



# Daniela Breitman

## Education

- 2021-2025 **PhD**, *Scuola Normale Superiore di Pisa*, Physics, supervised by Andrei Mesinger.
- 2020-2021 **MSc**, *University of Toronto*, Department of Physics, supervised by Keith Vanderlinde. Project summary [here](#).
- 2017-2020 **BSc**, *McGill University*, Montreal, HONOURS MATHEMATICS AND PHYSICS.

## Talks at Conferences

- September 2023 **6th Annual Global 21-cm Signal Workshop**, Trieste, Italy.  
11-15 2023 21cmEMU: An emulator of 21cmFAST summary observables
- March 6-10 2023 **Understanding the Epoch of Reionization**, Sesto, Italy.  
2023 21cmEMU: An emulator of 21cmFAST summary observables
- November 15-18 2022 **iid2022: Statistical Methods for Events Data – Illuminating the Dynamic Universe**, Lake Guntersville State Park, AL, USA.  
21cmEMU: An emulator of 21cmFAST summary observables
- October 12-14 2022 **HERA Annual Meeting**, UC Berkeley, CA, USA.  
21cmEMU: An emulator of 21cmFAST summaries
- October 17-20 2022 **5th Annual Global 21-cm Signal Workshop**, UC Berkeley, CA, USA.  
21cmEMU: An emulator of 21cmFAST summary observables
- September 27-29 2022 **Cosmic Dawn/EoR SKA SWG Meeting**, Pisa, Italy.  
21cmEMU: An emulator of 21cmFAST summary observables

## Research Experience & Awards

- May-July 2020 **Characterizing the Repetition Rate of CHIME Fast Radio Bursts**, *Victoria Kaspi*, McGill University, Value: \$6,000.00.  
Continue the project on simulating FRB populations from my undergraduate thesis. Full [report](#).
- May-July 2020 **Solving the relativistic wave equation in FLRW cosmology using spectral theory on non-Euclidean spaces**, *Dmitry Jakobson, Linan Chen, Gantumur Tsogtgerel*, McGill University, Value: \$2,000.00.
  - On the torus  $\mathcal{T}^3$ : Solved the relativistic wave equation and show that only one initial condition is required for the IVP of the wave equation.
  - On the sphere  $\mathcal{S}^3$  and the hyperbola  $\mathcal{H}^3$ : solved the time ODE.
- Summer 2019 **SURP**, *Ue-Li Pen*, University of Toronto, Value: \$9,500.00 + \$2,000.00 FRQNT BPCA.
  - FRB microstructure: Analyse FRBs with microstructure i.e burst components at the microsecond timescale.
  - FRB descatteraing: Correlate and descatter wide FRB pulses using different pulse components based on the work of Main et al. 2017 on the descattering of giant pulses. Full report [here](#).
- Winter 2019 **Tomlinson Engagement Award for Mentoring (TEAM)**, McGill, Value: \$300.00.  
Conduct weekly tutorials for MATH 248 - Honours Advanced Calculus, awarded per the recommendation of the professor.
- Summer 2018 **USRA**, *Victoria Kaspi*, McGill University, Value: \$6,500.00 + \$2,000.00 FRQNT BPCA.
  - Develop a data visualisation web app using Bokeh to compare CHIME data with FRB and pulsar catalogues and view data statistics to monitor telescope sensitivity.
  - Develop a CHIME/FRB CPU monitoring system using Node.js in Javascript and HTML/CSS.

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## Selected Publications

- [1] Daniela Breitman, Andrei Mesinger, Steven Murray, David Prelogovic, Yuxiang Qin, and Roberto Trotta. 21cmEMU: an emulator of 21cmFAST summary observables. *MNRAS Submitted*, page arXiv:2309.05697, September 2023.
- [2] Ketan R. Sand, Daniela Breitman, and et al. A CHIME/FRB Study of Burst Rate and Morphological Evolution of the Periodically Repeating FRB 20180916B. *ApJ*, 956(1):23, October 2023.
- [3] HERA Collaboration. Improved Constraints on the 21 cm EoR Power Spectrum and the X-Ray Heating of the IGM with HERA Phase I Observations. *ApJ*, 945(2):124, March 2023.
- [4] CHIME/FRB Collaboration. Sub-second periodicity in a fast radio burst. *Nature*, 607(7918):256–259, July 2022.
- [5] CHIME/FRB Collaboration. The First CHIME/FRB Fast Radio Burst Catalog. *ApJS*, 257(2):59, December 2021.

See all publications [here](#).

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## Languages

- *Programming*: Python, PyTorch, TensorFlow.
- *Python packages*: [py21cmemu](#)
- *Spoken and written*: Russian, Hebrew, English, French, and Italian.