Ian D. Roberts

Post-doctoral Research Associate, Leiden Observatory, 2020-present
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galaxy evolution • galaxy groups and clusters • star formation quenching • multi-wavelength

Education:

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

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

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

Teaching:

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

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

Outreach and Service:

- Local Organizing Committee Member - 2022 LOFAR Early Career Scientists Meeting
- Coordinator of the PhD Colloquia, Leiden Observatory, 2021-present
- 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

Scholarships & Recognitions:

- Finalist for the J.S. Plaskett medal for most outstanding Canadian doctoral thesis in astronomy or astrophysics
- Ontario Graduate Scholarship (Doctoral), $15000
- Dawes Memorial Fellowship for Graduate Studies in Physics, $2000
- NSERC Post Graduate Scholarship (Doctoral), $105000 over 3yr
- Ontario Graduate Scholarship (Masters), $15000
- NSERC Post Graduate Scholarship (Masters), $17500
- Marjorie Young Bell Summer Research Grant, $6250
- Mount Allison University Entrance Scholarship, $32000 over 4yr

Seminars & Invited Talks:

- 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

Observing Programs:

CO-PI – **Roberts I.D.**, CO-PI – Parker L.C., 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.*

PI – **Roberts I.D.**, van Weeren R.J., McGee S.L., Isaac Newton Telescope semesters 2021B & 2022A, Large Program, 23 nights (15 dark, 9 gray), *H-alpha Imaging of Jellyfish Galaxies in Groups.*

PI – **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.*

CO-I – 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.*

PI – **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.*

PI – **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.*

Refereed Publications:

12 papers as first author and 24 papers total, ★ denotes students of I. Roberts

24. 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*, PASA, submitted.

23. 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*, A&A, in press.

22. **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.

21. 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.

20. 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.

19. 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.

18. 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.

17. 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.

16. 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.

15. **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.

14. **Roberts I.D.**, Parker L.C., Gwyn S., Hudson M., Carlberg R., *Ram Pressure Candidates in UNIONS*, 2022, MNRAS, 509, 1342.

13. 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.

12. 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.

11. **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.

10. **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.

9. **Roberts I.D.**, Parker L.C., *Ram pressure candidates in the Coma Cluster: Evidence for enhanced star formation*, 2020, MNRAS, 495, 554.

8. **Roberts I.D.**, Parker L.C., *"Observing" unrelaxed clusters in dark matter simulations*, 2019, MNRAS, 490, 773.

7. Demers M.L., Parker L.C., **Roberts I.D.**, *Smaller stellar disc scale lengths in rich environments*, 2019, MNRAS, 489, 2216.

6. **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.

5. 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.

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.

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

Contributed Talks:

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:

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^{th} Anniversary Symposium, The Future of Materials Research, Halifax, Canada.