

YUN-TING CHENG

California Institute of Technology, M.C. 367-17, 1200 E California Blvd, Pasadena, CA 91125

(+1) 310-227-2817 | ycheng3@caltech.edu | <https://yuntingcheng.github.io/>

EDUCATION

California Institute of Technology

Ph.D. in Physics; Advisor: Prof. James J. (Jamie) Bock

September 2015 - June 2021 (Expected)

California Institute of Technology

M.S. in Physics

September 2015 - June 2019

National Taiwan University

B.S. in Physics

September 2010 - June 2014

RESEARCH INTERESTS

Line Intensity Mapping, Extragalactic Background Light (EBL), Intra-Halo Light, Data Analysis, Large-scale Structure, Epoch of Reionization, Machine Learning

RESEARCH EXPERIENCE

California Institute of Technology

Graduate Research Assistant

Advisor: Prof. James J. (Jamie) Bock

Pasadena, CA

September 2015 - Present

- Cosmic Infrared Background Experiment (CIBER)
 - Studying intra-halo light with CIBER imaging data
 - Building analysis pipeline and characterizing noise and systematic effects for CIBER imagers
- Intensity Mapping
 - Developing techniques to overcome the line blending problem in line intensity mapping
 - Establishing the formalism of optimal mapping strategy for large-scale structure survey
 - Performing the sensitivity forecast of redshift-dependent EBL spectrum for SPHEREx
- Tomographic Ionized Carbon Intensity Mapping Experiment (TIME)
 - Simulating the signal and foregrounds for TIME analysis pipeline
 - Developing foreground mitigation techniques for line intensity mapping
 - Analyzing TIME instrument data

Academia Sinica of Astronomy and Astrophysics (ASIAA)

Research Assistant

Advisor: Dr. Tzu-Ching Chang

- Developing foreground cleaning technique for line intensity mapping

Taipei, Taiwan

May 2014 - July 2015

Summer Student

Advisor: Dr. Sheng-Yuan Liu, Dr. Yu-Nung Su, Mr. I-Ta Hsieh

- Modeling the starless core with radiative transfer

July 2013 - August 2013

PUBLICATIONS

For the complete publication list, see my [ADS](#), [Google Scholar](#), and [INSPIRE](#)

First-author papers

- “Phase-Space Spectral Line De-confusion in Intensity Mapping”
Y.-T. Cheng, T.-C. Chang, J. J. Bock
2020, ApJ, 901, 142; arXiv:2005.05341, DOI: 10.3847/1538-4357/abb023
- “Optimally Mapping Large-Scale Structures with Luminous Sources”
Y.-T. Cheng, R. de Putter, T.-C. Chang, O. Doré
2019, ApJ, 877, 86; arXiv:1809.06384, DOI: 10.3847/1538-4357/ab1b2b
- “Spectral Line De-Confusion in an Intensity Mapping Survey”
Y.-T. Cheng, T.-C. Chang, J. J. Bock, C. M. Bradford, A. R. Cooray
2016, ApJ, 832, 165; arXiv:1604.07833, DOI: 10.3847/0004-637X/832/2/165

Co-author papers

- “*Line-Intensity Mapping: 2017 Status Report*”
E. D. Kovetz, M. P. Viero, ..., **Y.-T. Cheng**, et al.
arXiv:1709.09066
- “*A Foreground Masking Strategy for [C ii] Intensity Mapping Experiments Using Galaxies Selected by Stellar Mass and Redshift*”
G. Sun, L. Monceli, M.P. Viero, ..., **Y.-T. Cheng**, et al.
2018, ApJ, 856, 107; arXiv:1610.10095, DOI: 10.3847/1538-4357/aab3e3

Manuscripts In Preparation

- “*Near-Infrared Intra-Halo Light from CIBER*”
Y.-T. Cheng, et al. (CIBER collaboration)
- “*Extragalactic Background Light Spectrum Tomography with SPHEREx*”
Y.-T. Cheng, T.-C. Chang
- “*Super-resolution Reconstruction of Severely Undersampled Point Spread Functions Using Point Source Stacking and Deconvolution*”
T. Symons, M. Zemcov, ..., **Y.-T. Cheng**, et al.
- “*Rocket Based Measurements of the Zodiacal Light Absolute Intensity through Fraunhofer Absorption Line Spectroscopy*”
P. M. Korngut, ..., **Y.-T. Cheng**, et al.

PRESENTATIONS

Conference/Seminar Presentations:

(Upcoming)

- UChicago Astronomy Seminar (virtual) Chicago, IL, Jan, 2021
- Berkeley BCCP Seminar (virtual) Berkeley, CA, Dec, 2020

(Past)

- CCA Flatiron Institute Cosmology Group Meeting (virtual) CCA, NY, Oct, 2020
- OSU CCAPP Seminar (virtual) OSU, OH, Oct, 2020
- Johns Hopkins U Cosmology/GW Journal Club (virtual) JHU, MD, Oct, 2020
- UPenn Astronomy Seminar (virtual) UPenn, PA, Sep, 2020
- Caltech ObsCos Seminar (virtual) Caltech, CA, Sep, 2020
- CCAT-prime Science Working Group Meeting (virtual) Cornell, NY, Sep, 2020
- CCA Flatiron Institute Lunch Talk (virtual) CCA, NY, Sep, 2020
- Caltech ObsCos Seminar Caltech, CA, Feb, 2020
- L2S2 : Lines in the Large Scale Structure Conference Marseille, France, Jul, 2019
- Caltech ObsCos Seminar Caltech, CA, Jun, 2019
- Caltech ObsCos Seminar Caltech, CA, May, 2019
- 233rd AAS Meeting Seattle, WA, Jan, 2019
- Taiwanese Theoretical Astrophysics Workshop ASIAA, Taiwan, Sep, 2018
- ASIAA Seminar ASIAA, Taiwan, Sep, 2018
- Caltech ObsCos Seminar Caltech, CA, Jun, 2018
- Cosmological Signals from Cosmic Dawn to the Present Aspen, CO, Feb, 2018
- Caltech ObsCos Seminar Caltech, CA, Dec, 2017
- Caltech ObsCos Seminar Caltech, CA, Nov, 2016
- Caltech ObsCos Seminar Caltech, CA, Jun, 2016
- Opportunities and Challenges in Intensity Mapping Workshop KIPAC, CA, Mar, 2016
- ASROC Annual Meeting (Taiwanese Astronomical Society) Ilan, Taiwan, May, 2015

Posters:

- Summer School on Large-Scale Structure Berlin, Germany, Jul, 2018

TECHNICAL SKILLS

- Statistical Tools: Bayesian statistics, Markov Chain Monte Carlo, Fisher analysis, Sparse Reconstruction, Machine Learning (with experience in CNN and Machine Learning Explainability)
- Programming Languages: Python (Astropy, emcee, Pandas, scikit-learn, TensorFlow, Keras, seaborn), SQL, IDL, Matlab, C++, Fortran, Latex
- Instrumentation: SOLIDWORKS, machine shop certification

AWARDS AND HONORS

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| Taiwan/Caltech Ministry of Education Fellowship | Sep 2015 - Aug 2019 |
| Dean's Award of College of Science, National Taiwan University | Jun 2014 |

OUTREACH

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| Leading physics in-class activities at Gabrielino High School, CA | Jan 2020 - Present |
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REFERENCES

- **James J. (Jamie) Bock**
Professor
`jjb@astro.caltech.edu`
California Institute of Technology
Jet Propulsion Laboratory
- **Tzu-Ching Chang**
Research Scientist
`tzu-ching.chang@jpl.nasa.gov/tzu@caltech.edu`
Jet Propulsion Laboratory
California Institute of Technology
Institute of Astronomy and Astrophysics, Academia Sinica (Taiwan)
- **Olivier P. Doré**
Research Scientist
`olivier.p.dore@jpl.nasa.gov/odore@caltech.edu`
Jet Propulsion Laboratory
California Institute of Technology
- **Abigail T. Crites**
Assistant Professor
`abigail.crites@astro.utoronto.ca`
University of Toronto