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Research Interests:

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

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-Physics, 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, WV
- 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*

Scheduled 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*
- Green Bank Observatory, GBT18B-355, *High Time Resolution Observations of a Bright Millisecond Pulsar*

Student Research Mentoring and Supervision:

- 2017 — Michelle Lin (Ossining High School)
Stellar Metallicity and Age Distribution of the Galactic Habitable Zone
- 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 within the Milky Way to Outer Star Systems
- 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 Competition 2014 Regional Finalist

Teaching and Outreach Experience:

- 2018 Honors Astronomy HONR 298B, Lead Instructor
- 2016 — 2018 Graduate Astrophysics Seminar ASTR 693A, Co-Instructor
- 2015 — AskScience Moderator and AMA Coordinator
Organize direct Q&As between the public (~16 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:

- 2018 — NANOGrav Equity and Climate Committee
- 2018 — American Physical Society Division of Gravitational Physics Executive Committee
Member-at-Large
- 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:

- 2018 University of Vermont Physics Colloquium
“Gravitational Wave Astronomy with a Next-Generation Pulsar Timing Array Detector”
- 2018 International Pulsar Timing Array Conference
“Optimal Frequency Ranges for Sub-Microsecond Precision Pulsar Timing”
- 2018 Green Bank Observatory Talk
“Towards a Next Generation Pulsar Timing Array”
- 2018 231st American Astronomical Society Meeting
“Optimal Frequency Ranges for Sub-Microsecond Precision Pulsar Timing”
- 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”

Publications:

NOTE: Certain publications produced by the NANOGrav and IPTA collaborations have all authors or a subset of the authors listed in alphabetical order. This ordering does not represent the proportion of contributions made to the papers. Publications that I have led or where I have made critical contributions are highlighted in bold.

32. “High-Precision X-ray Timing of Three Millisecond Pulsars with *NICER*: Stability Estimates and Comparison with Radio”
Deneva, J. S., et al. (48 authors, including Lam, M. T.), 2018
submitted to *ApJ*
31. “PSR J2234+0611: A New Laboratory for Stellar Evolution”
Stovall, K., et al. (33 authors, including Lam, M. T.), 2018
arXiv:1809.05064, accepted by *ApJ*
30. “The NANOGrav 11-year Data Set: Solar Wind Sounding through Pulsar Timing”
Madison, D. R., et al. (31 authors, including Lam, M. T.), 2018
arXiv:1808.07078, submitted to *ApJ*
29. “**The NANOGrav 12.5-Year Data Set: The Frequency Dependence of Pulse Jitter in Precision Millisecond Pulsars**”
Lam, M. T., et al. (28 authors), 2018
arXiv:1809.03058, submitted to *ApJ*
28. “Tests of Gravitational Symmetries with Pulsar Binary J1713+0747”
Zhu, W. W., et al. (53 authors, including Lam, M. T.), 2018
accepted by *MNRAS*
27. “**The NANOGrav 11-year Data Set: Pulse Profile Variability**”
Brook, P., Karastergiou, A., McLaughlin, M. A., Lam, M. T., et al. (33 authors), 2018
ApJ, **868**, 122
26. “**Optimizing Pulsar Timing Array Observational Cadences for Sensitivity to Low-frequency Gravitational-wave Sources**”
Lam, M. T., 2018
ApJ, **868**, 33
25. “Studying the Solar System with the International Pulsar Timing Array”
Caballero, R., et al. (90 authors, including Lam, M. T.), 2018
481, 5501 *MNRAS*, 481, 5501
24. “**An Acoustical Analogue of a Galactic-scale Gravitational-Wave Detector**”
Lam, M. T., Romano, J. D., Key, J. S., Normandin, M., Hazboun, J. S., 2018
AJP, **86**, 755
23. “The NANOGrav 11-year Data Set: Arecibo Observatory Polarimetry and Pulse Microstructure”
Gentile, P. A., et al. (21 authors, including Lam, M. T.), 2018
ApJ, **862**, 47

22. **“A Second Chromatic Timing Event of Interstellar Origin toward PSR J1713+0747”**
Lam, M. T., et al. (37 authors), 2018
ApJ, **861**, 132
21. **“Optimal Frequency Ranges for Submicrosecond Precision Pulsar Timing”**
Lam, M. T., McLaughlin, M. A., Cordes, J. M., Chatterjee, S., Lazio, T. J. W., 2018
ApJ, **861**, 12
20. **“The NANOGrav 11-year Data Set: Pulsar-timing Constraints On The Stochastic Gravitational-wave Background”**
Arzoumanian, Z., et al. (61 authors, including Lam, M. T.), 2018
ApJ, **859**, 47
19. **“The NANOGrav 11-year Data Set: High-precision Timing of 45 Millisecond Pulsars”**
Arzoumanian, Z., et al. (56 authors, including Lam, M. T.), 2018
ApJS, 235, 37
18. **“The NANOGrav Nine-Year Data Set: Measurement and Interpretation of Variations in Dispersion Measures”**
Jones, M. L., McLaughlin, M. A., Lam, M. T., et al. (24 authors), 2017
ApJ, **841**, 125
17. **“The NANOGrav Nine-Year Data Set: Excess Noise in Millisecond Pulsar Arrival Times”**
Lam, M. T., et al. (25 authors), 2017
ApJ, **834**, 35
16. **“The NANOGrav Nine-year Data Set: Mass and Geometric Measurements of Binary Millisecond Pulsars”**
Fonseca, E., et al. (19 authors, including Lam, M. T.), 2016
ApJ, **832**, 167
15. **“PSR J1024-0719: A Millisecond Pulsar in an Unusual Long-Period Orbit”**
Kaplan, D., et al. (35 authors, including Lam, M. T.), 2016
ApJ, **826**, 86
14. **“Single-Source Gravitational Wave Limits From the J1713+0747 24-hr Global Campaign”**
Dolch, T., Ellis, J. A., Chatterjee, S., Cordes, J. M., Lam, M. T., et al. (37 authors), 2016
Journal of Physics Conference Series, **716**, 012014
13. **“From Spin-Noise to Systematics: Stochastic Processes in the First International Pulsar Timing Array Data Release”**
Lentati, L., et al. (84 authors, including Lam, M. T.), 2016
MNRAS, **458**, 2161
12. **“The International Pulsar Timing Array: First Data Release”**
Verbiest, L., et al. (92 authors, including Lam, M. T.), 2016
MNRAS, **458**, 1267

11. **“Systematic and Stochastic Variations in Pulsar Dispersion Measures”**
Lam, M. T., Cordes, J. M., Chatterjee, S., Jones, M. L., McLaughlin, M. A., Armstrong, J. W. ,
2016
ApJ, **821**, 66
10. **“The NANOGrav Nine-year Data Set: Limits on the Isotropic Stochastic Gravitational Wave Back-
ground”**
Arzoumanian, Z., et al. (48 authors, including Lam, M. T.), 2016
ApJ, **821**, 13
9. **“The NANOGrav Nine-year Data Set: Noise Budget For Pulsar Arrival Times on Intraday
Timescales”**
Lam, M. T., et al. (24 authors), 2016
ApJ, **819**, 155
8. **“The NANOGrav Nine-year Data Set: Monitoring Interstellar Scattering Delays”**
Levin, L., et al. (25 authors, including Lam, M. T.), 2016
ApJ, **818**, 166
7. **“The NANOGrav Nine-year Data Set: Astrometric Measurements of 37 Millisecond Pulsars”**
Matthews, A. M., et al. (21 authors, including Lam, M. T.), 2016
ApJ, **818**, 92
6. **“The NANOGrav Nine-year Data Set: Observations, Arrival Time Measurements, and Analysis of
37 Millisecond Pulsars”**
Arzoumanian, Z., et al. (44 authors, including Lam, M. T.), 2015
ApJ, **813**, 65
5. **“NANOGrav Constraints on Gravitational Wave Bursts with Memory”**
Arzoumanian, Z., et al. (42 authors, including Lam, M. T.), 2015
ApJ, **810**, 150
4. **“Testing Theories of Gravitation Using 21-Year Timing of Pulsar Binary J1713+0747”**
Zhu, W. W., et al. (20 authors, including Lam, M. T.), 2015
ApJ, **809**, 41
3. **“Pulsar Timing Errors from Asynchronous Multi-Frequency Sampling of Dispersion Mea-
sure Variations”**
Lam, M. T., Cordes, J. M., Chatterjee, S., Dolch, T., 2015
ApJ, **801**, 130
2. **“Gravitational Waves from Individual Supermassive Black Hole Binaries in Circular Orbits: Limits
from the North American Nanohertz Observatory for Gravitational Waves”**
Arzoumanian, Z., et al. (39 authors, including Lam, M. T.), 2014
ApJ, **794**, 141
1. **“A 24 Hr Global Campaign to Assess Precision Timing of the Millisecond Pulsar J1713+0747”**
Dolch, T., Lam, M. T., Cordes, J., Chatterjee, S., et al. (43 authors), 2014
ApJ, **794**, 21

References:

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