Naman Jain

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Education

PhD in Physics — Expected 2029
McGill University — Montreal, QC
Supervisor: Dr. Victoria Kaspi
Thesis Projects:

- Population Modelling of FRBs Using the Second CHIME/FRB Catalog

Master of Science in Physics — July 2025
McGill University — Montreal, QC
Supervisor: Dr. Victoria Kaspi
Thesis Projects:

- Sensitivity Threshold estimation for CHIME/FRB system
- Flux/Fluence and Sensitivity Threshold Calculations for the Second CHIME/FRB catalog

Bachelor of Science with Honours in Astrophysics — July 2023
McMaster University — Hamilton, ON

- Undergraduate Thesis: CO Isotopologues in Galaxy Mergers
  Supervisor: Dr. Christine Wilson
- Independent Study: Numerically Computing Fast Oscillating Integrals
  Supervisor: Dr. Sergey Sibiryakov

Scholarships and Awards

- McGill International Research Masters Award (CAD 8700) — Sept 2024 - Aug 2025
- NSERC-CREATE New Technologies for Canadian Observatories Program (CAD 13500) — Sept 2024 - Dec 2024
- Institut Trottier de recherche sur les exoplanètes (iREx) Excellence Grant (CAD 9000) — May 2023 - Aug 2023
- Department of Physics and Astronomy Research Experience Award (CAD 7350) — May 2022 - Aug 2022
- MacPherson Institute Student Partner Program (CAD 1200) — Sept 2021 - Apr 2022
- The Gerald and Verna Simpson Memorial Scholarship (CAD 600) — Sept. 2021

Publications

First Author

Co-Author – Significant Contributions

1. The CHIME/FRB Collaboration (2025), **Naman Jain**. *The Second CHIME/FRB Fast Radio Burst Catalog.* To be submitted to The Astrophysical Journal Supplement Series.
2. Alice P. Curtin, **Naman Jain**, et al. (2025). *Morphology of 20 Repeating FRBs at Microsecond Time Scales with CHIME/FRB.* To be submitted to The Astrophysical Journal Supplement Series.
3. Kaitlyn Shin, **Naman Jain**, et al. (2025). *The CHIME/FRB Discovery of the Extremely Active Fast Radio Burst Source FRB 20240114A.* To be submitted to The Astrophysical Journal Supplement Series.

Co-Author – Collaboration Contributions

4. Vishwangi Shah, et al. (47 co-authors incl. **Naman Jain**) (2025). *The CHIME/FRB Outrigger localization of a repeating fast radio burst to the outskirts of a quiescent galaxy. ApJL*, 979, L21. https://doi.org/10.3847/2041-8213/ad9ddc

Conferences and Talks

Fast Radio Bursts (FRB) 2025 (Long Talk) July 2025
McGill University

- "The Second CHIME/FRB Fast Radio Burst Catalog"

Canadian Astronomical Society (CASCA) Annual Meeting (Poster Presentation) June 2024
University of Toronto, Toronto, CA

- Poster title: "The Second CHIME/FRB Fast Radio Burst Catalog"

Hotwiring the Transient Universe VII (Flash Talk) May 2024
University of Toronto, Toronto, CA

- Presentation title: "Sensitivity Threshold estimation for CHIME/FRB system"

Centre de Recherche en Astrophysique du Québec (CRAQ) (Flash Talk) May 2024
L'Auberge du Lac-à-l'Eau-Claire, CA

- Presentation title: "Sensitivity Threshold estimation for CHIME/FRB system"

Canadian Undergraduate Physics Conference (CUPC) (Oral Presentation) Oct 2022
University of Guelph, Guelph, CA

- Presentation title: "Phase Space Study of Star Formation in Cluster Galaxies"

Research Experience

Graduate Student, Trottier Space Institute September 2023 - Present
Supervisor: Dr. Vicky Kaspi

1. The Second CHIME/FRB Catalog

- Used the workflow framework to perform flux/fluence and sensitivity threshold calculations on 4500 events in CHIME/FRB Catalog 2.
- Led the efforts to validate the results and perform relevant analysis to understand fluence distribution and assess biases in calculation.

2. Sensitivity Threshold estimates for CHIME/FRB system

- Integrated new plotting features for robust validation to ensure correctness and stability of the sensitivity threshold pipeline.
- Created comprehensive user-focused documentation to support wide adoption within the CHIME/FRB collaboration.
- Adapted the pipeline for compatibility with the workflow system, a bookkeeping framework for CHIME/FRB operations.
- Extended the script to support raw voltage (baseband) data and VLBI localizations.
- The pipeline is now widely used by CHIME/FRB collaborators and underpins several ongoing analyses of telescope sensitivity and burst detectability.

3. CHIME/FRB Catalog 2 Flux/Fluence Calculations

- Ported the pipeline to be compatible with the workflow system, using GitHub Actions to refactor the scripts, fix bugs, and update dependencies.
- Set up collaboration-facing Docker environments to enable accessible functionality for running the pipeline.

Summer Intern, Trottier Institute for Research on Exoplanets May 2023 – Aug 2023
Supervisor: Dr. Jonathan Gagné

Planemos and Planet Formation

- Cross-matched NASA exoplanet data with the MOCA database to estimate system ages for young stellar populations.
- Used KDEpy and Normalizing Flows to constrain exoplanet population distributions from sparse infrared data.
- Developed an MCMC pipeline to calculate proper motions and parallaxes using multi-epoch WISE and Pan-STARRS data.

Undergraduate Thesis, McMaster University Sept 2022 – Apr 2023
Supervisor: Dr. Christine Wilson

CO Isotopologues in Merging Galaxies

- Analyzed ALMA 3D data cubes to extract CO isotopologue line ratios in Antennae galaxies.
- Studied optical depth and dust-to-gas ratio variations at different resolutions to trace ISM structure in mergers.

Independent Study Project, McMaster University Sept 2022 – Dec 2022
Supervisor: Dr. Sergey Sibiryakov

Numerically Computing Fast Oscillating Integrals

- Developed C++ solvers for fast oscillating integrals using asymptotic expansions and Picard-Lefschetz theory.
- Improved convergence performance of existing solvers for physics applications in lensing and wave optics.

Research Assistant, McMaster University May 2022 – Aug 2022
Supervisor: Dr. Laura Parker

Phase Space Study of Star Formation in Cluster Galaxies

- Cross-matched SDSS with GALEX and MPA-JHU catalogs to study star formation via phase-space analysis of 100,000 galaxies.
- Studied how environmental conditions suppress star formation in low-redshift galaxy clusters.

Research Assistant, McMaster University Sept 2021 – Apr 2022
Supervisor: Dr. Rob Cockcroft

Developing a Two-Eyed Seeing Astronomy Course

- Helped design ASTRON 2A03 course integrating Indigenous astronomy with Western physics pedagogy.
- Updated lecture materials, redesigned assessments, and built Planetarium-based experiential components.
- Course supported EDI awareness and reconciliation through astronomy education.

Skills

- **Programming Languages:** Python, C++, MATLAB, LaTeX, SQL, ADQL
- **Scientific Libraries and Tools:** NumPy, Pandas, Astropy, Matplotlib, Jupyter, SciPy
- **Astronomy Software:** HEASoft (Xspec, xselect), CASA, CARTA, TopCat
- **Workflow and Infrastructure:** Git, Docker, Bash, SQLite, Sequel Ace, CANFAR
- **Languages:** Hindi, English
- **Miscellaneous:** Zoom, Excel, Slack, Microsoft Teams, Notion

Teaching and Mentorship

Teaching Assistant at Department of Physics
McGill University, Montreal, CA

- Space, Time, and Matter (Physics 180) Fall 2024
- Introductory Physics: Electricty and Magnetism (PHYSICS 142; Head TA) Winter 2024
- Introductory Physics: Mechanics (PHYSICS 101; Head TA) Fall 2023

Teaching Assistant at Department of Physics and Astronomy
McMaster University, Hamilton, CA

- Scientific Computing (PHYSICS 2G03) Fall 2022
- Introduction to Modern Physics (PHYSICS 1AA3) Summer 2022
- The Big Questions (ASTRON 2B03) Spring 2022
- Waves, Electricity and Magnetic Fields (PHYSICS 1E03) Winter 2022

– Introductory Mechanics (PHYSICS 1D03) Fall 2021

Upper Year Mentor at International Student Services Sept 2022 - Apr 2023
McMaster University, Hamilton, CA

– Mentored a first-year international student to navigate life in university and Canada

Outreach and Service

VP Professional Development – Graduate Association of Physics Students Sept 2023 - August 2024
McGill University, Montreal, CA

– Coordinating action in providing awareness of early career planning and professional development for graduate students by fostering network of McGill Physics Alumni, facilitating contacts with professional clubs and associations, and inviting experts to learn about jobs that require skills physicists develop.

VP Academic – McMaster Undergraduate Physics Society Sept 2022 - Apr 2023
McMaster University, Hamilton, CA

– Organized 1 academic event every month, such as physics help sessions, graduate panels, and career workshops for undergraduate students in the physics department

Symbiosis Night – McMaster University Oct 2022
Organized by McMaster Science Society and Science Career and Cooperative Education Office

– Panellist for undergraduate students in science interested in research, including both summer and thesis projects, to communicate different resources and personal experiences

Adventures in Physics and Astronomy – Department of Physics and Astronomy Sept 2022
McMaster University, Hamilton, CA

– Panellist for visiting grade 4-8 students from IL Thomas School, Six Nations, to answer questions about life at university and possible career paths.

Volunteer at Canadian Association of Physicists Congress June 2022
McMaster University, Hamilton, CA

– Assisted with organizing the conference by helping set up registration logistics for 500 attendees, offering support for 4 scientific sessions, and planning signage across campus.

Peer Leader (Experiential) at Student Success Centre Sept 2021 - Apr 2022
McMaster University, Hamilton, CA

– Created material for workshops, outreach and campus events such as newsletters, presentations, etc.

– Communicated work experience opportunities to about 50 international students through 2 webinars.

Leadership & Residential Experience

Community Advisor at Housing and Conference Services Sept 2021 - Apr 2023
McMaster University, Hamilton, CA

– Managed a floor of 100+ students in McMaster residence working closely with 2 other community advisors (CA), within a larger team consisting of 25 CAs spanning 2 residence buildings and 1000+ students

– Organized monthly events with specific learning goals, connected with students on individual basis, and promoted a respectful and inclusive learning/living environment.

– Implemented a strategic approach to solving problems in the residence, using appropriate and intentional actions to handle stressful situations involving (and including) roommate conflicts, intoxication, sexual identities, and fire response.

Professional Training

Dunlap Institute Summer School: Introduction to Astronomical Instrumentation 2023
By University of Toronto and Dunlap Institute for Astronomy and Astrophysics

ALMA Cycle 10 Proposal Workshop 2023
By National Radio Astronomy Observatory (NRAO) and ALMA Ambassadors Program

More Feet on the Ground for Suicide Prevention 2022
By Council of Ontario Universities, Brock University, and the Centre for Innovation in Campus Mental Health

Responding to Disclosures of Sexual Violence 2022
By McMaster's Sexual Violence Prevention and Response Office

Violence and Harassment in the Workplace 2022
By McMaster University

Environmental and Occupational Health Support Services (EOHSS) 2022
By McMaster University

- Accessibility for Ontarians with Disabilities Act (AODA)
- Health and Safety Orientation
- Fire Safety
- Ergonomics
- Primer on Privacy
- Slips, Trips and Falls