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

Postdoctoral Research Associate   (Oct 2024–)
Department of Astronomy, University of Maryland, College Park
Mentor: Prof. Alberto Bolatto

Collaboration Member   Jan 2021–*present*
The PHANGS Team (international collaboration on nearby galaxies)

Graduate Student Researcher   Jan 2020–Jun 2024
Department of Physics, University of California San Diego
Advisor: Prof. Karin Sandstrom

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

AUI/IAU/Heising-Simons Scholar ($1,500), *International Astronomical Union (IAU)*   2024
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

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-H_2 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-H_2 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-H_2 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

- Cosima Eibensteiner, Jiayi Sun, Frank Bigiel, ..., **Yu-Hsuan Teng** *et al.*, "PHANGS-MeerKAT and MHONGOOSE HI observations of nearby spiral galaxies: physical drivers of the molecular gas fraction, Rmol", 2024, *A&A*, in press; *arXiv:2407.01716*.

- Hao He, Christine Wilson, Jiayi Sun, **Yu-Hsuan Teng** *et al.*, "Unraveling the Mystery of the Low CO-to-H_2 Conversion Factor in Starburst Galaxies: RADEX Modeling of the Antennae", 2024, *ApJ*, in press; *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*, in press; *arXiv:2401.15142*.

- I-Da Chiang, Karin M. Sandstrom, Jeremy Chastenet, ..., **Yu-Hsuan Teng** *et al.*, "Resolved Maps of the CO-to-H_2 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 N_2H^+ 3mm lines", 2023, *A&A*, 680, L20.

- Jakob S. den Brok, Adam K. Leroy, Antonio Usero, ..., **Yu-Hsuan Teng** *et al.*, "Resolved low-J ^{12}CO 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 $\sim$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-H_2 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-H_2 Conversion Factor Prescription", Jan. 2024.

- Invited talk*, ***PHANGS Colloquium***, "Star Formation Efficiency in Nearby Galaxies Revealed with a New CO-to-H_2 Conversion Factor Prescription", Nov. 2023.

- Invited talk, ***Group Meeting Talk, Northwestern University*** (host: Prof. Allison Strom), "Revealing the Drivers of CO-to-H_2 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-H_2 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-H_2 Conversion Factor Variation and its Impact on Star Formation Efficiency", Nov. 2023.

- Invited talk, ***CfA Seminar, Harvard & Smithonian Center for Astrophysics (CfA)***, "Revealing the Drivers of CO-to-H_2 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-H_2 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-H_2 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-H_2 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-H_2 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-H_2 Conversion Factor Variation and its Impact on Star Formation Efficiency", Oct. 2023.

- Invited talk, ***TUNA Lunch Talk, NRAO***, "Revealing the Drivers of CO-to-H_2 Conversion Factor Variation and its Impact on Star Formation Efficiency", Oct. 2023.

- Invited talk, ***Lunch Talk, ASIAA***, "Revealing the Drivers of CO-to-H_2 Conversion Factor Variation and its Impact on Star Formation Efficiency", Sep. 2023.

- Talk, ***CASS Journal Club, UC San Diego***, "The Physics of CO-to-H_2 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-H_2 Conversion Factor Variations in Nearby Galaxy Centers", Mar. 2022.
- Talk*, ***CASS Journal Club, UC San Diego***, "Molecular Gas and CO-to-H_2 Conversion Factors in the Center of NGC 3351", May 2021.
- Talk, ***Lunch Talk, ASIAA***, "Properties and Kinematics in OMC1 with N_2H^+ Observations", Sep. 2018.
- Talk, ***Star Formation Seminar, ASIAA***, "Non-LTE Analysis and Filamentary Structure in OMC1 with N_2H^+ Observations", Aug. 2018.
- Talk, ***Student Seminar, ASIAA***, "Filamentary Structure and Star Formation in OMC1", May 2018.

Conference & workshop presentations

- Talk, ***Views on the Multi-phase Interstellar Medium in Galaxies***, "Star Formation Efficiency in Nearby Galaxies Revealed with a New CO-to-H_2 Conversion Factor Prescription", Bologna, Italy, (Sep. 2024).
- 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-H_2 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-H_2 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-H_2 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-H_2 Conversion Factor in Nearby Barred Galaxy Centers", Lyon, France, Jun. 2023.
- Talk, ***241st AAS Meeting***, "Connecting CO-to-H_2 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-H_2 Conversion Factor Variations in Nearby Galaxy Centers", Busan, South Korea, Aug. 2022.
- Poster, ***From Stars to Galaxies II***, "Investigating the Drivers of CO-to-H_2 Conversion Factor Variations in Nearby Galaxy Centers", Gothenburg, Sweden, Jun. 2022.
- Invited talk*, ***PHANGS Collaboration Meeting***, "Molecular Gas Properties and CO-to-H_2 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-H_2 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

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

Teaching Experience

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

Academic Service

Panel Reviewer, *ALMA Student Observing Support Program*	2024
Organizer, *ALMA Cycle 11 Proposal Preparation Workshop at UC San Diego*	2024
Judge, *Chambliss Astronomy Achievement Student Award*	2023, 2024
Mentor, *UCSD Physics Peer-to-Peer Mentoring Program*	2023
Mentor, *Taiwanese Young Researcher Association* (Mentees: Sy-Yun Pu, Shu-Fei Ho)	2023, 2024
Reviewer, *ALMA Proposal* (Cycles 9–11; 50 proposals reviewed)	2022–2024
Volunteered Lecturer, *Shihguang Elementary School, Hsinchu, Taiwan*	2015
Volunteered Science Tutor, *Minzu Experimental Junior High School, Taipei, Taiwan*	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 July 14, 2024 —