Thomas (Shao-Yu) Lai

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Education

University of Toledo, USA	Ph.D. in Physics & Astronomy, 2014–2021 Advisor: Dr. J.D.T Smith
National Central University, Taiwan	B.A. in Space Science, 2011

Professional Experience

Postdoctoral Scholar, Caltech/IPAC, CA — 2021–*present*
Advisor: Dr. Lee Armus

Keck Visiting Scholar, Keck Observatory, HI — 2018
Mentor: Dr. Carlos Alvarez
Project: *Updating DEIMOS Throughput Curves with 16 Years of Observations*

UT University Fellow, University of Toledo, OH — 2015–2021
Advisor: Dr. J.D.T Smith
Project: *Characterizing Properties of Small Dust Grains Across Different Galaxies*

Doreen and Lyman Spitzer Graduate Fellow, University of Toledo, OH — 2015
Advisor: Dr. Adolf Witt
Project: *The Extended Red Emission in IC 59 and IC 63*
The Connection between DIBs and ERE

Research Assistant, ASIAA, Taiwan — 2013–2014
Advisor: Dr. Ciska Kemper, Dr. Masaaki Otsuka, and Dr. Sundar Srinivasan
Project: *Near-infrared Photometry of Evolved Asymptotic Giant Branch Stars in M33*

Corporal, The Republic of China Army, Taiwan — 2012

Research Assistant, National Central University, Taiwan — 2011
Advisor: Dr. Chung-Ming Ko
Project: *2MASS Whole Sky Star Count*

Scientific Presentations

Talks:

- "*How to Make Good Plots*"
  Python Visualization Workshop workshop, Toledo, OH, Aug 2, 2021
- "*All the PAHs: Exploring Small Dust Grains In Galaxies*"
  GOALS workshop, virtual, Jul 21, 2021
- "*Understanding small dust grains in different interstellar environments*"
  AAS dissertation talk, Hawaii, Jan 6, 2020
- "*Outreach talk: DEIMOS Throughput After 16 Years of Operations*"
  Keck Visiting Scholar Party, Keck observatory, Dec 6, 2018
- "*DEIMOS Throughput After 16 Years of Operations*"
  Keck Visiting Scholar Presentation, Keck observatory, Dec 5, 2018

- "*Exploring Small Dust Grains Across Different Interstellar Environments*"
  Astronomy Seminar, Keck observatory, Nov 19, 2018
- "*Extended Red Emission in IC 59 and IC 63*"
  Astronomy Seminar, JAXA, Japan, Jun 13, 2017
- "*Extended Red Emission in IC63 & IC59: How Does it Produce?*"
  Astronomy Seminar, National Central University, Dec 31, 2015
- "*The Mass Loss from Asymptotic Giant Branch Stars in M33*"
  The Astronomical Society of the Republic of China Annual Meeting, May 23–25, 2014
- "*Near-Infrared Photometry of Evolved Stars in the Nearby Galaxy M33*"
  ASIAA Summer Student Presentation, Aug 29, 2013

Posters:

- "*All the PAHs: a Spitzer–AKARI Cross-Archival Spectroscopic Survey of Aromatic Emission in Galaxies*"
  Dusting the Universe, The University of Arizona, Tucson, AZ, Mar 4–8, 2019
- "*Near-Infrared Photometry of Evolved Stars in The Nearby Galaxy M33*"
  Science Eyes and Minds towards Cosmic Horizon, Sokendai, Japan, Nov 11–15, 2013
- "*The Information of Milky Way from 2MASS Whole Sky Star Counts: the Bimodal Color Distributions*"
  IAU 28th General Assembly, Beijing, China, Aug 20–24, 2012

Article:

- IRSIG newsletter - "Revealing All the PAHs in Galaxies with an AKARI-Spitzer Survey"

Workshops:

- "*Python in Astronomy 2018*", Flatiron Institute, NY, Apr 30– May 4, 2018
- "*PAHs in the ISM: Observational, Experimental and Computational Tools*", Les Houches, France, Apr 2–6, 2018
- "*ALMA/VLA/VLBA workshop*", University of Michigan, Mar 7, 2017
- "*SciCoder 8*", Yale University, Aug 1–5, 2016

Honors and Awards

2019	**Award for Best Graduate Student Presentation ($125)** *University of Toledo Astronomy Journal Seminar*
2019	**FAMOUS travel grant ($500)** *American Astronomical Society*
2019	**Graduate Research Scholar Travel Award ($500)** *College of Natural Science & Mathematics, University of Toledo*
2018	**AAS Travel Grant ($1,607)** *American Astronomical Society*
2016	**Award for Best Graduate Student Presentation ($250)** *University of Toledo Astronomy Journal Seminar*
2015–2019	**University Fellowship (4 years - $72,000 + tuition)** *Highest award from Graduate School, University of Toledo*
2014	**Doreen and Lyman Spitzer Graduate Fellowship in Astropysics ($9,000)** *Department of Physics and Astronomy, University of Toledo*
2008	**Outstanding Award** *National Central University*

Observation Proposal

- **JWST GO1**: *How Do the Small Survive: PAH's in Low Metallicity Starburst II Zw 40*, 2020 (PI: Lai, T)
- **JWST GO1**: *The Vanishing Act: PAHs and Heavy Element Abundance in M101*, 2020 (PI: Smith, J)
- **JWST GO1**: *The JWST Whirlpool Galaxy Treasury*, 2020 (PI: Sandstrom, K)
- **JWST GO1**: *CLASSYIR: The COS Legacy Archive Spectroscopic SurveY Infrared Treasury Project*, 2020 (PI: Berg, D)
- **JWST GO1**: *Searching for the Smallest Dust Grains in the Extremely Low Metallicity Dwarf Galaxy Leo P*, 2020 (PI: Tarantino, E)
- **JWST GO1**: *Kinematics of warm gas in AGN tori with NIRSpec high-resolution spectroscopy of CO absorption lines* , 2020 (PI: Baba, S)
- **JWST ERS 1288**: *Radiative Feedback from Massive Stars as Traced by Multiband Imaging and Spectroscopic Mosaics*, 2018 (PI: Berne, O)
- **Discovery Channel Telescope / DeVeny Spectrograph**: *The search of connection between Diffuse Interstellar Bands and Extend Red Emission*, 2017 (2017Q4T01), 1 full night (PI: Lai, T)
- **Keck/DEIMOS**: *Potential Connection Between DIBs and ERE in the Reflection/Emission Nebula IC 63*, 20170716, 1 full night (PI: Alvarez, C)
- **Discovery Channel Telescope / DeVeny Spectrograph**: *The search of connection between Diffuse Interstellar Bands and Extend Red Emission*, 2016 (2016Q3T02), 2 full nights (PI: Lai, T)
- **SMA** (The Submillimeter Array): *Using SMA to observe FU Orionis stars RNO 1C/1B*, 1 full night (PI: Lai, T)

Teaching Experience

- Graduate Teaching Assistant, Fall 2014, Summer 2016, Summer 2018, and Summer 2019

Skills

- Programming: Python, IDL, IRAF, SExtractor, HTML, LaTeX, SQL
- Operating System: Mac OS, Linux, Windows

Publication

- All the PAHs: an *AKARI-Spitzer* Cross-Archival Spectroscopic Survey of Aromatic Emission in Galaxies
  Lai, T.S.-Y., Smith, J.D.T, Baba, S, Spoon, H.W.W, Imanishi, ApJ, 905, 55
- The Observational Constraints of the Extended Red Emission
  Witt, A.N, **Lai, T.S.-Y.**, Astrophysics and Space Science Journal, 2020Ap&SS.365.58W

- Are the Carriers of Diffuse Interstellar Bands and Extended Red Emission the Same?
  Lai, T.S.-Y., Witt, A.N, Alvarez, C, Cami, J, 2020MNRAS.492.5853L

- Extended Red Emission in IC59 and IC63
  Lai, T.S.-Y., Witt, A.N, Crawford, K, 2017MNRAS.469.4933L

- The Information of The Milky Way from Two Micron All Sky Survey Whole Sky Star Count: The Bimodal Color Distributions
  Chang, C.K.,**Lai, S.Y.**, Ko, C.M. & Peng, T.H., 2012, Astrophysical Journal, 759, 94

Service and Outreach

- Coordinator, *Python Visualization Workshop*, Aug 2, 2021
- Co-referee, *The Astrophysical Journal*, 2020-*present*
- Builder, AKARI-Spitzer Extragalactic Spectral Survey (ASESS), 2020-*present*
- Deputy Science Coordinator, the ASESS team, 2017-*present*
- Conference for Undergraduate Women in Physics (CUWiP), Jun 2018
- 50^{th} anniversary of the Ritter Observatory, Oct 2017
- Cedar Point Physics, Science and Math Week, May 2016
- Total Lunar Eclipse Outreach Program, Sep 2015