

DR. TOBY BROWN

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Department of Physics and Astronomy, McMaster University, Hamilton, Canada

RESEARCH INTERESTS

Extragalactic astronomy, galaxy evolution, star formation, observational astronomy

PROFESSIONAL EXPERIENCE

Postdoctoral Fellow

October 2017 - present

Department of Physics and Astronomy

McMaster University, Hamilton, Canada

- Devising, leading, and completing successful research programs on galaxy formation and evolution
- P.I. of VERTICO, an ALMA Large Program that is mapping molecular gas in 53 Virgo Cluster galaxies
- Supervising PhD and undergraduate students in astrophysics and machine learning
- Speaking at international conferences, research institutions and public events
- Collaborating with leading experts to form productive international partnerships

EDUCATION

Business Administration with Management

May 2018 - present

McMaster University CCE

Hamilton, Canada

- Continued education to ensure a strong foundation in business competencies, including finance, operations, and general management

Doctor of Philosophy (Ph.D.), Astrophysics

October 2013 - August 2017

Swinburne University of Technology

Melbourne, Australia

- Large multi-wavelength study of the gas and star formation cycle of nearby galaxies
- Supervisors: Dr. Barbara Catinella (primary), Dr. Luca Cortese, Prof. Virginia Kilborn

Astrophysics MPhys, Hons

September 2009 - June 2013

University of Liverpool & Liverpool John Moores University

Liverpool, UK

COMPETITIVE HONORS, AWARDS, AND FUNDING

Approx. Total Value: \$140,800

MITACS Globalink Research Award (\$6,000)	2019
NAASC ALMA Ambassadorship (\$13,500)	2018
ASTRO-3D Science Visitor Program (\$1,500)	2018
TMT Early-Career Workshop Grant (\$1,800)	2018
ACURA Travel Award (\$1,000)	2018
MacDATA Fellow Supervisor (\$18,000)	2017
Famelab Australia Finalist	2016
ASA Travel Award (\$1,000)	2015
SUPRA Graduate Scholarship (\$98,000 + Tuition-fee Waiver)	2013

SUPERVISING AND TEACHING EXPERIENCE

MacDATA Fellow Supervisor

March 2018 - December 2018

Dept. Physics & Astronomy, & MacDATA Institute, McMaster University *Hamilton, Canada*

- Supervisor of McMaster's MacDATA Graduate (PhD level) Fellow
- Won \$18,000 grant to pay student salary for 9 month astronomy-data science collaboration

Integrated Science Project Supervisor

November 2017 - present

McMaster University *Hamilton, Canada*

- Supervisor for 14 high-achieving undergraduate students pursuing an Integrated Science degree
- Teaching and mentoring using problem-based learning and peer instruction

Teaching Assistant

February - November 2016

University of Western Australia *Perth, Australia*

- Demonstrating, supervising and grading *Quantum Mechanics and Electromagnetism* labs and tutorials

Teaching Assistant

February - October 2015

Swinburne University of Technology *Melbourne, Australia*

- Demonstrating, supervising and grading *Electronic Systems* labs and tutorials

Undergraduate Project Supervisor

September 2014 - July 2015

Swinburne University *Melbourne, Australia*

- Supervising 4 final year Animation undergraduate student projects

LEADERSHIP AND SERVICE ROLES IN ASTRONOMY

Principle Investigator, VERTICO

July 2019 - present

Virgo Environment Traced in CO

ALMA Cycle 7 Large Program

- Awarded ~200 hours as P.I. of VERTICO, the first and only Candian-led ALMA Large Program
- VERTICO will map the molecular gas content of 53 Virgo Cluster galaxies
- Assembling and managing the VERTICO collaboration of ~30 world-class researchers
- Coordinating VERTICO projects and collaborations to ensure maximum impact and legacy value

NAASC ALMA Ambassador

December 2018 - present

North American ALMA Science Center

Charlottesville, Virginia

- Acting as an ALMA resource for the Canadian community
- Hosting ALMA preparation workshops and sharing ALMA/interferometry expertise

Women in Astronomy Working Group Member

November 2018 - present

International Astronomical Union

- Asses and report on the status of gender equality in astronomy and recommend future actions that will improve the environment for all astronomers

SKA HI in Galaxies Working Group Member

November 2018 - present

Square Kilometer Array Organisation

Steering Committee Member

May 2016 - May 2017

Early Career Researcher Chapter

Astronomical Society of Australia

- Advocating for and representing early career astronomers in Australia including establishing legacy database of students and postdocs who have left the field

Student Mentor

January - October 2015

Swinburne University of Technology

Melbourne, Australia

Scientific Organizing Committee Member

- ICRARcon, Mandura, Western Australia, 2016

Local Organizing Committee Member

- ICRARcon, Mandura, Western Australia, 2016
- The Role of Neutral Hydrogen in Galaxy Evolution, Kuching, Borneo, 2015

LEADERSHIP ROLES OUTSIDE ASTRONOMY

Bargaining Committee Chair

October 2018 - present

Canadian Union of Public Employees - Local 3906

Hamilton, Canada

- Elected to represent all postdocs in contract negotiations with McMaster University leadership

Field Director

July - October 2018

Municipal Council Election Campaign

Hamilton, Canada

- Devising campaign strategy and coordinating approximately 120 volunteers
- Campaign data analytics lead

Senior Field Organiser

April - June 2018

Ontario New Democratic Party

Hamilton, Canada

- Coordinating approximately 200 volunteers for ONDP leader's successful re-election campaign
- Led the campaign's final volunteer organisation phase and consulted on data analytics

Political Action Committee Member

January - September 2018

Canadian Union of Public Employees - Local 3906

Hamilton, Canada

- Oversee political donations, events and awareness campaigns of union

CONTRIBUTED CONFERENCE TALKS

Total number: 8

Metals in Galaxies Near and Far, The Lorentz Centre, Leiden, Netherlands	2019
The Life and Death of Star-Forming Galaxies, Perth, Australia	2019
KIAA Forum on Gas in Galaxies, Peking University, Beijing, China	2018
European Week of Astronomy, Liverpool, UK	2018
MockPerth, Perth, Australia	2017
Pathfinders HI Science Coordination Committee meeting, Cape Town, South Africa	2016
Drifting through the Cosmic Web, Aix-en-Provence, France	2015
The Many Pathways to Galaxy Growth, Prato, Italy	2015

PUBLIC SPEAKING AND COMMUNICATION

Award-winning public talks

- Speaking to audiences of 700+, including the March for Science, the British Council's Famelab Australia Final, British live event series Cosmic Shambles

Media coverage

- Stories on my research have been featured in Scientific American, News.com.au, The Daily Telegraph, Space.com, Gizmodo, IFL Science, among others

Media commentary

- Providing comment on STEM issues for local and national media, including The Conversation, ABC Radio National, ABC 720 Perth, ABC Melbourne

COLLOQUIA AND SEMINARS

Total number: 18

Swinburne University of Technology, Melbourne, Australia	2019
Carnegie Observatories, Pasadena, CA, USA	2018
University of York, York, Canada	2018
Royal Military College of Canada, Kingston, Canada	2018
Queens University, Kingston, Canada	2018
University of Victoria, Victoria, Canada	2018
National Research Council Hertzberg Astronomy and Astrophysics, Victoria, Canada	2018
University of British Columbia, Vancouver, Canada	2018
McMaster University, Hamilton, Canada	2017
Liverpool John Moores University, Liverpool, UK	2016
Max Planck Institute for Extraterrestrial Physics, Garching, Germany	2016
European Southern Observatory, Garching, Germany	2016
University College London, London, UK	2016
University of Hertfordshire, Hatfield, UK	2016
LERMA, l'Observatoire de Paris, Paris, France	2016
Institut d'astrophysique de Paris, Paris, France	2016
ICRAR, University of Western Australia, Perth, Australia	2015
Centre de Recherche Astrophysique de Lyon, Lyon, France	2015

SURVEY MEMBERSHIPS

WALLABY (The ASKAP HI All-Sky Survey, PIs Koribalski, Staveley-Smith)
JINGLE (JCMT dust and gas In Nearby Galaxies Legacy Exploration, PI Wilson)
DINGO (Deep Investigation of Neutral Gas Origins, PI Meyer)
xGASS (extended GALEX Arecibo SDSS Survey, PI Catinella)
HIX (HI eXcess galaxy survey, PI Lutz)

DR. TOBY BROWN - LIST OF PUBLICATIONS (4 FIRST AUTHOR, 8 CO-AUTHOR)

12. **Brown, T.** & Wilson, C.D., 2019, *Extreme CO Isotopologue Line Ratios in ULIRGS: Evidence for a Top-heavy IMF*, ApJ, 879, 17
11. Stevens, A.R.H.; Diemer, B.; Lagos, C.d.P.; Nelson, D.; Pillepich, A.; **Brown, T.**; Catinella, B.; Hernquist, L.; Weinberger, R.; Vogelsberger, M.; Marinacci, F., 2019, *Atomic hydrogen in IllustrisTNG galaxies: the impact of environment paralleled with local 21-cm surveys*, MNRAS, 483, 5334
10. Roberts, I.D.; Parker, L.; **Brown, T.**; Joshi, G.; Hlavacek-Larrondo, J.; Wadsley J., 2018, *Quenching low-mass satellite galaxies: evidence for a threshold ICM density*, ApJ, 873, 42
9. Ellison S.L.; **Brown, T.**; Catinella, B.; Cortese, L., 2018, *Atomic gas fractions in active galactic nucleus host galaxies*, MNRAS, 482, 5694
8. Saintonge, A.; Wilson, C.D.; Xiao, T.; Lin, L.; Hwang, H.S.; Tosaki, T.; Bureau, M.; Cigan, P.J.; Clark, C.J.R.; Clements, D. L.; De Looze, I.; Dharmawardena, T.; Gao, Y.; Gear, W.K.; Greenslade, J.; Lamperti, I.; Lee, J.C.; Li, C.; Michałowski, M.J.; Mok, A.; Pan, H.A.; Sansom, A.E.; Sargent, M.; Smith, M.W.L.; Williams, T.; Yang, C.; Zhu, M.; Accurso, G.; Barmby, P.; Brinks, E.; Bourne, N.; **Brown, T.** and the JINGLE Survey Team, 2018, *JINGLE, a JCMT legacy survey of dust and gas for galaxy evolution studies - I. Survey overview and first results*, MNRAS, 481, 3497
7. Pan, H-A; Lin, L; Hsieh, B-C; Xiao, T; Gao, Y; Ellison, S.L.; Scudder, J.M.; Barrera-Ballesteros, J.; Yuan, F.; Saintonge, A.; Wilson, C.D.; Hwang, H.S.; De Looze, I.; Gao, Y.; Ho, L.C.; Brinks, E.; Mok, A.; **Brown, T.**; Davis, T.A.; Williams, T.G.; Chung, A.; Parsons, H.; Bureau, M.; Sargent, M.T.; Chung, E.J.; Kim, E.; Liu, T.; Michałowski, M.J.; Tosaki, T., 2018, *The Effect of Galaxy Interactions on Molecular Gas Properties*, ApJ, 868, 132
6. **Brown, T.**; Cortese, L.; Catinella, B.; Kilborn, V.A, 2018, *The role of atomic hydrogen in regulating the scatter of the mass–metallicity relation*, MNRAS, 473, 1868
5. Stevens, A. & **Brown, T.**, 2017, *Physical drivers of galaxy atomic gas content: exploring environmental and evolutionary effects with Dark Sage*, MNRAS, 471, 447
4. Lutz, K. A.; Kilborn, V.A.; Catinella, B.; Koribalski, B. S.; **Brown, T.**; Cortese, L.; Denes, H.; Jozsa, G. I. G.; Wong, O. I., 2017, *The HIX galaxy survey I: Study of the most gas rich galaxies from HIPASS*, MNRAS, 467, 1083
3. Janowiecki, S.; Catinella B.; Cortese, L.; Saintonge, A.; **Brown, T.**, Wang, J., 2017, *xGASS: Exceptionally gas-rich central galaxies in small groups and their connections to pre-processing and galaxy evolution*, MNRAS, 466, 4795
2. **Brown, T.**; Catinella, B.; Cortese, L.; Lagos, C.d.P. ; Dave, R.; Kilborn, V.A.; Haynes, M.P.; Giovanelli, R.; Rafieferantsoa, M., 2017, *Cold gas stripping in satellite galaxies: from pairs to clusters*, MNRAS, 466, 1275
1. **Brown, T.**; Catinella, B.; Cortese, L.; Kilborn, V.A.; Haynes, M.P.; Giovanelli, R., 2015, *The effect of structure and star formation on the gas content of nearby galaxies*, MNRAS, 452, 2479