

Ting Li

Mailing Address

Department of Astronomy and Astrophysics
University of Toronto
50 St George Street
Toronto, ON M5S 3H4
Canada

Email: ting.li@astro.utoronto.ca
Homepage: <http://sazabi4.github.io>

Research Interests

Milky Way Formation and Evolution, Stellar Astrophysics, Galaxies, Stellar Streams, Metal-poor Stars, Stellar Populations, Optical Observations, Modern Sky Surveys.

Research Positions

Assistant Professor Department of Astronomy and Astrophysics University of Toronto 50 St. George Street, Toronto, ON M5S 3H4, Canada	Jul 2021 –
Carnegie Postdoctoral Fellow Carnegie Observatories, Carnegie Institution for Science 813 Santa Barbara St, Pasadena, CA 91101, USA	Jul 2019 – Jul 2021
Leon M. Lederman Postdoctoral Fellow Fermi National Accelerator Laboratory Kirk and, Pine St, Batavia, IL 60510, USA	Aug 2016 – Jul 2019

Education

Ph.D., Astrophysics Texas A&M University, Texas, USA	Sep 2010 - Aug 2016
M.S., Space Science Luleå University of Technology, Kiruna, Sweden	Sep 2008 - Jul 2010
B.S., Physics, Fudan University, Shanghai, China	Sep 2004 - Jul 2008

PhD Thesis: *Exploring Milky Way Halo Substructures with Large-area Sky Surveys*

Abstract: Over the last two decades, our understanding of the Milky Way has been improved thanks to large data sets arising from large-area digital sky surveys. The Milky Way is now known to be inhabited by a variety of spatial and kinematic stellar substructures, including stellar streams and stellar clouds, all of which are predicted by hierarchical Lambda Cold Dark Matter models of galaxy formation. In this dissertation, I present the discovery and analysis of these new structure and study their implications on the formation and evolution history of our Milky Way.

Thesis Advisors: *Prof. Darren L. DePoy, Prof. Jennifer L. Marshall* (Texas A&M University)

Grant

Canada CFI/JELF Grant (PI, \$350,000 CAD)	2022 – 2027
Univ. Toronto Connaught Grant (PI, \$20,000 CAD)	2022 – 2024
Canada NSERC Discovery Grant (PI, \$155,000 CAD)	2022 – 2027

Student Mentorship

Mairead Heiger (graduate at UToronto)	2022 –
Jordan Bruce (undergrad at UToronto)	2021 –
Jessica Patel (undergrad at UToronto)	2021 –
Charlie Hughes (undergrad at UToronto)	2021 –
William Cerny (Former undergrad at UChicago; now graduate at Yale)	2020 –
Peter Ferguson (Former graduate at Texas A&M; now postdoc at UW Madison)	2019 – 2021
Sydney Jenkins (Former undergrad at UChicago; now graduate at MIT)	2017 – 2021
Nora Shipp (Former graduate at UChicago; now postdoc at MIT)	2018 – 2019
Nicholas Mondrik (Former undergrad at Texas A&M; graduate at Harvard)	2015 – 2016

Public Outreach

Presenter, Astronomy on Tap	2018 – 2019
Lecturer, Fermilab Lifelong Learning Institute (LLI) Program	2018 – 2019
Lecturer, Fermilab Saturday Morning Physics for High School Students	2017 – 2019
Coordinator, Fermilab Saturday Morning Physics for High School Students	2016 – 2019
E/PO representative, Dark Energy Survey	2014 – 2016
Coordinator, Science Olympiad	2014
Instructor, "Expanding Your Horizons" Workshop	2012
Organizer, Texas A&M Physics and Astronomy Festival	2011 – 2014
Organizer, Texas A&M Star Parties	2011 – 2013

Conferences, Seminars, Colloquia

20. Colloquium, University of Toronto, Toronto, Canada, Sept 2022
19. (remote) Colloquium, Indiana University, Bloomington, IN, USA, Oct 19, 2021
18. (remote) Colloquium, National Research Council of Canada's Herzberg Astronomy and Astrophysics Research Centre, Victoria, BC, Sept 28, 2021
17. (remote) Invited Seminar Talk at N3AS ([Link to Talk](#)), May 11, 2021
16. (remote) Colloquium, the University of British Columbia, Vancouver, Canada, Apr 19, 2021
15. (remote) Invited Seminar Talk, the University of Kentucky, Lexington, KY, Feb 3, 2021
14. (remote) Invited Seminar Talk, UC Davis, Davis, CA, Jan 28, 2021
13. (remote) Invited Seminar Talk, University College London, London, England, Nov 2 2020
12. (remote) Invited Seminar Talk, McGill Space Institute, Montreal, Canada, Oct 13 2020
11. [iPoster](#), 235th AAS Meeting, Honolulu, Hawaii, Jan 2020
10. Colloquium, UC Santa Cruz, Santa Cruz, CA, Nov 2019
9. Colloquium, University of Toronto, Toronto, Canada, Oct 2019
8. Invited Talk, LSST Dark Matter Workshop, University of Chicago, Chicago, IL, Aug 2019
7. Invited Talk, IAU Symposium 353 "Galactic Dynamics in the Era of Large Surveys", Shanghai, China, Jul 2019

6. Invited Talk, Conference "Science in our own Backyard: Exploring the Galaxy and the Local Group with WFIRST", Caltech, Pasadena, CA, Jun 2019
5. Invited Talk, KITP Workshop "In the Balance: Stasis and Disequilibrium in the Milky Way", Santa Barbara, CA, Apr 2019
4. Invited Seminar Talk, Carnegie Mellon University, PA, Mar 2019
3. Participant, Aspen Workshop "Dynamics of the Milky Way System in the Era of Gaia", Aspen, CO, Sep 2018
2. Invited Long-term Participant, KITP Workshop, The Small-Scale Structure of Cold(?) Dark Matter, Santa Babara, CA, May 2018
1. Invited Plenary Talk, SnowPAC, Big Questions, Big Surveys, Big Data: Astronomy & Cosmology in the 2020s, Snowbird, UT, May 2018

Publication List

68. **Li, T. S.**, Ji, A. P., Pace, A. B. et al. "S⁵: The Orbital and Chemical Properties of One Dozen Stellar Streams", 2022, ApJ, 928, 30
67. Vivas, A. K., Martinez-Vazquez, C. E., Walker, A. R., Belokurov, V., **Li, T. S.** et al. "Variable Stars in the Giant Satellite Galaxy Antlia 2", 2022, ApJ, 926, 78
66. Tavangar, K., Ferguson, P., Shipp, N., (including **Li, T. S.**) "From the Fire: A Deeper Look at the Phoenix Stream", 2022, ApJ, 925, 118
65. Ferguson, P. S., Shipp, N., Drlica-Wagner, A., **Li, T. S.** et al. "DELVE-ing into the Jet: A Thin Stellar Stream on a Retrograde Orbit at 30 kpc", 2022, AJ, 163, 18
64. Mau, S., Nadler, E. O., Wechsler, R. H., (including **Li, T. S.**) "Milky Way Satellite Census. IV. Constraints on Decaying Dark Matter from Observations of Milky Way Satellite Galaxies", submitted, arXiv:2201.11740
63. Ji, A. P., Koposov, S. E., **Li, T. S.**, et al. "Kinematics of Antlia 2 and Crater 2 from the Southern Stellar Stream Spectroscopic Survey (S⁵)", 2021, ApJ, 921, 32
62. Shipp, N., Erkal, D., Drlica-Wagner, A., **Li, T. S.**, et al. "Measuring the Mass of the Large Magellanic Cloud with Stellar Streams Observed by S⁵", 2021, ApJ, 923, 149
61. Casey, A. R., Ji, A. P., Hansen, T. T., **Li, T. S.**, et al. "Signature of a Massive Rotating Metal-poor Star Imprinted in the Phoenix Stellar Stream", 2021, ApJ, 921, 67
60. Jenkins, S., **Li, T. S.**, Pace, A. B., et al. "VLT Spectroscopy of Ultra-Faint Dwarf Galaxies. 1. Boötes I, Leo IV, Leo V", 2021, ApJ, 920, 92J
59. Drlica-Wagner, A., Carlin, J. L., Nidever, D. L., et al. (including **Li, T. S.**) "The DECam Local Volume Exploration Survey: Overview and First Data Release", 2021, ApJS, 256, 2
58. Abbott, T. M. C., Adamów, M., Aguena, M. et al. (including **Li, T. S.**) "The Dark Energy Survey Data Release 2", 2021, ApJS, 255, 2, 20
57. Hansen, T. T., Ji, A. P., Da Costa, G. S., **Li, T. S.**, et al. "S⁵: The Destruction of a Bright Dwarf Galaxy as Revealed by the Chemistry of the Indus Stellar Stream", 2021, ApJ, 915, 103
56. Lu, W., Fuller, J., Raveh, Y., Perets, H. B., **Li, T. S.**, et al. "The former companion of hyper-velocity star S5-HVS1", 2021, MNRAS, 503, 603

55. **Li, T. S.**, Koposov, S. E., Erkal, D., et al. "Broken into Pieces: ATLAS and Aliqa Uma as One Single Stream", 2021, *ApJ*, 911, 149
54. Nadler, E. O., Drlica-Wagner, A., Bechtol, K., et al. (including **Li, T. S.**) "Constraints on Dark Matter Properties from Observations of Milky Way Satellite Galaxies", 2021, *PhRvL*, 126, 1101
53. Cerny, W., Pace, A. B., Drlica-Wagner, A., et al. (including **Li, T. S.**) "Discovery of an Ultra-faint Stellar System near the Magellanic Clouds with the DECam Local Volume Exploration Survey", 2021, *ApJ*, 910, 18
52. Tanoglidis, D., Drlica-Wagner, A., Wei, K., **Li, T. S.**, et al. "Shadows in the Dark: Low-surface-brightness Galaxies Discovered in the Dark Energy Survey", 2021, *ApJS*, 252, 18
51. Simon, J. D., Brown, T. M., Drlica-Wagner, **Li, T. S.**, et al. "Eridanus II: A Fossil from Reionization with an Off-center Star Cluster", 2021, *ApJ*, 908, 18
50. Chang, J., Yuan, Z., Xue, X-X, Simion, I. T., Kang, X., **Li, T. S.**, et al. "Is NGC 5824 the Core of the Progenitor of the Cetus Stream?", 2020, *ApJ*, 905, 100
49. Ji, A. P., **Li, T. S.**, Hansen, T. T., et al. "The Southern Stellar Stream Spectroscopic Survey (S5): Chemical Abundances of Seven Stellar Streams", 2020, *AJ*, 160, 181
48. Hansen, T. T., Marshall, J. L., Simon, J. D., **Li, T. S.**, et al. "Chemical Analysis of the Ultrafaint Dwarf Galaxy Grus II. Signature of High-mass Stellar Nucleosynthesis", 2020, *ApJ*, 897, 183
47. Li, Z-Z; Qian, Y-Z; Han, J.; **Li, T. S.**, et al. "Constraining the Milky Way Mass Profile with Phase-space Distribution of Satellite Galaxies", 2020, *ApJ*, 894, 10
46. Nadler, E. O., Wechsler, R. H., Bechtol, K. et al. (including **Li, T. S.**), "Milky Way Satellite Census. II. Galaxy-Halo Connection Constraints Including the Impact of the Large Magellanic Cloud", 2020, *ApJ*, 893, 48
45. Drlica-Wagner, A., Bechtol, K., Mau, S., McNanna, M., Nadler, E. O., Pace, A. B., **Li, T. S.** et al., "Milky Way Satellite Census. I. The Observational Selection Function for Milky Way Satellites in DES Y3 and Pan-STARRS DR1", 2020, *ApJ*, 893, 47
44. Allende Prieto, C., Cooper, A. P., Dey, A., Gansicke, B. T., Koposov, S. E., **Li, T. S.**, et al. "Preliminary Target Selection for the DESI Milky Way Survey (MWS)", 2020, *Research Notes of the AAS*, 4, 10
43. Simon, J. D., **Li, T. S.**, Erkal, D., et al. "Birds of a Feather? Magellan/IMACS Spectroscopy of the Ultra-faint Satellites Grus II, Tucana IV, and Tucana V", 2020, *ApJ*, 892, 137
42. Wan, Z., Lewis, G. F., **Li, T. S.**, et al. "The tidal remnant of an unusually metal-poor globular cluster", 2020, *Nature*, 583, 768
41. Koposov, S. E., Boubert, D., **Li, T. S.**, et al. "Discovery of a nearby 1700 km/s star ejected from the Milky Way by Sgr A*", 2020, *MNRAS*, 491, 2465
40. Ji, A. P., **Li, T. S.**, Simon, J. D., et al. "Detailed Abundances in the Ultra-faint Magellanic Satellites Carina II and III", 2020, *ApJ*, 889, 27
39. **Li, T. S.**, Koposov, S. E., Zucker, D. B., et al. "The Southern Stellar Stream Spectroscopic Survey (S⁵): Overview, Target Selection, Data Reduction, Validation, and Early Science", 2019, *MNRAS*, 490, 3508
38. Shipp, N., **Li, T. S.**, Pace, A. B., et al. "Proper Motions of Stellar Streams Discovered in the Dark Energy Survey", 2019, *ApJ*, 885, 3

37. Torrealba, G., Belokurov, V., Koposov, S. E., **Li, T. S.**, et al. "The hidden giant: discovery of an enormous Galactic dwarf satellite in Gaia DR2", 2019, MNRAS, 488, 2743
36. Erkal, D., Belokurov, V., Laporte, C. F. P., Koposov, S. E., **Li, T. S.**, et al. "The total mass of the Large Magellanic Cloud from its perturbation on the Orphan stream", 2019, MNRAS, 487, 2685
35. Koposov, S. E., Belokurov, V., **Li, T. S.**, et al. "Piercing the Milky Way: an all-sky view of the Orphan Stream", 2019, MNRAS, 485, 4726
34. Wang, M. Y., de Boer, T., Pieres, A., **Li, T. S.**, et al. "The Morphology and Structure of Stellar Populations in the Fornax Dwarf Spheroidal Galaxy from Dark Energy Survey Data", 2019, ApJ, 881, 118
33. Pace, A. B. & **Li, T. S.**, "Proper motions of Milky Way Ultra-Faint satellites with *Gaia* DR2 \times DES DR1", 2019, ApJ, 875, 77
32. Dey, Arjun et al. (including **Li, T. S.**), "Overview of the DESI Legacy Imaging Surveys", 2019, AJ, 157, 168
31. Wang, M. Y., Koposov, S., Drlica-Wagner, A., Pieres, A., **Li, T. S.**, "Rediscovery of the Sixth Star Cluster in the Fornax Dwarf Spheroidal Galaxy", 2019, ApJ, 875, 13
30. Abbott, B. P., et al. (including **Li, T. S.**), "The Dark Energy Survey: Data Release 1", 2018, ApJS, 239, 18
29. Erkal, D., **Li, T. S.**, Koposov, S. E., Belokurov, V., et al., "Modelling the Tucana III stream - a close passage with the LMC", 2018, MNRAS, 481, 3148.
28. **Li, T. S.**, Simon, J. D., Kuehn, K., et al., "The First Tidally Disrupted Ultra-Faint Dwarf Galaxy? - Spectroscopic Analysis of the Tucana III Stream", 2018, ApJ, 866, 22.
27. **Li, T. S.**, Simon, J. D., Pace, A. B., et al. "Ships Passing in the Night: Spectroscopic Analysis of Two Ultra-faint Satellites in the Constellation Carina", 2018, ApJ, 857, 145.
26. Shipp, N., Drlica-Wagner, A., Balbinot, E., Ferguson, P., Erkal, D., **Li, T. S.**, et al., "Stellar Streams Discovered in the Dark Energy Survey", 2018, ApJ, 862, 114.
25. Bernstein, G. M., Abbott, T. M. C., Armstrong, R., Burke, D. L., Diehl, H. T., Gruendl, R. A., Johnson, M. D., **Li, T. S.**, et al., "Photometric Characterization of the Dark Energy Camera", 2018, PASP, 130, 4501.
24. Bergemann, M., Sesar, B., Cohen, J., Serenelli, A. M., Sheffield, A. A., **Li, T. S.** et al., "Witnessing Galactic eviction – disc stars at extreme locations around our Galaxy", 2018, Nature, 555, 334.
23. Nagasawa, D. Q., Marshall, J. L., **Li, T. S.** et al. "Chemical Abundance Analysis of Three α -Poor, Metal-Poor Stars in the Ultra-Faint Dwarf Galaxy Horologium I", 2018, ApJ, 852, 99.
22. Torrealba, G. et al. (including **Li, T. S.**), "Discovery of two neighbouring satellites in the Carina constellation with MagLiteS", 2018, MNRAS, 475, 5085
21. Drlica-Wagner, A., et al. (including **Li, T. S.**), "Dark Energy Survey Year 1 Results: Photometric Data Set for Cosmology", 2018, ApJS, 235, 33.
20. Abbott, B. P., et al. (including **Li, T. S.**), "A gravitational-wave standard siren measurement of the Hubble constant", 2017, Nature, 551, 85.
19. Abbott, B. P., et al. (including **Li, T. S.**), "Multi-messenger Observations of a Binary Neutron Star Merger", 2017, ApJ, 848, L12.

18. Cowperthwaite, P. S., et al. (including **Li, T. S.**), "The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/Virgo GW170817. II. UV, Optical, and Near-infrared Light Curves and Comparison to Kilonova Models", 2017, *ApJ*, 848, L17.
17. Soares-Santos, M., et al. (including **Li, T. S.**), "The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/Virgo GW170817. I. Discovery of the Optical Counterpart Using the Dark Energy Camera", 2017, *ApJ*, 848, L16.
16. Johnston, K. V., Price-Whelan, A. M., Bergemann, M., Laporte, C., **Li, T. S.** et al., "Disk Heating, Galactoseismology, and the Formation of Stellar Halos", 2017, *Galax*, 5, 44.
15. **Li, T. S.**, Sheffield, A. A., Johnston, K. V., Marshall, J. L., Majewski, S. R. et al., "Exploring Halo Substructure with Giant Stars", 2017, *ApJ*, 844, 74.
14. Burke, D., Rykoff, E., et al. (including **Li, T. S.**), Forward Global Photometric Calibration of the Dark Energy Survey, 2018, *AJ*, 155, 41.
13. **Li, T. S.**, Simon, J. D., Drlica-Wagner, A., Bechtol, K., et al. "Farthest Neighbor: The Distant Milky Way Satellite Eridanus II", 2017, *ApJ*, 838, 8
12. Simon, J. D., **Li, T. S.**, Drlica-Wagner, A., Bechtol, K., et al. "Nearest Neighbor: The Low-mass Milky Way Satellite Tucana III", 2017, *ApJ*, 838, 44
11. Hansen, T. T., Simon, J. D., Marshall, J. L., **Li, T. S.**, et al. "An r-process Enhanced Star in the Dwarf Galaxy Tucana III", 2017, *ApJ*, 838, 11
10. **Li, T. S.**, DePoy, D. L., Marshall, J. L., Tucker, D. L., Bernstein, G. M., et al. "Assessment of Systematic Chromatic Errors that Impact Sub-1% Photometric Precision in Large-Area Sky Surveys", 2016, *AJ*, 151, 157
9. **Li, T. S.**, Balbinot, E., Mondrik, N., et al. "Discovery of a Stellar Overdensity in Eridanus-Phoenix in the Dark Energy Survey", 2016, *ApJ*, 817, 135
8. Balbinot, E., Yanny, B., **Li, T. S.**, et al. "The Phoenix stream: a cold stream in the Southern hemisphere", 2016, *ApJ*, 820, 58.
7. Melendez, J., Placco, V. M., Tucci-Maia, M., Ramirez, I., **Li, T. S.**, "2MASS J18082002-5104378: The Brightest ($V=11.9$) Ultra Metal-Poor Star", 2016, *A&A*, 585, 5
6. Simon, J. D., Drlica-Wagner, A., **Li, T. S.**, et al. "Stellar Kinematics and Metallicities in the Ultra-faint Dwarf Galaxy Reticulum II", 2015, *ApJ*, 808, 95
5. Drlica-Wagner, A., et al. (including **Li, T. S.**), "Eight Ultra-faint Galaxy Candidates Discovered in Year Two of the Dark Energy Survey", 2015, *ApJ*, 813, 109.
4. Drlica-Wagner, A., et al. (including **Li, T. S.**), "Search for Gamma-Ray Emission from DES Dwarf Spheroidal Galaxy Candidates with Fermi-LAT Data", 2015, *ApJ*, 809, L4
3. Bechtol, K., et al. (including **Li, T. S.**), "Eight New Milky Way Companions Discovered in First-year Dark Energy Survey Data", 2015, *ApJ*, 807, 50
2. Flaugher, B., et al. (including **Li, T. S.**), "The Dark Energy Camera", 2015, *AJ*, 150, 150
1. **Li, T. S.**, Marshall, J. L., Lépine, S., Williams, P., Chavez, J., "Optical BVRI Photometry of Common Proper Motion F/G/K+M Wide Separation Binaries", 2014, *AJ*, 148, 60