

## Ian D. Roberts

Post-doctoral Research Associate, Leiden Observatory  
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### Academic Positions

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<b>Banting Fellow</b>	2024 –
Waterloo Centre for Astrophysics, University of Waterloo, Canada	
<b>Waterloo Centre for Astrophysics Fellow</b>	2024 –
Waterloo Centre for Astrophysics, University of Waterloo, Canada	
<b>Postdoctoral Research Associate</b>	2020 – 2023
Leiden Observatory, Leiden University, The Netherlands	

### Education

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#### Doctor of Philosophy

McMaster University, Hamilton ON, Canada  
Thesis: *Galaxy Clusters and Their Role in Galaxy Evolution*  
Advisor: Dr. Laura Parker  
2016-2020

#### Masters of Science

McMaster University, Hamilton ON, Canada  
Thesis: *Galaxy Properties Across Diverse Halo Environments*  
Advisor: Dr. Laura Parker  
2014-2016

#### Bachelors of Science, honours with distinction

Mount Allison University, Sackville NB, Canada  
Thesis: *Simulation of Double-Peaked Meteor Light Curves*  
Advisor: Dr. Bob Hawkes  
2010-2014

### Refereed Publications

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**14 first-author papers, 33 total • 498 citations • h-index = 13**

Source: ResearchGate

★ denotes students of I. Roberts

First-author:

14. **Roberts I.D.**, van Weeren R.J., Lal D.V., Sun M., Chen H., et al., *Radio-continuum spectra of ram pressure stripped galaxies in the Coma Cluster*, A&A, submitted.
13. **Roberts I.D.**, Brown T., Zabel N., Wilson C.D., Chung A., et al., *VERTICO VI: Cold-Gas Asymmetries in Virgo Cluster Galaxies*, 2023, A&A, 675, A78.
12. **Roberts I.D.**, ★Lang M., ★Trotsenko D., Bemis A., Ellison S.L., et al., *LoTSS Jellyfish Galaxies IV: Enhanced Star Formation on the Leading Half of Cluster Galaxies and Gas Compression in IC3949*, 2022, ApJ, 941, 77.
11. **Roberts I.D.**, van Weeren R.J., Timmerman R., Botteon A., Gendron-Marsolais M.-L., et al., *LoTSS Jellyfish Galaxies: III. The First Identification of Jellyfish Galaxies in the Perseus Cluster*, 2022, A&A, 658, A44.
10. **Roberts I.D.**, Parker L.C., Gwyn S., Hudson M., Carlberg R., *Ram Pressure Candidates in UNIONS*, 2022, MNRAS, 509, 1342.
9. **Roberts I.D.**, van Weeren R.J., McGee S.L., Botteon A., Ignesti A., et al., *LoTSS Jellyfish Galaxies: II. Ram Pressure Stripping in Groups versus Clusters*, 2021, A&A, 652, A153.

8. **Roberts I.D.**, van Weeren R.J., McGee S.L., Botteon A., Drabent A., et al., *LoTSS Jellyfish Galaxies: I. Radio tails in low redshift clusters*, 2021, A&A, 650, A111.
7. **Roberts I.D.**, Parker L.C., *Ram pressure candidates in the Coma Cluster: Evidence for enhanced star formation*, 2020, MNRAS, 495, 554.
6. **Roberts I.D.**, Parker L.C., “*Observing*” *unrelaxed clusters in dark matter simulations*, 2019, MNRAS, 490, 773.
5. **Roberts I.D.**, Parker L.C., Brown T., Joshi G.D., Hlavacek-Larrondo J., et al., *Quenching low-mass satellite galaxies: evidence for a threshold ICM density*, 2019, ApJ, 873, 42.
4. **Roberts I.D.**, Parker L.C., Hlavacek-Larrondo J., *Connecting optical and X-ray tracers of galaxy cluster relaxation*, 2018, MNRAS, 475, 4704.
3. **Roberts I.D.**, Parker L.C., *Evidence of pre-processing and a dependence on dynamical state for low-mass satellite galaxies*, 2017, MNRAS, 467, 3268.
2. **Roberts I.D.**, Parker L.C., Karunakaran A., *Comparing galaxy morphology and star-formation properties in X-ray bright and faint groups and clusters*, 2016, MNRAS, 455, 3628.
1. **Roberts I.D.**, Parker L.C., Joshi G.D., Evans F.A., *Mass segregation trends in SDSS galaxy groups*, 2015, MNRAS, 448, L1.

Co-author:

19. Bemis A.R., Wilson C.D., Sharda P., and **Roberts I.D.**, *Does the HCN/CO ratio trace the fraction of gravitationally-bound gas? II. A radiative transfer perspective*, A&A, submitted.
18. Stevens A.R.H., Brown T., Diemer B., Pillepich A., Hernquist L., et al. incl. **Roberts I.D.**, *VERTICO VIII: Comparing the spatially resolved effects of environment on galactic gas with IllustrisTNG*, ApJL, submitted.
17. Hu D., Zajačec M., Werner N., Grossová R., Jáchym P., et al. incl. **Roberts I.D.**, *Ram-pressure stripped radio tail and two ULXs in the spiral galaxy HCG 97b*, MNRAS, submitted.
16. Ignesti A., Brienza M., Vulcani B., Poggianti B.M., Marasco A., et al. incl. **Roberts I.D.**, *On the encounter between the GASP galaxy JO36 and the radio plume of GIN 049*, ApJ, in press.
15. Brown T., **Roberts I.D.**, Thorp M., Ellison S.L., Zabel N., et al., *VERTICO VII: Environmental suppression of molecular gas content and star formation efficiency in Virgo Cluster galaxies*, ApJ, in press.
14. Edler H.W., de Gasperin F., Shimwell T.W., Hardcastle M.J., Boselli A., et al. incl. **Roberts I.D.**, *ViCTORIA: The LOFAR HBA Virgo Cluster Survey*, 2023, A&A, 676, A24.
13. Ignesti A., Vulcani B., Botteon A., Poggianti B., Giunchi E., et al. incl. **Roberts I.D.**, *Radio continuum tails in ram pressure-stripped spiral galaxies: Experimenting with a semi-empirical model in Abell 2255*, 2023, A&A, 675, A118.
12. Watts A.B., Cortese L., Catinella B., Brown T., Wilson C.D., et al. incl. **Roberts I.D.**, *VERTICO V: The Complex, Environmentally-driven Evolution of the Inner Cold Gas Discs of Virgo Cluster Galaxies*, 2023, PASA, 40, e017.
11. Jiménez-Donaire M., Brown T., Wilson C.D., **Roberts I.D.**, Zabel N., et al., *VERTICO III: The Kennicutt-Schmidt relation in Virgo cluster galaxies*, 2023, A&A, 671, A3.
10. Villanueva V., Bolatto A.D., Vogel S., Brown T., Wilson C.D., et al. incl. **Roberts I.D.**, *VERTICO IV: Environmental Effects on the Gas Distribution and Star Formation Efficiency of Virgo Cluster Spirals*, 2022, ApJ, 940, 176.
9. Ignesti A., Vulcani B., Poggianti B.M., Moretti A., Shimwell T., et al. incl. **Roberts I.D.**, *Walk on the Low Side: LOFAR explores the low-frequency radio emission of GASP jellyfish galaxies*, 2022, ApJ, 937, 58.
8. Lal D.V., Lyskova N., Zhang C., Venturi T., Forman W.R. et al. incl. **Roberts I.D.**, *High-resolution, high sensitivity, low frequency uGMRT view of Coma Cluster of Galaxies*, 2022, ApJ, 934, 170.

7. Smith R., Shinn J.-H., Tonnesen S., Calderón-Castillo P., Crossett J., et al. incl. **Roberts I.D.**, *A New Method to Constrain the Appearance and Disappearance of Observed Jellyfish Galaxy Tails*, 2022, ApJ, 934, 86.
6. Zabel N., Brown T., Wilson C.D., Davis T.A., Cortese L., et al. incl. **Roberts I.D.**, *VERTICO II: How HI-identified Environmental Mechanisms Affect the Molecular Gas in Cluster Galaxies*, 2022, ApJ, 933, 10.
5. Kotecha S., Welker C., Zhou Z., Wadsley J., Kraljic K., et al. incl. **Roberts I.D.**, *Cosmic Filaments Delay Quenching Inside Clusters*, 2022, MNRAS, 512, 926.
4. Ignesti A., Vulcani B., Poggianti B.M., Paladino R., Shimwell T., et al. incl. **Roberts I.D.**, *GASP XXXVIII: The LOFAR-MeerKAT-JVLA View on the Non-thermal Side of a Jellyfish Galaxy*, 2022, ApJ, 924, 64.
3. Brown T., Wilson C.D., Zabel N., Davis T., Boselli A., et al. incl. **Roberts I.D.**, *VERTICO: The Virgo Environment Traced in CO Survey*, 2021, ApJS, 257, 21.
2. Demers M.L., Parker L.C., **Roberts I.D.**, *Smaller stellar disc scale lengths in rich environments*, 2019, MNRAS, 489, 2216.
1. Evans, F.A., Parker L.C., **Roberts I.D.**, *Red Misfits in the Sloan Digital Sky Survey: Properties of Star-Forming Red Galaxies*, 2018, MNRAS, 476, 5284.

#### In proceedings:

1. **Roberts I.D.**, Hawkes R.L., Weryk R.J., Campbell-Brown M.D., Brown P.G., Stokan E., Subasinghe D., *Meteoroid structure and ablation implications from multiple maxima meteor light curves*, 2014, Proceedings of the Meteoroids Conference, ed: Jopek T.J., Rietmeijer F., Watanabe J., Williams I.P., 155

#### Research Supervision

- Rashmi Gottumukkala (Summer Student), *The Radio Continuum - Star Formation Relation in COSMOS-XS*, Leiden/ESA Astrophysics Program, 2022
- Daria Trotsenko (Summer Student), *Molecular Gas and Star Formation in the Jellyfish Galaxy, IC3949*, Leiden/ESA Astrophysics Program, 2022
- Federica Mauro (Masters), *SED Fitting in Coma Cluster Jellyfish Galaxies*, Leiden Observatory, 2021
- Maojin Lang (Masters), *Resolved Star Formation in Jellyfish Galaxies*, Leiden Observatory, 2021
- Shaojin Huang (Bachelors), *Galaxy Properties Between Close Cluster Pairs*, McMaster University, 2019

#### Awards & Recognitions

- Banting Fellowship, **\$140,000 over 2yr**
- Honourable mention for the J.S. Plaskett medal for most outstanding Canadian doctoral thesis in astronomy or astrophysics
- Ontario Graduate Scholarship (Doctoral), **\$15,000**
- Dawes Memorial Fellowship for Graduate Studies in Physics, **\$2,000**
- NSERC Post Graduate Scholarship (Doctoral), **\$105,000 over 3yr**
- Ontario Graduate Scholarship (Masters), **\$15,000**
- NSERC Post Graduate Scholarship (Masters), **\$17,500**
- McMaster University Graduate Scholarship, **\$2,500**
- McMaster University Entrance Scholarship, **\$3,000**
- Marjorie Young Bell Summer Research Grant, **\$6,250**
- Mount Allison University Entrance Scholarship, **\$32,000 over 4yr**
- Mount Allison University Dean's List: 2010-11, 2011-12, 2012-13, 2013-14

## Accepted Observing Programs

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### Principal investigator:

- **Roberts I.D.**, van Weeren R.J., Ignesti A., Tomicic N., Upgraded Giant Metrewave Radio Telescope, Cycle 45, 22 hr, *Mapping the Low-Frequency Spectrum of NGC2276 and its Extreme Stripped Tail*.
- **Roberts I.D.**, Hudson M.H., Ignesti A., McGee S.L., van Weeren R.J., William Herschel Telescope, WEAVE semester 2023B1/2024A1, 50 hr (dark time), *Resolved Spectroscopy of Coma Jellyfish Galaxies and Their Stripped Tails*.
- **Roberts I.D. (co-PI)**, Parker L.C. (co-PI), van Weeren R.J., Ignesti A., Tomicic N., Gemini semester 2022B, GN-2023B-Q-319, 10.2 hr, *Star Formation Inside and Outside of the Extreme Galaxy NGC 2276*.
- **Roberts I.D. (co-PI)**, Parker L.C. (co-PI), van Weeren R.J., Ignesti A., Tomicic N., Gemini semester 2022B, GN-2022B-Q-222, 9.6 hr, *Star Formation Inside and Outside of the Extreme Galaxy NGC 2276*.
- **Roberts I.D.**, van Weeren R.J., McGee S.L., Isaac Newton Telescope semesters 2021B & 2022A, Large Program, 24 nights (15 dark, 9 gray), *H-alpha Imaging of Jellyfish Galaxies in Groups*.
- **Roberts I.D.**, Bemis A., Brown T., Ellison S., McGee S.L., Parker L.C., Spekkens K., van Weeren R.J., Wilson C., Zabel N., ALMA Cycle 8 2021, 13 hr (C grade), *Resolving Molecular Gas and Star Formation in Coma Cluster Jellyfish*.
- **Roberts I.D.**, Parker L.C., Hlavacek-Larrondo J., Edwards L.O.V., Gemini semester 2019A, GN-2019A-Q-311, 18.0 hr, *Mapping central emission in cool-core groups*.
- **Roberts I.D.**, Parker L.C., Hlavacek-Larrondo J., Edwards L.O.V., Gemini semester 2018A, GN-2018A-Q-211, 13.5 hr, *Mapping central emission in cool-core groups*.

### Co-investigator:

- Tomicic N., et al. (**Roberts I.D., co-I**), Astrosat Cycle A13, A13\_064, 10ks, *Star formation as a laboratory for extra-galactic forces: a battle between two foes, gravity and ram pressure*.
- Miley G., et al. (**Roberts I.D., co-I**), LOFAR Cycle 20, LC20\_004, 30h, *Deep ILT observations of Coma A (3C277.3) : A unique laboratory of jet-induced star formation*.
- Brown T., et al. (**Roberts I.D., co-I**), ALMA Cycle 7, 2019.1.00763.L, Large Program, ~200 hr, *VERTICO: The Virgo Environment Traced in CO*.

## Professional Associations

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- Member, Canadian Astronomical Society, 2014 –
- Member, Virgo Environment Traced in CO (VERTICO) Collaboration, 2019 –
- Member, LOFAR Key Surveys Project Collaboration, 2020 –
- Member, Ultraviolet Near-Infrared Optical Northern Survey (UNIONS) Collaboration, 2020 –

## Outreach and Service

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- Local Organizing Committee Member - 2022 LOFAR Early Career Scientists Meeting
- Coordinator of the PhD Colloquia, Leiden Observatory, 2021 – 2023
- Invited referee for: MNRAS, CanTAC, GMRT-TAC
- Speaker at Astronomy on Tap Leiden
- Manager of the William J. McCallion Planetarium, 2016 – 2020
- Member of McMaster Sidewalk Astronomy, 2015 – 2020
- Presenter at William J. McCallion Planetarium, 2014 – 2020

## Seminars & Invited Talks

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- The University of Alabama in Huntsville, *A Multiwavelength View of Ram Pressure Stripping in Groups and Clusters*, 2023
- The University of Victoria, *Enhanced Star Formation on the Leading Half of Cluster Galaxies and Gas Compression in IC3949*, 2022
- Leiden/ESA Astrophysics Summer Student Program, *Tips and Tricks for Making Beautiful (and effective) Astronomical Figures*, 2022
- CANVAS Lecture Series, *Ram Pressure Stripping in Nearby Groups & Clusters: A Low Frequency Perspective*, 2022
- Max Planck Institut für Astronomie, *Identifying Ram Pressure Stripping from the Low-frequency Radio Continuum*, 2021
- Netherlands Institute for Radio Astronomy, *Fishing for Jellyfish Galaxies with LOFAR*, 2021
- Leiden Observatory, *Fishing for Jellyfish: The Evolution of Galaxies in Dense Environments*, 2020
- McMaster University, *Quenching Low Mass Galaxies: Evidence for a Threshold ICM Density*, 2019
- Université de Montréal, *The Dependence of Galaxy Properties on Group Dynamical State*, 2017

## Contributed Talks

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- *Gas Compression from Ram Pressure in Nearby Cluster Galaxies*, 2022, The Netherlands ALMA Science Day, The Netherlands.
- *The LoTSS Jellyfish Galaxy Sample*, 2022, LOFAR Early Career Researchers Meeting, Leiden, The Netherlands.
- *A Low Frequency Perspective on Ram Pressure Stripping (+ Enhanced SFRs on the Leading Edge)*, 2022, Epoch of Galaxy Quenching 2022, Cambridge, United Kingdom.
- *Studying Ram Pressure Stripping with the Canada-France Imaging Survey*, 2021, UNIONS Collaboration Meeting, virtual meeting.
- *Linking star formation quenching and ICM density*, 2020, Quenching and Transformation Throughout Cosmic Time, Aspen, United States.
- *Quenching low-mass satellite galaxies: evidence for a threshold ICM density*, 2020, Meeting of the American Astronomical Society, Honolulu, United States.
- *Quenching low-mass satellite galaxies: evidence for a threshold ICM density*, 2019, Meeting of the Canadian Astronomical Society, Montreal, Canada.
- *Insights into cluster relaxation and galaxy quenching from X-ray obs. (at low-z)*, 2018, GOGREEN collaboration meeting, Waterloo, Canada.
- *Connecting optical and X-ray tracers of galaxy cluster relaxation*, 2018, Glenfiddling Galaxy Clusters workshop, Edinburgh, Scotland.
- *A product of their Halo Environment: How galaxy properties depend on group X-ray luminosity and dynamical state*, 2016, Annual Meeting of the Canadian Astronomical Society, Winnipeg, Canada.
- *Implications for meteoroid structure and ablation from multiple maxima meteor light curves*, 2013, International Meteor Conference, Poznan, Poland.

## Contributed Posters

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- *LOFAR Jellyfish Galaxies in Nearby Groups*, 2021, Meeting of the European Astronomical Society, Leiden, Netherlands.

- *LoTSS of Jellyfish Galaxies in Nearby Groups and Clusters*, 2021, Meeting of the Canadian Astronomical Society, Penticton BC, Canada.
- *Quenching low-mass satellite galaxies: evidence for a threshold ICM density*, 2018, Meeting of the Canadian Astronomical Society, Victoria, Canada.
- *The dependence of galaxy properties on group X-ray luminosity and dynamics*, 2017, Galaxy Evolution Across Time, Paris, France.
- *How galaxy properties depend on group X-ray luminosity and dynamical state*, 2016, CAASTRO: The Changing Face of Galaxies, Hobart, Tasmania AUS.
- *How galaxy properties depend on group X-ray luminosity and dynamical state*, 2016, Great Lakes Cosmology Workshop, Hamilton, Canada.
- *Effects of X-ray luminosity on galaxy star formation and morphology in SDSS groups and clusters*, 2015, Meeting of the Canadian Astronomical Society, Hamilton, Canada.
- *Mass-segregation trends in SDSS galaxy groups*, 2015, Meeting of the Canadian Astronomical Society, Hamilton, Canada.
- *Laser Ablation Techniques for Simulation of Hypervelocity Impact on Materials Relevant to the Space Industry*, 2012, IRM 10<sup>th</sup> Anniversary Symposium, The Future of Materials Research, Halifax, Canada.

## Teaching

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**Head teaching assistant**, Introductory Physics, McMaster University, 2015-2020

**Teaching assistant**, McMaster University, 2014-2016

Courses including: Electricity and Magnetic Fields, Big Questions in Astronomy, Introductory Mechanics

**Teaching assistant**, Mount Allison University, 2011-2014

Courses including: General Physics, Solar System Astronomy, Stars Galaxies and the Universe