

# DR. TOBY BROWN

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

## RESEARCH INTERESTS

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Galaxy evolution, star formation, multi-wavelength astronomy

## PROFESSIONAL EXPERIENCE

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### Postdoctoral Fellow

*McMaster University*

October 2017 - present

*Hamilton, Canada*

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

### Mitacs Visiting Scholar

*University of Maryland*

September - December 2019

*College Park, MD, USA*

- Externally funded (Mitacs) research visit to Prof. Alberto Bolatto's group at the University of Maryland
- Establishing a new collaboration between two of the leading star formation groups in North America

## EDUCATION

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### Doctor of Philosophy (Ph.D.), Astrophysics

*Swinburne University of Technology*

October 2013 - August 2017

*Melbourne, Australia*

### Astrophysics MPhys, Hons

*University of Liverpool & Liverpool John Moores University*

September 2009 - June 2013

*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

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### Principle Investigator, VERTICO

*Virgo Environment Traced in CO, ALMA Cycle 7 Large Program*

July 2019 - present

- Awarded the first Canadian-led ALMA Large Program, VERTICO (180 hrs)
- Recruiting and managing 30 world-class researchers for the VERTICO collaboration

<b>2019 ALMA Ambassador</b> <i>North American ALMA Science Center</i>	December 2018 - April 2019
· Acting as an ALMA resource for the Canadian community · Hosting ALMA preparation workshops and sharing ALMA/interferometry expertise	
<b>Postdoc Representative</b> <i>Department of Physics &amp; Astronomy, McMaster University</i>	July 2018 - present
<b>Women in Astronomy Working Group Member</b> <i>International Astronomical Union</i>	November 2018 - present
<b>SKA HI Galaxy Science Working Group Member</b> <i>Square Kilometer Array Organisation</i>	November 2018 - present
<b>Steering Committee Member</b> <i>Early Career Researcher Chapter, Astronomical Society of Australia</i>	May 2016 - May 2017
<b>Student Mentor</b> <i>Swinburne University of Technology</i>	January - October 2015
<b>Scientific Organizing Committee Member</b> <i>ICRARcon, Mandura, Australia</i>	June - September 2016
<b>Local Organizing Committee Member</b> <i>ICRARcon, Mandura, Australia</i>	June - September 2016
<b>Local Organizing Committee Member</b> <i>The Role of Neutral Hydrogen in Galaxy Evolution, Borneo, Malaysia</i>	June - September 2015

## SUPERVISING AND TEACHING EXPERIENCE

<b>MacDATA Fellow Supervisor</b> <i>Dept. Physics &amp; Astronomy, &amp; MacDATA Institute, McMaster University</i>	March 2018 - December 2018 <i>Hamilton, Canada</i>
· Supervisor of McMaster's MacDATA Graduate (PhD level) Fellow · Won \$7,500 grant to pay student salary for 9 month astronomy-data science collaboration	
<b>Integrated Science Project Supervisor</b> <i>McMaster University</i>	November 2017 - present <i>Hamilton, Canada</i>
<b>Teaching Assistant</b> <i>University of Western Australia</i>	February - November 2016 <i>Perth, Australia</i>
<b>Teaching Assistant</b> <i>Swinburne University of Technology</i>	February - October 2015 <i>Melbourne, Australia</i>
<b>Undergraduate Project Supervisor</b> <i>Swinburne University of Technology</i>	September 2014 - July 2015 <i>Melbourne, Australia</i>

## 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

## COLLOQUIA AND SEMINARS

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*Total number: 19*

National Radio Astronomy Observatory, Charlottesville, VA, USA	2019
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
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

## PUBLIC SPEAKING AND COMMUNICATION

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### **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 The Sun (UK), New York Post, Scientific American, 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

## LEADERSHIP ROLES OUTSIDE ASTRONOMY

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### **Chair, Negotiating Committee**

*Canadian Union of Public Employees - Local 3906*

October 2018 - present

*Hamilton, Canada*

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

### **Field Director**

*Municipal Council Election Campaign*

July - October 2018

*Hamilton, Canada*

### **Senior Field Organiser**

*Ontario New Democratic Party*

April - June 2018

*Hamilton, Canada*

### **Political Action Committee Member**

*Canadian Union of Public Employees - Local 3906*

January - September 2018

*Hamilton, Canada*

## SURVEY MEMBERSHIPS

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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)

## WHITE PAPERS

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*LRP2020: Canada and the SKA from 2020-2030, Co-Author, 2019, arXiv:1911.03250*

*LRP2020: Opportunities and Outcomes for Postdocs in Canada, Co-Author, 2019*

## DR. TOBY BROWN - LIST OF REFEREED 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, accepted, arXiv:1911.02795
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