

Michael Radica | Curriculum Vitae

Ph.D Candidate - Université de Montréal

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🌐 radicamc.github.io

General Information

- Nationality: Canadian
- Languages: English (Native), French (Advanced, C1)
- Affiliations: Canadian Astronomical Society (CASCAS), Centre de Recherche en Astrophysique du Québec (CRAQ), Institute for Exoplanet Research (iREx)
- Research Interests:
 - Exoplanet atmosphere characterization at high and low resolution
 - Evolution of highly irradiated atmospheres
 - Exotic atmospheric chemistry
 - Development of astronomical data analysis tools

Education

- **Ph.D., Physique** 2019 - 2023 (expected)
Université de Montréal, Montréal, QC, Canada
Advisor: Dr. David Lafrenière
GPA: 4.3/4.3
- **M.Sc., Physics & Astronomy** 2017 - 2019
McMaster University, Hamilton, ON, Canada
Advisor: Dr. Douglas Welch
GPA: 11.7/12
- **B.Sc. Summa Cum Laude, Honours Physics Co-op** 2012 - 2017
McMaster University, Hamilton, ON, Canada
GPA: 11.3/12

Employment & Research Experience

- **Ph.D. Researcher** Sept 2019 - present
Supervisor: Dr. David Lafrenière
Université de Montréal, Montréal QC, Canada
 - Drawing links between atmospheric chemistry of exoplanets and their formation histories using next generation instrumentation.
- **M.Sc. Researcher** Sept 2017 - Aug 2019
Supervisor: Dr. Douglas Welch
McMaster University, Hamilton, ON, Canada
 - Developed a novel method to search for light echoes from core-collapse supernovae using the SITELLE instrument on the CFHT.
- **Planetarium Presenter** Sept 2017 - Aug 2019
William J. McCallion Planetarium
McMaster University, Hamilton, ON, Canada
 - Prepared and presented weekly shows on a variety of popular astronomy topics for the public.
- **Science Intern** Sept - Dec 2017
Supervisor: Dr. Laurie Rousseau-Nepton

Canada-France-Hawaii Telescope, Waimea, HI, USA

- Studied high resolution spectra of NGC 6822 from SITELLE to quantify variations in dust extinction in the Milky Way.

- **Research Assistant** May - Aug 2017
Supervisor: Dr. Douglas Welch
McMaster University, Hamilton, ON, Canada
- **Research Assistant** May - Dec 2016
Supervisor: Dr. Chris O'Dea
University of Manitoba, Winnipeg, MB, Canada
 - Analysis of emission from galaxy clusters to understand the connection between X-Ray morphology and AGN feedback.
- **Honours Thesis Researcher** Sept 2015 - Apr 2016
Supervisor: Dr. Laura Parker
McMaster University, Hamilton, ON, Canada
 - Studied the evolution of dark matter haloes within the Bolshoi Cosmological Simulation.
- **Research Assistant** Jan - Aug 2015
Supervisor: Dr. Judith Irwin
Queen's University, Kingston, ON, Canada
 - Data reductions and analysis of radio emission images of galaxies with the CHANG-ES Consortium.

Awards & Honours

- Bourse J.A. DeSève (1yr; *declined*) **\$8,000** 2021
- NSERC Canada Graduate Scholarship - Doctoral Program (3yr) **\$105,000** 2021
- FRQNT Bourse de Doctorat en Recherche (3yr) **\$70,000** 2021
- iREx Trottier Scholarship **\$1,000** 2019, 2020, 2021
- Ontario Graduate Scholarship (1yr; *declined*) **\$15,000** 2019
- McMaster University Symposium Day, 1st Place Talk 2018
- NSERC Canada Graduate Scholarship - Master's Program (1yr) **\$17,500** 2018
- Ontario Graduate Scholarship (1yr) **\$15,000** 2017
- Ontario Graduate Fellowship (1yr; *declined*) **\$12,500** 2017
- Canadian Undergraduate Physics Conference Research Presentations, 1st Place 2015, 2016
- McMaster University Faculty of Science Dean's List 2013 - 2017
- McMaster University President's Award **\$2,500** 2012

All values in Canadian Dollars

Refereed Publications

3. [Characterizing exoplanetary atmospheres at high resolution with SPIRou: Detection of water on HD 189733 b](#)
Boucher, A., Darveau-Bernier, A., Pelletier, S., Lafrenière, D., Artigau, E., Cook, N.J., **Radica, M.**, Allart, R., Doyon, R., Benneke, B., *et al.*
The Astronomical Journal, in press.
2. [A Search for Supernova Light Echoes in NGC 6946 with SITELLE](#)
Radica, M.C., Welch, D., Rousseau-Nepton, L.
Monthly Notices of the Royal Astronomical Society, 497, 3297 (2020).

1. [CHANG-ES XXI. Transport processes and the X-shaped magnetic field of NGC 4217: off-center superbubble structure](#)
Stein, Y., Dettmar, R. -J., Beck, R., Irwin, J., Wiegert, T., Miskolczi, A., Wang, Q. D., English, J., Henriksen, R., **Radica, M.**, Li, J. -T.
Astronomy & Astrophysics, 639, A111 (2020).

White Papers & Conference Proceedings

1. [Exoplanet instrumentation in the 2020s: Canada's pathway towards searching for life on potentially Earth-like exoplanets](#)
Benneke, Bjorn; Cowan, Nick; Rowe, Jason; Marois, Christian; *et al.* (including **Radica, Michael**)
White Paper for the Canadian Long Range Plan 2020

Successful Observing Proposals

Summary: 3 PI programs, 2 Co-I programs.

3. [Photometric Followup of an M-Dwarf Trio of Planets Spanning the Radius Valley](#)
Michael Radica, Christopher Mann, David Lafrenière
36 hours, OMM/PESTO, Semester 2021C, PID: OMM-21C-07
2. [Do Exo-Neptunes Have Low-Metallicity Atmospheres? A Case Study of HAT-P-11 b](#)
Michael Radica, Stefan Pelletier, David Lafrenière, Romain Allart, Anne Boucher, Étienne Artigau
8 hours, CFHT/SPIRou, Semester 2021B, PID: 21BC009
1. [A SITELLE Survey for Highly Broadened H-alpha P-Cygni Profiles in NGC 6946 from Core-Collapse Supernova Light Echoes](#)
Michael Radica, Douglas Welch, Laurie Rousseau-Nepton
12 hours, CFHT/SITELLE, Semester 2018B, PID: 18BC017

Conference/Colloquia Talks & Posters

Summary: 6 talks, 3 invited; 5 posters. * denotes an invited talk.

- *Towards a Robust Extraction Algorithm for NIRISS SOSS Spectra*
Michael Radica, Antoine Darveau-Bernier, David Lafrenière, Loic Albert & Geert-Jan Talens
Poster presentation, **Canadian Astronomical Society Annual General Meeting** May 2021
Dominion Radio Astrophysical Observatory, Penticton, BC, Canada
- *Towards a Robust Extraction Algorithm for NIRISS SOSS Spectra*
Michael Radica, Antoine Darveau-Bernier, David Lafrenière, Loic Albert & Geert-Jan Talens
Poster presentation, **Exoplanets 3** Jul 2020
Heidelberg, Germany
- *NEAT Exploration of Exoplanet Atmospheres*
Michael Radica, David Lafrenière & Antoine Darveau-Bernier
Poster presentation, **Canadian Astronomical Society Annual General Meeting** May 2020
York University, York, ON, Canada
- *A Search for Supernova Light Echoes in NGC 6946 with SITELLE*
Michael Radica, Doug Welch, & Laurie Rousseau-Nepton
Poster presentation, **Canadian Astronomical Society Annual General Meeting** Jun 2019
McGill University, Montréal, QC, Canada

- **The Search for Supernova Light Echoes in NGC 6946*
 Michael Radica & Doug Welch
 Invited Talk, **McMaster University Symposium Day**
 McMaster University, Hamilton, ON, Canada Oct 2018
- **A High Resolution Study of NGC 6822 with SITELLE*
 Michael Radica & Laurie Rousseau-Nepton
 Invited Talk, **Canada-France-Hawaii Telescope Colloquium Series**
 Canada-France-Hawaii Telescope, Waimea, HI, USA Dec 2017
- *The Evolution of Dark Matter Substructure in Simulated Galaxy Clusters*
 Michael Radica & Laura Parker
 Contributed Talk, **Canadian Undergraduate Physics Conference**
 Dalhousie University, Halifax, NS, Canada Nov 2016
- **Probing Correlations between AGN Activity and X-Ray Emission*
 Michael Radica, Ajay Gill, Sarka Wykes & Chris O'Dea
 Invited Talk, **Summer AstroTea Series**
 University of Manitoba, Winnipeg, MB, Canada Aug 2016
- *Segregation of Dark Matter Substructure in the Bolshoi Simulation*
 Michael Radica & Laura Parker
 Poster presentation, **McMaster Honours Thesis Poster Presentation**
 McMaster University, Hamilton, ON, Canada Jan 2015
- *Studying Radio Haloes of Galaxies with CHANG-ES*
 Michael Radica & Judith Irwin
 Contributed Talk, **Canadian Undergraduate Physics Conference**
 Trent University, Peterborough, ON, Canada Nov 2014
- *Quark Stars and Compact Stellar Remnants*
 Michael Radica
 Contributed Talk, **McMaster Undergraduate Colloquium Series**
 McMaster University, Hamilton, ON, Canada Feb 2013

Committee Membership & Community Service

- CUPC 2021 Judge - Astrophysics Nov 2021
- CASCA 2021 AGM Online Organizing Committee Sept 2020 - May 2021
- UdeM Equity and Diversity Committee June 2020 - present
- CASCA Graduate Student Committee Jan 2020 - present

Technical Skills

- **Operating Systems:** Linux, OS X
- **Programming:** Python, C++
- **Astronomical Data Processing:** CIAO, CASA, IRAF, ds9, ORCS
- **Pubic Speaking:** I enjoy preparing and giving talks to all audiences, and have presented research at numerous conferences.

Teaching & Mentorship

- **Co-op Program Alumni Mentor** 2020 - present
 McMaster University
 Mentor to an undergraduate student in the Physics & Astronomy co-op program.

- **Teaching Assistant** 2020 - present
 Université de Montréal
 Marking and presentation of tutorials (*en français*) for courses including:
 - Astrobiologie (Winter 2020, 2021)
 - Introduction à la Physique Numérique (Fall 2020)
- **Graduate Student Mentor** Sept 2018 - Aug 2019
 McMaster University
 Mentor to incoming M.Sc student.
- **Teaching Assistant** 2017 - 2019
 McMaster University
 Marking and presentation of tutorials for courses including:
 - Introduction to Physics for Engineers (Winter 2017)
 - Planetary Astronomy (Winter 2018, 2019)
 - Introduction to Astronomy (Fall 2018)
 - The Big Questions in Astronomy (Fall 2018)
 - Stellar Structure (Winter 2019)
- **Senior Undergraduate Mentor** May - Aug 2016
 University of Manitoba
 Research mentor to two first year undergraduate students.
- **Certified Tutor** 2014 - 2019
 - McMaster Physics Help Initiative (2014 - 2016)
 - McMaster Physics Help Center (Winter 2018)
 - Private Tutor (Fall/Winter 2019)

Science Outreach

- 24 Hours of Science - Astronomer in your Classroom (May 2021)
- Montréal Student Space Association iREx Liaison (2020 - present)
- William J. McCallion Planetarium Presenter (2017 - 2019)
- McMaster Sidewalk Astronomy Guide (2017 - 2019)
- McMaster University Fall Preview Lab Tour Guide (Oct 2013)