

Yu-Hsuan “Eltha” Teng

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Research Interests

Star formation, interstellar medium, galactic nuclei, galaxy evolution

Education

University of California San Diego Sep 2019–(Jun 2024)

Ph.D. in Physics

Thesis: “Molecular Gas and Star Formation in Nearby Galaxy Centers”

National Taiwan University Sep 2017–Jun 2019

M.S. in Physics

Thesis: “Physical Conditions and Kinematics of the Filamentary Structure in OMC-1”

National Taiwan University Sep 2013–Jun 2017

B.S. in Electrical Engineering

Experience

Graduate Student Researcher Jan 2020–*present*

Department of Physics, University of California San Diego

Advisor: [Prof. Karin Sandstrom](#)

Collaboration Member Jan 2021–*present*

The PHANGS Team (international collaboration on nearby galaxies)

Graduate Student Researcher Jun–Dec 2020

Department of Physics, University of California San Diego

Advisor: [Prof. Alison Coil](#)

Research Student Jul 2016–Jun 2019

Academia Sinica, Institute of Astronomy and Astrophysics (ASIAA)

Advisor: [Dr. Naomi Hirano](#)

Student Researcher Feb 2016–May 2018

Department of Electrical Engineering, National Taiwan University

Advisor: [Prof. Jean-Fu Kiang](#)

Honors & Awards

ALMA Ambassador (\$10,000), *National Radio Astronomy Observatory (NRAO)* 2024

Friends of the International Center Fellowship (\$2,000), *Graduate Division, UC San Diego* 2023

Government Scholarship to Study Abroad (\$32,000), *Ministry of Education, Taiwan* 2021–2023

Chambliss Astronomy Achievement Student Award, *American Astronomical Society (AAS)* 2021

Chien-Shiung Wu Fellowship (NT\$20,000), *The Physical Society of Taiwan* 2020

Physics Excellence Award (\$8,500), *Department of Physics, UC San Diego* 2019–2020

Dean’s Award, *College of Science, National Taiwan University* 2019

Best Oral Presentation Award (NT\$10,000), *Astronomical Society of Taiwan (ASROC)* 2018

Travel grants

AAS International Travel Grant (\$2,140), *American Astronomical Society (AAS)* 2023

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| GPSA Travel Grant (\$300), <i>Graduate and Professional Student Association, UC San Diego</i> | 2023 |
| IAU Grant (€1,800), <i>International Astronomical Union (IAU)</i> | 2022, 2024 |
| KAS Grant (€318), <i>Korean Astronomical Society (KAS)</i> | 2022 |
| Chair's Challenge Award (\$1,500), <i>Department of Physics, UC San Diego</i> | 2021, 2022, 2023 |

Publications

My ADS Library: [Yu-Hsuan Teng](#)
 Google Scholar ID: [_eK2SQkAAAAJ](#)

First-authored refereed publications.....

- **Yu-Hsuan Teng**, I-Da Chiang, Karin M. Sandstrom, Jiayi Sun, Adam K. Leroy, Alberto D. Bolatto, Antonio Usero, Eve C. Ostriker, Miguel Querejeta *et al.*, “[Star Formation Efficiency in Nearby Galaxies Revealed with a New CO-to-H₂ Conversion Factor Prescription](#)”, 2024, *ApJ*, 961, 42. [🔗](#)
- **Yu-Hsuan Teng**, Karin M. Sandstrom, Jiayi Sun, Munan Gong, Alberto D. Bolatto, I-Da Chiang, Adam K. Leroy, Antonio Usero, Simon C. O. Glover, Ralf S. Klessen *et al.*, “[The Physical Drivers and Observational Tracers of CO-to-H₂ Conversion Factor Variations in Nearby Barred Galaxy Centers](#)”, 2023, *ApJ*, 950, 119. [🔗](#)
- **Yu-Hsuan Teng**, Karin M. Sandstrom, Jiayi Sun, Adam K. Leroy, L. Clifton Johnson, Alberto D. Bolatto, J. M. Diederik Kruijssen, Andreas Schruba, Antonio Usero *et al.*, “[Molecular Gas Properties and CO-to-H₂ Conversion Factors in the Central Kiloparsec of NGC 3351](#)”, 2022, *ApJ*, 925, 72. [🔗](#)
- **Yu-Hsuan Teng** and Naomi Hirano, “[Physical Conditions and Kinematics of the Filamentary Structure in Orion Molecular Cloud 1](#)”, 2020, *ApJ*, 893, 63. [🔗](#)

Co-authored refereed publications.....

- Hao He, Christine Wilson, Jiayi Sun, **Yu-Hsuan Teng** *et al.*, “[Unraveling the Mystery of the Low CO-to-H₂ Conversion Factor in Starburst Galaxies: RADEX Modeling of the Antennae](#)”, 2024, *ApJ*, submitted; [arXiv:2401.16476](#). [🔗](#)
- Thomas G. Williams, Janice C. Lee, Kirsten L. Larson, ..., **Yu-Hsuan Teng** *et al.*, “[PHANGS-JWST: Data Processing Pipeline and First Full Public Data Release](#)”, 2024, *ApJS*, submitted; [arXiv:2401.15142](#). [🔗](#)
- I-Da Chiang, Karin M. Sandstrom, Jeremy Chastenet, ..., **Yu-Hsuan Teng** *et al.*, “[Resolved Maps of the CO-to-H₂ Conversion Factor in 37 Nearby Galaxies](#)”, 2024, *ApJ*, 964, 18. [🔗](#)
- Sophia K. Stuber, Jérôme Pety, Eva Schinnerer, ..., **Yu-Hsuan Teng** *et al.*, “[Surveying the Whirlpool at Arcseconds with NOEMA \(SWAN\) I. Mapping the HCN and N₂H⁺ 3mm lines](#)”, 2023, *A&A*, 680, L20. [🔗](#)
- Jakob S. den Brok, Adam K. Leroy, Antonio Usero, ..., **Yu-Hsuan Teng** *et al.*, “[Resolved low-J ¹²CO excitation at 190 parsec resolution across NGC2903 and NGC3627](#)”, 2023, *MNRAS*, 526, 6347. [🔗](#)
- Miguel Querejeta, Jérôme Pety, Andreas Schruba, ..., **Yu-Hsuan Teng** *et al.*, “[A sensitive, high resolution, wide field IRAM NOEMA CO\(1-0\) survey of the very nearby spiral galaxy IC 342](#)”, 2023, *A&A*, 680, A4. [🔗](#)
- Mattia C. Sormani, Ashley T. Barnes, Jiayi Sun, ..., **Yu-Hsuan Teng** *et al.*, “[Fuelling the nuclear ring of NGC 1097](#)”, 2023, *MNRAS*, 523, 2918. [🔗](#)
- Jiayi Sun, Adam K. Leroy, Eve C. Ostriker, ..., **Yu-Hsuan Teng** *et al.*, “[Star Formation Laws and Efficiencies across 80 Nearby Galaxies](#)”, 2023, *ApJL*, 945, 19. [🔗](#)
- Jakob S. den Brok, Frank Bigiel, Jérémy Chastenet, ..., **Yu-Hsuan Teng** *et al.*, “[Wide-Field CO Isotopologue Emission and the CO-to-H₂ Factor across the Nearby Spiral Galaxy M101](#)”, 2023, *A&A*, 676, A93. [🔗](#)
- Lukas Neumann, Molly J. Gallagher, Frank Bigiel, ..., **Yu-Hsuan Teng** *et al.*, “[The ALMOND Survey: Molecular cloud properties and gas density tracers across 25 nearby spiral galaxies with ALMA](#)”, 2023, *MNRAS*, 521, 3348. [🔗](#)
- Daizhong Liu, Eva Schinnerer, Toshiki Saito, ..., **Yu-Hsuan Teng** *et al.*, “[CI and CO in Nearby Spiral Galaxies - I. Line Ratio and Abundance Variations at ~200 pc Scales](#)”, 2023, *A&A*, 672, A36. [🔗](#)
- Daizhong Liu, Eva Schinnerer, Yixian Cao, ..., **Yu-Hsuan Teng** *et al.*, “[PHANGS-JWST First Results: Stellar](#)”

- Feedback-Driven Excitation and Dissociation of Molecular Gas in the Starburst Ring of NGC 1365?”, 2023, *ApJL*, 944, 19. [📄](#)
- Janice C. Lee, Karin M. Sandstrom, Adam K. Leroy, ..., **Yu-Hsuan Teng et al.**, “The PHANGS-JWST Treasury Survey: Star Formation, Feedback, and Dust Physics at High Angular resolution in Nearby Galaxies”, 2023, *ApJL*, 944, 17. [📄](#)
 - Axel García-Rodríguez, Antonio Usero, Adam K. Leroy, ..., **Yu-Hsuan Teng et al.**, “Sub-kpc empirical relations and excitation conditions of HCN and HCO⁺ J=3-2 in nearby star-forming galaxies”, 2023, *A&A*, 672, A96. [📄](#)
 - Cosima Eibensteiner, Ashley T. Barnes, Frank Bigiel, ..., **Yu-Hsuan Teng et al.**, “A 2-3 mm high-resolution molecular line survey towards the centre of the nearby spiral galaxy NGC 6946”, 2022, *A&A*, 659, A173. [📄](#)

Non-refereed publications.....

- **Yu-Hsuan Teng** and Karin Sandstrom, “Investigating the Drivers of CO-to-H₂ Conversion Factor Variations in Nearby Galaxy Centers”, 2023, *Proceedings of the International Astronomical Union*, 17, 157. [📄](#)
- **Yu-Hsuan Teng** and Naomi Hirano, “Physical Conditions and Kinematics of the Filamentary Structure in Orion Molecular Cloud 1”, 2020, *Submillimeter Array (SMA) Newsletter*, 30. [📄](#)

Research Talks (* = remote)

Seminar & colloquium talks.....

- Invited talk, **Lunch Talk, ASIAA**, “Re-evaluating Star Formation Efficiencies with a New CO-to-H₂ Conversion Factor Prescription”, Jan. 2024.
- Invited talk*, **PHANGS Colloquium**, “Star Formation Efficiency in Nearby Galaxies Revealed with a New CO-to-H₂ Conversion Factor Prescription”, Nov. 2023.
- Invited talk, **Group Meeting Talk, Northwestern University** (host: Prof. Allison Strom), “Revealing the Drivers of CO-to-H₂ Conversion Factor Variation and its Impact on Star Formation Efficiency”, Nov. 2023.
- Invited talk, **Open Group Seminar, University of Chicago** (host: Prof. Hsiao-Wen Chen), “Revealing the Drivers of CO-to-H₂ Conversion Factor Variation and its Impact on Star Formation Efficiency”, Nov. 2023.
- Invited talk, **KIPAC Tea Talk, Stanford University**, “Revealing the Drivers of CO-to-H₂ Conversion Factor Variation and its Impact on Star Formation Efficiency”, Nov. 2023.
- Invited talk, **CfA Seminar, Harvard & Smithsonian Center for Astrophysics (CfA)**, “Revealing the Drivers of CO-to-H₂ Conversion Factor Variation and its Impact on Star Formation Efficiency”, Oct. 2023.
- Invited talk, **Monday Afternoon Talks, Massachusetts Institute of Technology**, “Revealing the Drivers of CO-to-H₂ Conversion Factor Variation and its Impact on Star Formation Efficiency”, Oct. 2023.
- Invited talk, **Radio Millimeter Submillimeter (RMS) Seminar, CfA**, “Revealing the Drivers of CO-to-H₂ Conversion Factor Variation and its Impact on Star Formation Efficiency”, Oct. 2023.
- Invited talk, **Galread Discussion Group, Princeton University**, “The Physical Drivers and Observational Tracers of CO-to-H₂ Conversion Factor Variations in Nearby Barred Galaxy Centers”, Oct. 2023.
- Invited talk, **Low Density Universe Seminar, Space Telescope Science Institute (STScI)**, “Revealing the Drivers of CO-to-H₂ Conversion Factor Variation and its Impact on Star Formation Efficiency”, Oct. 2023.
- Invited talk, **Center for Theory and Computation (CTC) Seminar, University of Maryland**, “Revealing the Drivers of CO-to-H₂ Conversion Factor Variation and its Impact on Star Formation Efficiency”, Oct. 2023.
- Invited talk, **TUNA Lunch Talk, NRAO**, “Revealing the Drivers of CO-to-H₂ Conversion Factor Variation and its Impact on Star Formation Efficiency”, Oct. 2023.
- Invited talk, **Lunch Talk, ASIAA**, “Revealing the Drivers of CO-to-H₂ Conversion Factor Variation and its Impact on Star Formation Efficiency”, Sep. 2023.
- Talk, **CASS Journal Club, UC San Diego**, “The Physics of CO-to-H₂ Conversion Factor Variations in Nearby Galaxy Centers”, Apr. 2023.

- Invited talk*, **Submillimeter Array (SMA) Seminar, CfA**, “Studying Molecular Gas and Star Formation: from Orion Molecular Cloud to Nearby Galaxy Centers”, Mar. 2022.
- Invited talk*, **Ringberg Seminar, Max Planck Institute for Astronomy (MPIA)**, “Cloud-scale Molecular Gas Properties and CO-to-H₂ Conversion Factor Variations in Nearby Galaxy Centers”, Mar. 2022.
- Talk*, **CASS Journal Club, UC San Diego**, “Molecular Gas and CO-to-H₂ Conversion Factors in the Center of NGC 3351”, May 2021.
- Talk, **Lunch Talk, ASIAA**, “Properties and Kinematics in OMC1 with N₂H⁺ Observations”, Sep. 2018.
- Talk, **Star Formation Seminar, ASIAA**, “Non-LTE Analysis and Filamentary Structure in OMC1 with N₂H⁺ Observations”, Aug. 2018.
- Talk, **Student Seminar, ASIAA**, “Filamentary Structure and Star Formation in OMC1”, May 2018.

Conference & workshop presentations.....

- Talk, **IAU Focus Meeting: A Coherent View of Atomic and Molecular Gas from Infrared to Radio Wavelengths**, “Star Formation Efficiency in Nearby Galaxies Revealed with a New CO-to-H₂ Conversion Factor Prescription”, Cape Town, South Africa, (Aug. 2024).
- Invited talk, **Dense GAS in Nearby Galaxies – ALMA Workshop**, “Re-evaluating Star Formation Efficiencies in Nearby Galaxies with a New α_{CO} Prescription”, Osaka, Japan, Mar. 2024.
- Dissertation talk, **243rd AAS Meeting**, “Revealing the Drivers of CO-to-H₂ Conversion Factor Variation and its Impact on Star Formation Efficiency across Nearby Galaxies”, New Orleans, USA, Jan. 2024.
- Poster, **ALMA at 10 years: Past, Present, and Future**, “High Star Formation Efficiency in Barred Galaxy Centers Revealed with a New CO-to-H₂ Conversion Factor Prescription”, Virtual, Dec. 2023.
- Poster, **The Physics of Star Formation: from Stellar Cores to Galactic Scales**, “High Star Formation Efficiency and Low CO-to-H₂ Conversion Factor in Nearby Barred Galaxy Centers”, Lyon, France, Jun. 2023.
- Talk, **241st AAS Meeting**, “Connecting CO-to-H₂ Conversion Factors to Molecular Gas Properties in Nearby Barred Galaxy Centers”, Seattle, USA, Jan. 2023.
- E-talk, **IAU Symposium: Resolving the Rise and Fall of Star Formation in Galaxies**, “Investigating the Drivers of CO-to-H₂ Conversion Factor Variations in Nearby Galaxy Centers”, Busan, South Korea, Aug. 2022.
- Poster, **From Stars to Galaxies II**, “Investigating the Drivers of CO-to-H₂ Conversion Factor Variations in Nearby Galaxy Centers”, Gothenburg, Sweden, Jun. 2022.
- Invited talk*, **PHANGS Collaboration Meeting**, “Molecular Gas Properties and CO-to-H₂ Conversion Factors in the Central Kiloparsec of NGC 3351”, Virtual, Feb. 2022.
- Invited talk*, **Origins Workshop – ISM, Star and Cluster Formation**, “Molecular Gas Properties and CO-to-H₂ Conversion Factors in the Central Kiloparsec of NGC 3351”, Virtual, Jan. 2022.
- Talk with i-poster, **237th AAS Meeting**, “ALMA Observations and Multi-line Modeling of the Galaxy Center of NGC 3351”, Virtual, Jan. 2021. (**winner of Chambliss Astronomy Achievement Student Award**)
- Poster, **ASROC Annual Meeting**, “Physical Conditions and Kinematics in the Orion Molecular Cloud-1 Filaments”, Taichung, Taiwan, May 2019.
- Talk, **ASROC Annual Meeting**, “Filamentary Structure and Star Formation in OMC1”, Kinmen, Taiwan, May 2018. (**winner of Best Oral Presentation Award**)

Observing Experience

Telescope time awarded.....

- “Unveiling the physics that govern massive star-formation in extragalactic Central Molecular Zones (eCMZs)”, **JWST**, Cycle 3 (28h awarded as co-I).
- “Understanding the cause of the drastic decrease of α_{CO} in M101”, **SMA**, 2023B (9 tracks awarded as co-I).
- “Unveiling the physics controlling cloud and star formation in extragalactic Central Molecular Zones

- (eCMZs)", **ALMA**, Cycle 10, 2023.1.01182.S (grade A; 29h 12-m awarded as co-I).
- "Resolved molecular cloud properties in the nearby extreme starburst center of NGC1365", **ALMA**, Cycle 10, 2023.1.01219.S (9h 12-m awarded as co-I).
 - "Resolving HII Regions and ISM Structure Across the Milky Way Analog NGC 253", **JWST**, Cycle 2 (22h awarded as co-I).
 - "What drives α_{CO} in galaxy centres? Understanding the large decline in M101", **NOEMA**, Summer 2023 (grade A; 20h awarded as co-I).
 - "Hidden Gems on a Ring: Resolving Embedded Young Massive Clusters in a Nearby Ringed Galaxy", **ALMA**, Cycle 9, 2022.1.00159.S (7h 12-m awarded as co-I).
 - "A Top-down View of Massive Cluster Formation in a Nearby Nuclear Starburst Ring", **ALMA**, Cycle 8, 2021.1.00059.S (7h 12-m + 2h ACA awarded as co-I).
 - "Studying the Properties and Kinematics in the Nearest Massive Hub-Filament Region", *Submillimeter Telescope (SMT)*, 2018B, TW-T17 (12h awarded as **PI**).

Telescope operation

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| Second-shift remote operation , <i>Submillimeter Array (SMA)</i> , Taipei, Taiwan | Jul 2017–Jul 2019 |
| On-site operation , <i>Submillimeter Array (SMA)</i> , Hilo, HI, USA | Jun 2018 |
| Kenting Observatory Program , <i>Kenting Observatory</i> , Pingtung, Taiwan | Jul 2012, Jan 2014 |

Teaching Experience

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|---|--------------------------|
| Lecturer , <i>ALMA and Radio Interferometry, ALMA Cycle 11 Proposal Preparation Workshop</i> | March 2024 |
| Teaching Assistant , <i>PHYS 162 (Cosmology), UC San Diego</i> | Spring 2021 |
| Teaching Assistant , <i>PHYS 163 (Galaxies and Quasars), UC San Diego</i> | Spring 2020, Winter 2021 |
| Teaching Assistant , <i>PHYS 2A (Mechanics), UC San Diego</i> | Spring 2020 |
| Teaching Assistant , <i>PHYS 1B (Electromagnetism) Lab, UC San Diego</i> | Winter 2020 |
| Teaching Assistant , <i>PHYS 1A (Mechanics) Lab, UC San Diego</i> | Fall 2019 |

Academic Service

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| Organizer , <i>ALMA Cycle 11 Proposal Preparation Workshop at UC San Diego</i> | 2024 |
| Judge , <i>Chambliss Astronomy Achievement Student Award</i> | 2023, 2024 |
| Mentor , <i>UCSD Physics Peer-to-Peer Mentoring</i> (Mentees: Julianne Marc Tamayo, Joseph Hunt) | 2023 |
| Mentor , <i>Taiwanese Young Researcher Association</i> (Mentees: Sy-Yun Pu, Shu-Fei Ho) | 2023 |
| Reviewer , <i>ALMA Cycles 9 & 10</i> (30 proposals reviewed) | 2022, 2023 |
| Volunteered Lecturer , <i>Shihguang Elementary School, Hsinchu, Taiwan</i> | 2015 |
| Volunteered Science Tutor , <i>Minzu Experimental Junior High School, Taipei, Taiwan</i> | 2014 |

Skills

Languages: English, Mandarin (native)

Programming: Proficient in Python, MATLAB, LaTeX; familiar with C++, IDL, Bash/Csh

Scientific tools: Astropy, RADEX, MIRIAD, GILDAS, CASA

— Last updated on May 7, 2024 —