

Mallory Thorp

Affiliation: Physics & Astronomy Department, University of Victoria

3800 Finnerty Road, Victoria BC, V8P 5C2 Canada

Email: mallorythorp@uvic.ca **Telephone:** (253)-370-3784 **Website:** <http://www.astro.uvic.ca/~mallorythorp/>

Education

<i>University of Victoria</i>	2019 - 2022
PhD Candidate Physics and Astronomy (Supervisor: Dr. Sara Ellison)	
Title: "A multifaceted investigation of the resolved properties of galaxy mergers"	
<i>University of Victoria</i>	2017 - 2019
MSc Physics and Astronomy (Supervisor: Dr. Sara Ellison)	
Title: "Resolved properties of galaxy mergers from the MaNGA survey"	
Overall GPA: 8.00/9.00	
<i>University of Washington – Seattle</i>	2013 - 2017
B.S. Astronomy and Physics (Double Major), Minor in Classical Studies	
Overall GPA: 3.87/4.00, GPA in ASTR courses 300 level and above: 3.99/4.00	

Research

Interests: *Galaxy mergers, galactic evolution, star-forming regions, multi-wavelength astronomy*

Research Assistant - *University of Victoria, Dr. Sara Ellison* 2017 - 2022

Investigate star-formation and molecular gas properties of interacting galaxies using a combination of SDSS MaNGA integral field spectroscopy and ALMA CO observations. Construct innovative methods to visualize relationship between spatially resolved properties.

Mitacs Globalink Research Intern - *University of Cambridge, Dr. Roberto Maiolino & Dr. Asa Bluck* Fall 2019

Evaluate non-parametric morphology measurements of MaNGA integral field spectroscopy data. Utilize cosmological simulations to quantify impact of uncertainty and PSF on measurements and design procedures to correct for these effects.

Undergraduate Research Assistant - *University of Washington, Dr. Emily Levesque* 2016 - 2017

Analyze parameters of star forming regions in nearby galaxies through spectroscopic data. Characterize a gamma ray burst galaxy host complex using Gemini Multi-Object Spectrograph (South) data.

Compile and Analyze Data - *University of Washington, Dr. Woodruff Sullivan* 2015 - 2016

Study the declination of the sun with meridian line in Rome's Santa Maria Degli Angeli Basilica to gain understanding of ancient observational methods, collect data from images of solar transit over the line and compute declination from the meridian line's scale.

Collaborations

ALMaQUEST (ALMA MaNGA Quenching and Star Formation) Survey: Combining ALMA observations of resolved molecular gas with resolved star formation rates from MaNGA to investigate the evolution from starburst to quenched galaxies for a wide range of galactic properties. <http://arc.phys.uvic.ca/~almaquest/>

Role: Data Reduction & Management, Website maintenance

VERTICO (VIRGO Environment Traced in CO) Survey: Ongoing ALMA Large Program to investigate environmental effects on galaxy evolution with multi-wavelength observations of 51 VIRGO Cluster Galaxies.

<https://sites.google.com/view/verticosurvey>

Role: Survey Coordinator (Database management)

Awards

• The R.M. Petrie Memorial Fellowship (\$1463, \$ 3577)	2019, 2020
• L.E. Frances Druce Award in Science (\$4055)	2019
• Mitacs Globalink Research Award (\$6000)	2019
• James A. & Laurette Agnew Memorial Award (\$2188)	2018
• University of Victoria Graduate Fellowship (\$8000)	2017
• University of Victoria Graduate Entrance Award (\$5000)	2017
• University of Washington Dean's List	2014 - 2017
• UW Baer Award for astronomy scholarship and research	2016

Contributed Talks

- Kavli Institute of Cosmology virtual conference: Epoch of Galaxy Quenching - Cambridge, UK Sep 2022
Talk: What Powers Merger Induced Star Formation?
- KIAA Forum on Gas in Galaxies for Early Career Scientists - Virtual Nov 2021
Talk: Resolving Star Formation and Molecular Gas Properties of Merging Galaxies with ALMaQUEST
- Lorentz Centre Workshop: The Enigmatic Role of Mergers in Galaxy Evolution - Virtual Mar 2021
Talk: Resolving Star Formation and Molecular Gas Properties of Post-Merger Galaxies with ALMaQUEST
- Kavli Institute of Cosmology virtual conference: Epoch of Galaxy Quenching - Virtual Sep 2020
Talk: Spatially Resolved Properties of Post-Merger Galaxies with MaNGA and ALMA
- Australia-ESO Joint Conference: Linking galaxies from the Epoch of initial star-formation to today - Sydney, Australia Feb 2019
Talk: Spatially Resolved Star Formation and Metallicity Profiles in Post-Merger Galaxies from MaNGA

Contributed Posters

- 52nd annual meeting of the Canadian Astronomical Society - Virtual May 2021
Poster: Towards robust determination of non-parametric morphologies in marginal astronomical data: resolving uncertainties with cosmological hydrodynamical simulations
- European Astronomical Society Annual Meeting - Virtual June 2020
Poster: Spatially Resolved Star Formation in Merging Galaxies from MaNGA
- 49th annual meeting of the Canadian Astronomical Society - Victoria, Canada May 2018
Poster: Spatial Distribution of Star Formation Rate and Other Properties of MaNGA Post-Merger Galaxies
- Mary Gates Undergraduate Research Symposium - Seattle WA, USA May 2017
Talk: A Spatially Resolved Study of the GRB 020903 Host Complex
- 229th American Astronomical Society Meeting - Grapevine TX, USA Jan 2017
Poster: A Spatially - Resolved Study of the GRB 020903 Host Complex

Seminars

- Ringberg Virtual Seminar Series - Virtual Dec 2020
Talk: Spatially Resolved Properties of Post-Merger Galaxies with MaNGA and ALMA
Recording: https://www.youtube.com/watch?v=kXo6dJBb9dc&ab_channel=VirtualRingbergSeminarSeries%2C2020
- Oxford Galaxy Evolution Seminar - Oxford, UK Nov 2019
Talk: Spatially Resolved Properties of Galaxy Mergers from MaNGA
- University of Cambridge: Institute of Astronomy Seminar - Cambridge, UK Oct 2019
Talk: Spatially Resolved Properties of Galaxy Mergers from MaNGA
- UVic Astronomy Summer Seminar Series - Victoria, Canada June 2018
Talk: Resolved Profiles of Star Formation and Metallicity in Post-Merger Galaxies from MaNGA

Publications

First Author Contributions

1. **Thorp, M.D.**; Ellison, S.L.; Pan, H.; Lin, L.; Patton, D. R.; Bluck, A.F.L.; Walters, D.; Scudder, J. M.; “[The ALMaQUEST Survey X: What powers merger induced star formation?](#)”, 2022, MNRAS, 516, 1462.
2. **Thorp, M.D.**; Bluck, A.F.L.; Ellison, S.L.; Maiolino, R.; Conselice, C.J.; Hani, M.H.; Bottrell, C.; “[Towards robust determination of non-parametric morphologies in marginal astronomical data: resolving uncertainties with cosmological hydrodynamical simulations](#)”, 2021, MNRAS, 507, 886.
3. **Thorp, M.D.**; Ellison, S.L.; Simard, L.; Sánchez, S.F.; Antonio, B.; “[Spatially resolved star formation and metallicity profiles in post-merger galaxies from MaNGA](#)”, 2019, MNRAS, 482, L55-59.
4. **Thorp, M.D.** and Levesque, E.; “[A spatially resolved study of the GRB 020903 host galaxy](#)”, 2018, ApJ, 856, 36.

Other Publications

1. Jiménez-Donaire, M. J. ; Brown, T. ; Wilson, C. D. ; Roberts, I. D. ; Zabel, N. ; Ellison, S. L. ; Thorp, M. ; Villanueva, V. ; Chown, R. ; Bisaria, D. ; Bolatto, A. D. ; Boselli, A. ; Catinella, B. ; Chung, A. ; Cortese, L. ; Davis, T. A. ; Lagos, C. D. P. ; Lee, B. ; Parker, L. C. ; Spekkens, K. ; Stevens, A. R. H. ; Sun, J.; “[VERTICO III: The Kennicutt-Schmidt relation in Virgo cluster galaxies](#)”, 2023, A&A accepted

2. Villanueva, V.; Bolatto, A. D.; Vogel, S.; Brown, T.; Wilson, C. D.; Zabel, N.; Ellison, S.; Stevens, A. R. H.; Jimenez Donaire, M. J.; Spekkens, K.; Thorp, M.D.; Davis, T. A.; Parker, L. C.; Roberts, I. D.; Bisaria, D.; Boselli, A.; Catinella, B.; Chung, A.; Cortese, L.; Lee, B.; Watts, A.; “[VERTICO IV: Environmental Effects on the Gas Distribution and Star Formation Efficiency of Virgo Cluster Spirals](#)”, 2023, ApJ accepted.
3. Baker, W. M.; Maiolino, R.; Belfiore, F.; Bluck, A. F. L.; Curti, M.; Wylezalek, D.; Bertemes, C.; Bothwell, M. S.; Lin, L.; Thorp, M.; Pan, H.; “[The molecular gas main sequence and Schmidt-Kennicutt relation are fundamental, the star-forming main sequence is a \(useful\) byproduct](#)”, 2023, MNRAS, 518, 4767.
4. Baker, W. M.; Maiolino, R.; Belfiore, F.; Curti, M.; Bluck, A. F. L.; Lin, L.; Ellison, S. L.; **Thorp, M.D.**; Pan, H.; “[The metallicity's fundamental dependence on both local and global galactic quantities](#)”, 2023, MNRAS, 519, 1149.
5. Su, Y.C.; Lin, L.; Pan, H.; Cobá, C.L.; Hsieh, B.C.; Sánchez, S. F.; **Thorp, M.D.**; Bureau, M.; Ellison, S.L.; Li, C.; “[The ALMaQUEST survey. VIII. What causes the velocity discrepancy between CO and H \$\alpha\$ rotation curves in galaxies?](#)”, 2022, ApJ, 934, 19.
6. Zabel, N.; Brown, T.; Wilson, C. D.; Davis, T. A.; Cortese, L.; Parker, L. C.; Boselli, A.; Catinella, B.; Chown, R.; Chung, A.; Deb, T.; Ellison, S. L.; Jiménez-Donaire, M. J.; Lee, B.; Roberts, I. D.; Spekkens, K.; Stevens, A. R. H.; **Thorp, M. D.**; Tonnesen, S.; Villanueva, V.; “[VERTICO II: effects of HI-identified environmental mechanisms on molecular gas](#)”, 2022, ApJ, 933, 17.
7. Baker, W. M.; Maiolino, R.; Bluck, A.F.L.; Lin, L.; Ellison, S. L.; Belfiore, F.; Pan, H.; **Thorp, M.D.**; “[The ALMaQUEST survey IX: the nature of the resolved star forming main sequence](#)”, 2022, MNRAS, 510, 3622.
8. Bluck, A.F.L.; Maiolino, R.; Brownson, S.; Conselice, C.J.; Ellison, S.L.; Piotrowska, J.M.; **Thorp, M.D.**; “[The quenching of galaxies, bulges, and disks since cosmic noon. A machine learning approach for identifying causality in astronomical data](#)”, 2022, A&A, 659, A160.
9. Lin, L.; Ellison, S.L.; Pan, H.-A.; **Thorp, M.D.**; Yu, P.C.; Belfiore, F.; Hsieh, B.-C.; et al., “[The ALMaQUEST Survey. VII. Star Formation Scaling Relations of Green Valley Galaxies](#)”, 2022, ApJ, 926, 175.
10. Brown, T.; Wilson, C.D.; Zabel, N.; Davis, T.A.; Boselli, A.; Chung, A.; Ellison, S.L.; Lagos, C.D.P.; Stevens, A.R.H.; Cortese, L.; Bahé, Y.M.; Bisaria, D.; Bolatto, A. D.; Cashmore, C. R.; Catinella, B.; Chown, R.; Diemer, B.; Elahi, P. J.; Hani, M. H.; Jiménez-Donaire, M. J.; Lee, B.; Leidig, K.; Mok, A.; Olsen, K. P.; Parker, L. C.; Roberts, I. D.; Smith, R.; Spekkens, K.; **Thorp, M.D.**; Tonnesen, S.; Vienneau, E.; Villanueva, V.; Vogel, S. N.; Wadsley, J.; Welker, C.; Yoon, H.; “[VERTICO: The Virgo Environment Traced in CO Survey](#)”, 2021, ApJS, 257, 21.
11. Ellison, S.L.; Lin, L.; **Thorp, M.D.**; Pan, H.-A.; Sánchez, S.F.; Bluck, A.F.L.; Belfiore, F.; “[The ALMaQUEST survey - VI. The molecular gas main sequence of 'retired' regions in galaxies](#)”, 2021, MNRAS, 502, L6.
12. Ellison, S.L.; Lin, L.; **Thorp, M.D.**; Pan, H.-A.; Scudder, J.M.; Sánchez, S.F.; Bluck, A.F.L.; et al., “[The ALMaQUEST Survey - V. The non-universality of kpc-scale star formation relations and the factors that drive them](#)”, 2021, MNRAS, 501, 4777.
13. Bluck, A.F.L.; Maiolino, R.; Piotrowska, J.M.; Trussler, J.; Ellison, S.L.; Sánchez, S.F.; **Thorp, M.D.**; et al., “[How do central and satellite galaxies quench? - Insights from spatially resolved spectroscopy in the MaNGA survey](#)”, 2020, MNRAS, 499, 230.
14. Lin, L.; Ellison, S.L.; Pan, H.-A.; **Thorp, M.D.**; Su, Y.-C.; Sánchez, S.F.; Belfiore, F.; et al., “[ALMaQUEST. IV. The ALMA-MaNGA QUenching and STar Formation \(ALMaQUEST\) Survey](#)”, 2020, ApJ, 903, 145.
15. Ellison, S.L.; **Thorp, M.D.**; Lin, L.; Pan, H.-A.; Bluck, A.F.L.; Scudder, J.M.; Teimoorinia, H.; et al., “[The ALMaQUEST survey - III. Scatter in the resolved star-forming main sequence is primarily due to variations in star formation efficiency](#)”, 2020, MNRAS, 493, L39.
16. Ellison, S.L.; **Thorp, M.D.**; Pan, H.-A.; Lin, L.; Scudder, J.M.; Bluck, A.F.L.; Sánchez, S.F.; et al., “[The ALMaQUEST Survey - II. What drives central starbursts at \$z \sim 0\$?](#)”, 2020, MNRAS, 492, 6027.
17. Bluck, A.F.L.; Maiolino, R.; Sánchez, S.F.; Ellison, S.L.; **Thorp, M.D.**; Piotrowska, J.M.; Teimoorinia, H.; et al., “[Are galactic star formation and quenching governed by local, global, or environmental phenomena?](#)”, 2020, MNRAS, 492, 96.

18. Bottrell, C.; Hani, M. H.; Teimoorinia, H.; Ellison, S. L.; Moreno, J.; Torrey, P.; Hayward, C. C.; **Thorp, M.D.**; Simard, L.; Hernquist, L.; “Deep learning predictions of galaxy merger stage and the importance of observational realism”, 2019, MNRAS, 490, 5390.
19. Lin, L.; Pan, H.-A.; Ellison, S. L.; Belfiore, F.; Shi, Y.; Sánchez, S. F.; Hsieh, B.-C.; Rowlands, K.; Ramya, S.; **Thorp, M. D.**; Li, C.; Maiolino, R.; “The ALMaQUEST Survey: The Molecular Gas Main Sequence and the Origin of the Star-forming Main Sequence”, 2019, ApJL, 884, L33.
20. Woodruff, S.; **Thorp, M.D.**; Tovar, G.; Look, J.; "Modern observations using the 1702 Meridian Line of the Basilica of Santa Maria degli Angeli e dei Martiri (Rome)". The British Sundial Society: Bulletin, vol. 29(3), pp. 2 - 12. September 2017.

Skills

Coding Languages: Python/Jupyter Notebook, SQL, C Shell, IRAF/PYRAF, LaTeX

Astronomy Specific: CASA (ALMA data reduction), ALMA Observing Tool, SAOImage DS9, Gemini IRAF (GMOS data reduction)

Other

- Public Speaking for STEM Topics (general audience & elementary school)
- Planetary & WorldWide Telescope Presentations
- Educational and Lecturing Techniques (UVic Graduate Student Teaching Pro-D Certificate)
- Database Structuring and Management

Teaching & Supervising Experience

- Summer Student Supervisor (University of Victoria) May 2022 - Present
Graduate supervisor for 1st-year undergraduate internship through Valerie Kuehne Undergraduate Research Award. Student used MaNGA DR17 to investigate variations in post-merger star formation with respect to global galaxy properties
- Teaching Assistant (University of Victoria) 2017 - Present
Astro 102: Exploring the Cosmos, Astro 101: Exploring the Night Sky, Astro 150: Concepts in Modern Astronomy, Astro 250: Introduction to Astrophysics
- Astronomy 3xx series class grader (University of Washington) 2016 - 2017
Astro 321: The Solar System, Astro 322: Content of our Galaxy, Astro 323: Extragalactic Astronomy and Cosmology

Qualifications

- *LTSI Graduate Student Teaching Pro-D Certificate* 2022
Attended a series of professional development workshops about learning and teaching in higher education, with focuses on inclusivity, interactive learning, and virtual classrooms
- *Fall TA Conference Certificate* 2017
Attended six workshops focused on foundational skills for teaching assistants, including lecturing and assessment techniques along with conflict resolution and communication

Volunteer Experience

- UVic Astronomy Research Centre Program Management Team: Graduate representative 2021 - Present
- Physics and Astronomy Graduate Student Associations: President 2020 - Present
Duties: Organize social and academic events to enrich the university experience of graduate students, and to represent graduate students on a departmental level. As president: form committees to carry out these events, budget expenses, and apply for additional event funding.
- Organizer and chair, University of Victoria Astronomy Summer Seminar Series 2018 - Present
- CUPE 4163 Departmental Steward 2018 - 2020
- Victoria Nerd Nite Volunteer 2018 - 2020
- UVic PAGSA Graduate Student Mentor 2018
- AstronoMay at the Pacific Science Center 2017
- Theodore Jacobsen Observatory volunteer: Assist at observatory open house and present astronomy based public lectures 2013 - 2017
- UW Astronomy Club outreach and tutoring (2017 Club President) 2013 - 2017

- UW planetarium presentations 2014 - 2017
- Undergraduate representative for UW astronomy undergraduate curriculum committee 2016 - 2017

Outreach & Public Presentations

- Public Lecture - Cowichan Valley Starfinders Astronomy Club Aug 2022
- Public Lecture - Astronomy Day at the Royal BC Museum May 2022
- Public Lecture - UVic Observatory Open House Aug 2020
- Victoria Nerd Nite Presenter: Clash of the Galaxies Apr 2020
- 3 Minute Thesis: UVic Finalist Jan 2020
Recording (bottom of page): <http://www.astro.uvic.ca/~mallorythorp/>
- Public Lecture - University of Cambridge: Institute of Astronomy Oct 2019
Recording: <https://sms.cam.ac.uk/media/3124250>
- Sydney Elementary School Guest Speaker: Intro to Astronomy Jan 2019 / 2021