

# Michael Radica | Curriculum Vitae

Ph.D Candidate - Université de Montréal

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🌐 radicamc.github.io

## General Information

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- 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

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- **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

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- **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

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- 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, 1<sup>st</sup> 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, 1<sup>st</sup> 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

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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

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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

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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

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

## Committee Membership & Community Service

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- 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

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- **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

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- **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

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- 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)