Ziggy Pleunis

Dunlap Institute for Astronomy & Astrophysics
University of Toronto
50 St. George Street
Toronto, Ontario, Canada M5S 3H4

ziggy.pleunis@dunlap.utoronto.ca
https://dunlap.utoronto.ca/~ziggy.pleunis
ADS
zpleunis

Research

Interests	Fast radio bursts (FRBs), pulsars, neutron stars, astrophysical transients, propagation effects in the interstellar and intergalactic medium, coherent radio emission.
Methods	Radio interferometry, pulsar timing, algorithms for time-series analysis.

Employment

2021–	**Dunlap Postdoctoral Fellow, University of Toronto**
2020–2021	**Postdoctoral Researcher, McGill University**

Education

2016–2020	**PhD Physics, McGill University** Thesis awarded the IAU Division D PhD Prize and the J. S. Plaskett medal. Supervisor: Prof. Victoria Kaspi
2014–2016	**MSc Astronomy and Astrophysics, University of Amsterdam** Supervisors: Prof. Jason Hessels, Dr. Cees Bassa
2010–2014	**BSc Physics and Astronomy, University of Amsterdam**

Grants and Awards

2024–2027	**Veni Fellowsip**, Dutch Research Council.
2021–2024	**Dunlap Postdoctoral Fellowship**, Dunlap Institute, University of Toronto.
2022	**NSERC Brockhouse Canada Prize**, for interdisciplinary research in science and engineering, as part of the CHIME team.
2022	**AAS Berkeley Prize**, for meritorious work in astronomy, as part of the CHIME/FRB team.
2021	**IAU Division D PhD Prize**, for most remarkable work in high energy phenomena and fundamental physics.
2021	**J. S. Plaskett Medal**, for the most outstanding doctoral thesis in astronomy or astrophysics in Canada.
2021	Finalist, **APS DAP Cecilia Payne-Gaposchkin Dissertation Award**.
2020	**Governor General's Innovation Award**, as part of the CHIME team.
2018–2020	**Schulich Graduate Fellowship**, selected by the McGill physics department.

Leadership Experience

CHIME/FRB Collaboration

2019– Convener of various working groups on operations and scientific topics.
2020–2021 Coordinator: Responsible for coordinating overall operations of the FRB survey.
2018 Led the detailing, installation and testing of the 2500-core FRB compute cluster.

April 2023 **Fast radio burst follow-up workshop, University of Toronto**
Chair of the scientific and local organizing committees for a two-day hybrid workshop to discuss FRB follow-up strategies with 120+ international researchers.

Teaching Experience

Graduate research supervision

Co-supervisor with Prof. Bryan Gaensler at the University of Toronto

2021– Ayush Pandhi, PhD thesis: Polarization properties of FRBs.

Undergraduate research supervision

2023– Affan Khadir: FRB drift rates.
Co-supervisor with Dr. Kenzie Nimmo at MIT
2023– Hannah Didehbani, summer project: FRB scattering.
Co-supervisor with Dr. Paul Scholz at the University of Toronto
2023– Arianna Lasinski, summer project and thesis: Hyperactive FRBs.
2023– Jillian Henkel, summer project and thesis: Automation of repeater identification.
2022–2023 Ishika Bangari, summer project and thesis: FRB population synthesis.
2022–2023 Maxwell Fine, summer project and thesis: Prompt Swift/BAT FRB counterparts.
Co-supervisor with Prof. Victoria Kaspi at McGill University
2022–2022 Camryn Mullin (→PhD@UVic), thesis: Pulsar timing with CHIME/FRB.
2021 Camryn Mullin, summer project: Emission bandwidth of FRBs.
2019 Amanda Cook (→PhD@UofT), thesis: Detecting magnetars with CHIME/FRB.

Instructor

Fall 2022 Astrophysical Transients (graduate course), co-instructor with Prof. Marten van Kerkwijk at the University of Toronto.

Teaching assistantships

2016–2020 Introductory Astrophysics, Measurements Lab, Astrophysics (graduate course), Optics and Signal Processing at McGill University.

2013–2016 Introduction to Scientific Programming, Physics Lab Work, Academic Skills and Thermal Physics at the University of Amsterdam.

Technical Experience

- Primary author of `dfdt` and contributor to `DM_phase` and `cdmt`, open-source software packages for the study of fast radio bursts and pulsars.
- Proficient in **Python**, **C** and **Mathematica**; skillful in scientific data analysis and modelling.
- Experience with distributed **high-performance computing**: scripting for computing clusters, handling large amounts of data (i.e., TB scale) and parallel programming of GPUs.

Academic Service

Peer review	Nature, Nature Astronomy, ApJL, ApJ, MNRAS, Universe NRAO observing proposals (gravitational waves and energetic transients; 4 semesters), FAST observing proposals (FRBs and pulsars; 3 years)

Other Academic Activities

2023	**Graduate admission committee, University of Toronto**
2022	**SURP committee member, Dunlap Institute for Astronomy & Astrophysics** Organization of the Summer Undergraduate Research Program, including lectures on astronomy and professional development, social activities and a symposium.
2016–2020	**Physics TA committee member, McGill University** Improved teaching at McGill University's physics department and trained peers to use active learning techniques in the lab and during tutorials.
2016–2020	**Astronomy outreach with AstroMcGill, Montreal**
2014–2016	**Tour guide at the Anton Pannekoek Observatory, Amsterdam**

Selected Refereed Publications

48 refereed publications in total, with 3,960 citations and an H-index of 26 (as of September 17, 2023). For a complete list, see ADS or arXiv.

Publications as Lead Author

28 citations	CHIME/FRB Collaboration [58 co-authors; corresponding author: Z. Pleunis], "CHIME/FRB discovery of 25 repeating fast radio burst sources", ApJ, in press (2023)
131 citations	Z. Pleunis et al. [30 additional co-authors], "Fast radio burst morphology in the first CHIME/FRB catalog", ApJ, 923, 1 (2021)
104 citations	Z. Pleunis et al. [34 additional co-authors], "LOFAR detection of 110–188 MHz emission and frequency-dependent activity from FRB 20180916B", ApJL, 911, L3 (2021)
19 citations	Z. Pleunis et al. [9 additional co-authors], "A millisecond pulsar discovery in a survey of unidentified *Fermi* γ-ray sources with LOFAR", ApJL, 846, L19 (2017)

Ten Most Cited Publications with Significant Contributions

252 citations	CHIME/FRB Collaboration [74 co-authors], "The first CHIME/FRB fast radio burst catalog", ApJS, 257, 59 (2021)
462 citations	CHIME/FRB Collaboration [70 co-authors], "A bright millisecond-duration radio burst from a Galactic magnetar", Nature, 587, 54–58 (2020)
278 citations	CHIME/FRB Collaboration [72 co-authors], "Periodic activity from a fast radio burst source", Nature, 582, 351–355 (2020)
191 citations	E. Fonseca et al. [40 additional co-authors], "Nine new repeating fast radio burst sources from CHIME/FRB", ApJL, 891, L6 (2020)
326 citations	CHIME/FRB Collaboration [56 co-authors], "CHIME/FRB detection of eight new repeating fast radio burst sources", ApJL, 885, L24 (2019)

112 citations	A. Josephy et al. [43 additional co-authors], "CHIME/FRB Detection of the Original Repeating Fast Radio Burst Source FRB 121102", ApJL, 882, L18 (2019)
285 citations	CHIME/FRB Collaboration [59 co-authors], "A second source of repeating fast radio bursts", Nature, 566, 235–238 (2019)
236 citations	CHIME/FRB Collaboration [51 co-authors], "The CHIME fast radio burst project: system overview", ApJ, 863, 48 (2018)
50 citations	C. G. Bassa, Z. Pleunis et al. [16 additional co-authors], "LOFAR discovery of the fastest-spinning millisecond pulsar in the Galactic field", ApJL, 846, L20 (2017)
24 citations	C. G. Bassa, Z. Pleunis, J. W. T. Hessels, "Enabling pulsar and fast transient searches using coherent dedispersion", Astronomy and Computing, 18, 40–46 (2017)

Five Most Cited Publications as a Contributing Author

50 citations	CHIME/FRB Collaboration [61 co-authors], "Sub-second periodicity in a fast radio burst", Nature 607, 256–259 (2022)
306 citations	B. Marcote et al. [53 additional co-authors], "A repeating fast radio burst source localized to a nearby spiral galaxy", Nature, 577, 190–194 (2020)
77 citations	P. Chawla et al. [39 additional co-authors] ,"Detection of Repeating FRB 180916.J0158+65 Down to Frequencies of 300 MHz", ApJL 896, L41 (2020)
185 citations	CHIME/FRB Collaboration [54 co-authors], "Observations of fast radio bursts at frequencies down to 400 megahertz", Nature, 566, 230–234 (2019)
122 citations	K. Stovall et al. [34 additional co-authors], "PALFA Discovery of a Highly Relativisic Double Neutron Star Binary", ApJL 854, L22 (2018)

Selected Talks

5 colloquia and seminars; 11 invited and 13 contributed conference talks in total.

Colloquia & Seminars

April 2023	Lunch talk "CHIME/FRB Discovery of 25 Repeating Fast Radio Burst Sources," UofT, Toronto, Canada.
Dec 2022	Lunch talk "Uncovering the diversity of fast radio bursts," Sterrewacht, Leiden, the Netherlands.
Nov 2022	Colloquium "Uncovering the diversity of fast radio bursts," Dominion Astrophysical Observatory, Victoria, Canada.
Nov 2021	Seminar "The CHIME/FRB experiment," CASCA Canadian telescope seminar series, virtual.
Oct 2021	Colloquium "The repetition and morphology of fast radio bursts," the University of Toronto, Toronto, Canada.

Invited Conference Talks

Sep 2023	"The CHIME/FRB experiment," Flatiron Institute workshop, New York, USA.
May 2023	"Fast radio bursts as probes for Galactic and extragalactic magnetism with DSA-2000," DSA-2000 meeting, virtual.

Aug 2022	"Fast radio burst detection and differentiation with the CHIME telescope," IAU General Assembly Division D day, Busan, South Korea.
May 2022	"FRBs with CHIME Past and Future," Royal Astronomical Society meeting on The new transient radio sky, virtual.
April 2021	"Fast radio bursts, repetition and morphology," American Physical Society meeting, virtual.
Feb 2021	"The first CHIME/FRB catalog: Fast Radio Burst morphologies and differentiating repeaters," Yukawa Institute for Theoretical Physics, Kyoto University, virtual.
Feb 2019	"Fast radio bursts with CHIME/FRB," FRB2019, Amsterdam, the Netherlands.
Dec 2018	"Finding fast radio bursts in real-time with CHIME," SRitp workshop Fast Radio Bursts, Rehovot, Israel.

Contributed Conference Talks

May 2023	"Fast radio bursts as probes for Galactic and extragalactic magnetism with the SKA and ngVLA," New Eyes on the Universe: SKA and ngVLA, Vancouver, Canada.
Oct 2022	"New repeating sources of FRBs from CHIME/FRB," Cornell FRB meeting, Ithaca, USA.
Aug 2022	"New repeating sources of FRBs from CHIME/FRB," FRB2022, Busan, South Korea.
June 2022	"Fast radio bursts with the LOFAR telescope," LOFAR family meeting, Cologne, Germany.
Dec 2021	"New repeating sources of fast radio bursts from CHIME/FRB," Science at Low Frequencies VIII, virtual.
July 2021	"New repeating sources of fast radio bursts from CHIME/FRB," FRB2021, virtual.
Jan 2022	"Fast radio burst morphology in the first CHIME/FRB catalog," 237th American Astronomical Society meeting, virtual.
Dec 2020	"Fast radio burst morphology in the first CHIME/FRB catalog," Science at Low Frequencies VII, virtual.
July 2020	"Fast radio burst morphology with CHIME," FRB2020, virtual.
July 2016	"First LOFAR millisecond pulsar discovery," 71st Netherlands Astronomy Conference, Nunspeet, the Netherlands.