

DR. TOBY BROWN

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Department of Physics & 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

- PI of ALMA Large Program, VERTICO, that is mapping molecular gas in 51 Virgo Cluster galaxies
- Devising successful research programs and publishing in leading journals
- Supervising PhD and undergraduate students in astrophysics and machine learning
- Speaking at international conferences, research institutions, and public events

EDUCATION

Business Administration with Management

May 2018 - present

McMaster University CCE

Hamilton, Canada

Doctor of Philosophy (Ph.D.), Astrophysics

October 2013 - August 2017

Swinburne University of Technology

Melbourne, Australia

Astrophysics MPhys, Hons

September 2009 - June 2013

University of Liverpool & Liverpool John Moores University

Liverpool, UK

COMPETITIVE FUNDING AND HONOURS

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| ARCADE: ALMA Reduction in the CANFAR Data Environment (co-I, \$250,000) | 2019 |
| MITACS Globalink Research Award (\$6,000) | 2019 |
| NAASC ALMA Ambassador (\$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 (\$7,500) | 2017 |
| Famelab Australia Finalist | 2016 |
| ASA Travel Award (\$1,000) | 2015 |
| SUPRA Graduate Scholarship (\$98,000 + Tuition-fee Waiver) | 2013 |

LEADERSHIP AND SERVICE ROLES IN ASTRONOMY

Principle Investigator, VERTICO

July 2019 - present

Virgo Environment Traced in CO, ALMA Cycle 7 Large Program

- Awarded ~200 ALMA hours as P.I. of VERTICO, the first Canadian-led ALMA Large Program
- VERTICO will map the molecular gas content of 51 Virgo Cluster galaxies
- Assembling and managing the VERTICO collaboration of ~30 world-class researchers
- Ensuring maximum impact and legacy value by coordinating projects and collaborations

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| NAASC ALMA Ambassador <i>North American ALMA Science Center</i> | December 2018 - present |
| <ul style="list-style-type: none"> · Acting as an ALMA resource for the Canadian community · Hosting ALMA preparation workshops and sharing ALMA/interferometry expertise | |
| Women in Astronomy Working Group Member <i>International Astronomical Union</i> | November 2018 - present |
| <ul style="list-style-type: none"> · Assess and report on the status of gender equality in astronomy and recommend future actions that will improve the environment for all astronomers | |
| SKA HI Galaxy Science Working Group Member <i>Square Kilometer Array Organisation</i> | November 2018 - present |
| <ul style="list-style-type: none"> · Provide input to the Office of the SKA Organization on issues relating to the design, construction, and future operations of the SKA as they pertain to HI Galaxy Science | |
| Steering Committee Member <i>Early Career Researcher Chapter, Astronomical Society of Australia</i> | May 2016 - May 2017 |
| Student Mentor <i>Swinburne University of Technology</i> | January - October 2015 Melbourne, Australia |
| Scientific Organizing Committee Member <i>ICRARcon</i> | June - September 2016 Mandurah, Australia |
| Local Organizing Committee Member <i>ICRARcon</i> | June - September 2016 Mandurah, Australia |
| Local Organizing Committee Member <i>The Role of Neutral Hydrogen in Galaxy Evolution</i> | June - September 2015 Borneo, Malaysia |

SUPERVISING AND TEACHING EXPERIENCE

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| MacDATA Fellow Supervisor <i>Dept. Physics & Astronomy, & MacDATA Institute, McMaster University</i> | March 2018 - December 2018 Hamilton, Canada |
| <ul style="list-style-type: none"> · 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 <i>McMaster University</i> | November 2017 - present Hamilton, Canada |
| Teaching Assistant <i>University of Western Australia</i> | February - November 2016 Perth, Australia |
| Teaching Assistant <i>Swinburne University of Technology</i> | February - October 2015 Melbourne, Australia |
| Undergraduate Project Supervisor <i>Swinburne University</i> | September 2014 - July 2015 Melbourne, Australia |

LEADERSHIP ROLES OUTSIDE ASTRONOMY

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| Bargaining Committee Chair <i>Canadian Union of Public Employees - Local 3906</i> | October 2018 - present Hamilton, Canada |
| <ul style="list-style-type: none"> · Elected to represent all postdocs in contract negotiations with McMaster University leadership | |

Field Director*Municipal Council Election Campaign*

July - October 2018

Hamilton, Canada

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

Senior Field Organiser*Ontario New Democratic Party*

April - June 2018

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*Canadian Union of Public Employees - Local 3906*

January - September 2018

Hamilton, Canada

- Oversee political donations, events and awareness campaigns of union

CONTRIBUTED CONFERENCE TALKS

Total number: 8

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| 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

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| Swinburne University of Technology, Melbourne, Australia | 2019 |
| Carnegie Observatories, Pasadena, CA, USA | 2018 |
| York University, York, Canada | 2018 |
| Royal Military College of Canada, Kingston, Canada | 2018 |
| Queens University, Kingston, Canada | 2018 |

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| 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

VERTICO (Virgo Environment Traced in CO, PI Brown)

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, 10 CO-AUTHOR)

14. Gao, Y.; Xiao, T.; Li, C.; Jiang, X.; Tan, Q.; Gao, Y.; Wilson, C.D.; Bureau, M.; Saintonge, A.; Sánchez-Gallego, J.R.; **Brown, T.**; Clark, C.J.R.; Hwang, H.S.; Lamperti, I.; Lin, L.; Liu, L.; Lu, D.; Pan, H.; Sun, J.; Williams, T.G., 2019, *Estimating the molecular gas mass of low-redshift galaxies from a combination of mid-infrared luminosity and optical properties*, ApJ, submitted
13. Lamperti, I.; Saintonge, A.; De Looze, I.; Accurso, G.; Clark, C.J.R.; Smith, M.W.L.; Wilson, C.D.; Brinks, E.; **Brown, T.**; Bureau, M.; Clements, D.L.; Eales, S.; Glass, D.H.W.; Hwang, H.S.; Lee, J.C.; Lin, L.; Michalowski, M.J.; Sargent, M.; Williams, T.G.; Xiao, T.; Yang, C., 2019, *JINGLE V: Dust properties of nearby galaxies derived from hierarchical Bayesian SED fitting*, MNRAS, accepted, DOI: 10.1093/mnras/stz2311
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