TALKS

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| 1) <b>UC Davis Cosmology and Astronomy Seminar</b><br>Unveiling Fast Radio Burst Origins Using the CHIME Outrigger Telescopes                                  | Oct 2024  |
| 2) <b>University of Wisconsin-Milwaukee Center for Gravitation, Cosmology &amp; Astrophysics</b><br>Exploring the Radio Transient Sky with the CHIME Telescope | Sept 2024 |
| 3) <b>Northwestern University CIERA Observational Group Meeting</b><br>Commissioning the Green Bank CHIME/FRB Outrigger Telescope                              | Feb 2024  |
| 4) <b>International Union of Radio Science (URSI) National Radio Science Meeting (NRSM)</b><br>Commissioning Status of the Green Bank CHIME/FRB Outrigger      | Jan 2024  |
| 5) <b>NANOGrav Pulsar Science Collaboratory</b><br>CHIME/FRB Outriggers  | Nov 2023  |

## CONTRIBUTED TALKS AND POSTERS

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| 1) <b>Fast Radio Burst 2023 Meeting, Poster/Lightning Talk</b><br>Host Association for CHIME/FRB Bursts in the First Baseband Catalog  | Nov 2023 |
| 2) <b>Fast Radio Burst 2022 Meeting, Talk</b><br>Fast Radio Burst Flux Calibration with CHIME  | Aug 2022 |
| 3) <b>237<sup>th</sup> Meeting of the American Astronomical Society, Talk</b><br>CHIME Discovery of a Binary Pulsar with a Massive Non-Degenerate Companion                      | Jan 2021 |
| 4) <b>Annual Le Centre de Recherche en Astrophysique du Québec (CRAQ) Meeting, Talk</b><br>Fast Radio Burst Flux Calibration with CHIME  | May 2019 |
| 5) <b>231<sup>st</sup> Meeting of the American Astronomical Society, Poster</b><br>The Mass Evolution of Protostellar Disks and Envelopes in the Perseus Molecular Cloud         | Jan 2018 |
| 6) <b>Smithsonian Astrophysical Observatory Summer Student Research Symposium, Talk</b><br>The Mass Evolution of Protostellar Disks and Envelopes in the Perseus Molecular Cloud | May 2017 |

- 7) **229<sup>th</sup> Meeting of the American Astronomical Society**, *Poster* Jan 2017  
 Seeking Fast Radio Bursts Using the Very Large Array
- 8) **National Radio Astronomy Observatory (NRAO) REU Summer Student Talk**, *Talk* Aug 2016  
 Realfast: Fast Radio Burst Localization with the Very Large Array
- 9) **UVA Astronomy Undergraduate Research Symposium**, *Poster* Aug 2016  
 An XMM-Newton X-Ray Observation of the Galaxy Cluster Abell 3653: The Origin of High Velocity BCGs

## TEACHING

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- **Lab Supervisor at McGill University** 2021 – Present  
 PHYS 101: *Introductory Mechanics*  
 PHYS 102: *Introductory Electromagnetism*  
 PHYS 131: *Mechanics and Waves*  
 PHYS 142: *Electromagnetism & Optics*
- **Teaching Assistant at McGill University** 2018 – 2021  
 PHYS 214: *Introductory Astrophysics*  
 PHYS 181: *Everyday Physics*  
 PHYS 183: *The Milky Way Inside and Out*
- **Teaching Assistant at University of Virginia** Spring 2018  
 ASTR 3130: *Observational Astronomy*

## MENTORING

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- **Naman Jain, M.Sc. Student** at McGill University 2023 – Present  
 Flux Calibration for the 2nd CHIME/FRB Catalog
- **Tal Sharoni, Undergraduate Student** at McGill University Summer 2023  
 Improving the CHIME/FRB Data Quality Monitoring Report

## OUTREACH AND PROFESSIONAL SERVICE

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- Telescope Operations Administrator, CHIME/FRB Collaboration** 2019 – Present
  - Recognized for deep knowledge of the software and hardware innerworkings of the CHIME/FRB telescope and FRB detection pipeline.
  - On-call expert for solving issues that arise during operations of the CHIME telescope and its outriggers.
- Volunteer, Montréal Astronomy On Tap** 2023
  - Invented and presented astronomy-themed trivial rounds for English and bilingual (English/French) trivia nights (favorites include “Moon or Frying Pan?” and “Astronomy New 2023”).
- Coordinator, AstroMcGill Outreach** 2019 – 2021
  - Served in lead role for the Trottier Space Institute’s public outreach program: recruited volunteers, invited public speakers, booked event locations, coordinated advertising.
  - Highlights: biweekly Public Lecture Nights, Astronomy On Tap, 24 Heures de Science Festival, Online Trivia Nights during COVID pandemic (~200 participants each night)
- Organizer, Trottier Space Institute Neutron Star Discussion** 2021 – 2022
  - Organized weekly discussion/journal group about neutron star theory and observation.
- Volunteer, AstroMcGill Public Lecture Series** 2018 – 2020
  - Assisted in greeting the public, engaging audience questions, and monitoring AV equipment.
- President, Astronomy Club at UVA** 2015 – 2018
  - As leader of the executive board, planned and led astronomy activities and outings for UVA undergraduates.
  - Highlights: solar and lunar eclipse-watching sessions, trips to the McCormick and Fan Mountain Observa-

tories, constellation tours, trips to Green Bank Observatory in West Virginia, astrophotography workshops, and night hikes in the Blue Ridge Mountains for beautiful dark sky views.

**Vice President, UVA Sigma Pi Sigma Physics Honor Society**

2017 – 2018

- Organized undergraduate physics research symposium in October 2017 to provide UVA physics majors with an opportunity to present their research and obtain feedback from faculty judges. Coordinated advertising, prize money management, catering, judge recruitment, and symposium schedule.

**Referee, Academic Journals**

2022 – Present

- Completed referee reports for *Astronomy & Astrophysics (A&A)* and *Monthly Notices of the Royal Astronomical Society (MNRAS)*.

**REFERENCES**

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**Professor Victoria Kaspi**

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McGill University  
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**Professor Kiyoshi Masui**

Kavli Institute for Astrophysics and Space Research  
Massachusetts Institute of Technology  
Email: kmasui@mit.edu

**Professor J. Xavier Prochaska**

Astronomy & Astrophysics Department  
UC Santa Cruz  
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**Professor Emmanuel Fonseca**

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West Virginia University  
Email: emmanuel.fonseca@mail.wvu.edu