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Research Interests:

- Pulsar Timing Arrays and Gravitational Waves
- Interstellar Medium
- Fast Radio Bursts and Propagation Effects

Education:

- 2016 Ph. D. in Astronomy, Cornell University (Ithaca, NY)
Dissertation: “Characterization of a Precision Pulsar Timing Gravitational Wave Detector”
Advisor: James M. Cordes
- 2014 M.S. in Astronomy, Cornell University (Ithaca, NY)
- 2011 B.A. in Astronomy, Computer Science, Colgate University (Hamilton, NY)

Awards:

- 2016 Cornell University Department of Astronomy
Cranson and Edna B. Shelley Graduate Research Award
- 2015 New York Space Grant Fellowship
- 2011 Colgate University Award for Academic Excellence in Computer Science
- 2011 Colgate University Physics and Astronomy Alumni Award

Research Experience:

- 2016 — NANOGrav Physics Frontier Center Postdoctoral Research Fellow
Department of Physics and Astronomy, West Virginia University, Morgantown, NY
- 2013 — 2016 Graduate Research Assistant
Department of Astronomy, Cornell University, Ithaca, NY
- 2009 Summer Student Research Assistant
National Radio Astronomy Observatory, Charlottesville, VA
Poster at AAS 215: *Lam, M., & Demorest, P. 2010, BAAS, 42, #453.24*
- 2008, 2010 Independent Student Researcher
Department of Physics and Astronomy, Colgate University, Hamilton, NY
Poster at AAS 217: *Lam, M. T., & Balonek, T. J. 2011, BAAS, 43, #142.10*
Poster at AAS 217: *Balonek, T. J., Lam, M. T., et al., 2011, BAAS, 43, #142.09*
Poster at AAS 213: *Balonek, T. J., Lam, M. T., et al., 2009, BAAS, 41, #446.02*

Principal Investigator Observations:

- Arecibo Observatory, P3077, *Characterizing Galactic Scintillations of Fast Radio Bursts using Radio Pulsars*
- Green Bank Telescope, GBT17A-401, *High-Fluence Timing of a Radio Millisecond Pulsar*

Student Research Mentoring and Supervision:

- 2017 — Casey Wilson (West Virginia University)
Frequency-Dependent Contributions to Pulse Arrival Times
- 2017 — Nihan Pol (West Virginia University)
Estimates of Fast Radio Burst Dispersion Measures from Cosmological Simulations
- 2017 — Florencia De Armas (Ossining High School)
Methods for Understanding Exoplanet Atmospheres
- 2017 — Tyler Shaw (Ossining High School)
Supermassive Black Hole Binary Candidates from Periodicities in Quasar Lightcurves
- 2015 — 2016 Douglas Riegel (Cornell University)
Development of Quicklook: Quasi-real-time Investigation of NANOGrav Observations
<https://github.com/mtlam/Quicklook>
- 2013 — 2015 Charles Gulian (Ossining High School)
A Search for Tidally-Distorted White Dwarf Binaries in the Kepler Survey
Intel STS 2015 Finalist, Siemens Competitions 2015 Regional Finalist

Teaching and Outreach Experience:

- 2018 Honors Astronomy ASTR 298A, Lead Instructor
- 2016 — 2017 Graduate Astrophysics Seminar ASTR 693A, Co-Instructor
- 2015 — AskScience Moderator and AMA Coordinator
Organize direct Q&As between the public (~15 million subscribers) and scientists.
- 2014 — 2016 Cornell Astronomy REU Python Programming, Gravitational Wave Workshop
- 2014 GRASSHOPR Graduate Student Fellow
Developed four-day lesson plan in astronomy with local high school physics class.
- 2013, 2015 Teaching Assistant: Cornell Adult University
- 2011 — 2016 Cornell University Ask an Astronomer Administrator
Answer questions from the public and manage website.
- 2011 — 2013 Teaching Assistant, Cornell University: Astronomy 1101, 1102, 2201, 2202
- 2008 — 2010 Teaching Assistant, Colgate University: Astronomy 101, 102, Physics 111, Computer Science 101, 102

Committees and Service:

- 2017 Spring NANOGrav Collaboration Meeting, Science Organizing Committee Chair
- 2015 — 2016 Astronomy Grads Network Officer, President
- 2015 Spring NANOGrav Collaboration Meeting, Science Organizing Committee
- 2014 International Pulsar Timing Array Conference Student Week Organizing Committee
- 2012 — 2015 Astronomy Grads Network Officer, Webmaster/Secretary

Software:

PyPulse: A Python package for handling and analyzing PSRFITS files
<http://ascl.net/1706.011>

Selected Talks:

- 2017 Transformative Science for the Next Generation Green Bank Observatory
Optimal Frequency Ranges for Sub-Microsecond Precision Pulsar Timing
- 2017 International Pulsar Timing Array Conference
“The NANOGrav Nine-Year Data Set: Excess Noise in Millisecond Pulsar Arrival Times”
- 2017 Fast Radio Bursts: New Probes of Fundamental Physics and Cosmology
“Characterizing Galactic Scintillations of Fast Radio Bursts using Radio Pulsars” (poster)
- 2017 229th American Astronomical Society Meeting
“A Precision Pulsar Timing Array Gravitational Wave Detector”
- 2016 University of Sussex Cosmology Seminar
“Astrophysical Constraints from Gravitational Wave Limits using Pulsar Timing Arrays”
- 2016 International Pulsar Timing Array Conference
“Systematic and Stochastic Variations in Pulsar Dispersion Measures”
- 2016 Colgate University Physics and Astronomy Seminar
“Gravitational Wave Astronomy using Pulsar Timing Arrays”
- 2015 Max Planck Institute for Radio Astronomy Lunch Colloquium
“A Short Timescale Noise Model for Pulsar Timing”
- 2014 Cornell Physics Department Lunch Talk Series
“Gravitational Wave Astronomy with Pulsar Timing Arrays”
- 2014 International Pulsar Timing Array Conference
“Investigation ISM Noise Processes for Gravitational Wave Detection”
- 2014 TEDxIthaca College
“Celestial Clocks and Ripples in Spacetime”

Primary Publications:

8. **Lam, M. T.**, et al. “A Second Chromatic Timing Event of Interstellar Origin toward PSR J1713+0747”, submitted to *ApJL*
7. **Lam, M. T.**, McLaughlin, M. A., Cordes, J. M., Chatterjee, S., Lazio, T. J. W, “Optimal Frequency Ranges for Sub-Microsecond Precision Pulsar Timing”, 2017, arXiv:1710.02272, submitted to *ApJ*
6. Jones, M. L., McLaughlin, M. A., **Lam, M. T.**, et al. (24 authors), “The NANOGrav Nine-Year Data Set: Measurement and Interpretation of Variations in Dispersion Measures”, 2017, *ApJ*, **841**, 2
5. **Lam, M. T.**, et al. “The NANOGrav Nine-Year Data Set: Excess Noise in Millisecond Pulsar Arrival Times”, 2017, *ApJ*, **834**, 35
4. **Lam, M. T.**, et al. “Systematic and Stochastic Variations in Pulsar Dispersion Measures”, 2016, *ApJ*, **821**, 66
3. **Lam, M. T.**, et al. “The NANOGrav Nine-year Data Set: Noise Budget For Pulsar Arrival Times on Intraday Timescales”, 2016, *ApJ*, **819**, 155
2. **Lam, M. T.**, Cordes, J. M., Chatterjee, S., Dolch, T., “Pulsar Timing Errors from Asynchronous Multi-Frequency Sampling of Dispersion Measure Variations”, 2015, *ApJ*, **801**, 130
1. Dolch, T., **Lam, M. T.**, Cordes, J., Chatterjee, S., et al. (43 authors), “A 24 Hr Global

Campaign to Assess Precision Timing of the Millisecond Pulsar J1713+0747”, 2014, *ApJ*, **794**, 21

Other Publications:

13. Gentile, P. A., et al. (21 authors, including **Lam, M. T.**), “The NANOGrav Nine-year Data Set: Polarimetry and Pulse Microstructure”, 2017, submitted to *ApJ*
12. Fonseca, E., et al. (19 authors, including **Lam, M. T.**), “The NANOGrav Nine-year Data Set: Mass and Geometric Measurements of Binary Millisecond Pulsars”, 2016, *ApJ*, **832**, 167
11. Kaplan, D., et al. (35 authors, including **Lam, M. T.**), “PSR J1024-0719: A Millisecond Pulsar in an Unusual Long-Period Orbit”, 2016, *ApJ*, **826**, 86
10. Dolch, T., et al. (37 authors, including **Lam, M. T.**), “Single-Source Gravitational Wave Limits From the J1713+0747 24-hr Global Campaign”, 2016, Journal of Physics Conference Series, **716**, 012014
9. Lentati, L., et al. (84 authors, including **Lam, M. T.**), “From Spin-Noise to Systematics: Stochastic Processes in the First International Pulsar Timing Array Data Release”, 2016, *MNRAS*, **458**, 2161
8. Verbiest, L., et al. (92 authors, including **Lam, M. T.**), “The International Pulsar Timing Array: First Data Release”, 2016, *MNRAS*, **458**, 1267
7. Arzoumanian, Z., et al. (48 authors, including **Lam, M. T.**), “The NANOGrav Nine-year Data Set: Limits on the Isotropic Stochastic Gravitational Wave Background”, 2016, *ApJ*, **821**, 13
6. Levin, L., et al. (25 authors, including **Lam, M. T.**), “The NANOGrav Nine-year Data Set: Monitoring Interstellar Scattering Delays”, 2016, *ApJ*, **818**, 166
5. Matthews, A. M., et al. (21 authors, including **Lam, M. T.**), “The NANOGrav Nine-year Data Set: Astrometric Measurements of 37 Millisecond Pulsars”, 2016, *ApJ*, **818**, 92
4. Arzoumanian, Z., et al. (44 authors, including **Lam, M. T.**), “The NANOGrav Nine-year Data Set: Observations, Arrival Time Measurements, and Analysis of 37 Millisecond Pulsars”, 2015, *ApJ*, **813**, 65
3. Arzoumanian, Z., et al. (42 authors, including **Lam, M. T.**), “NANOGrav Constraints on Gravitational Wave Bursts with Memory”, 2015, *ApJ*, **810**, 150
2. Zhu, W. W., et al. (20 authors, including **Lam, M. T.**), “Testing Theories of Gravitation Using 21-Year Timing of Pulsar Binary J1713+0747”, 2015, *ApJ*, **809**, 41
1. Arzoumanian, Z., et al. (39 authors, including **Lam, M. T.**), “Gravitational Waves from Individual Supermassive Black Hole Binaries in Circular Orbits: Limits from the North American Nanohertz Observatory for Gravitational Waves”, 2014, *ApJ*, **794**, 141