

Chih-Chun “Dino” Hsu

Center for Astrophysics and Space Sciences, University of California San Diego
9500 Gilman Drive, La Jolla, CA 92093, USA
chh194 [at] ucsd [dot] edu <https://chihchunhsu.github.io/>

EDUCATION	University of California, San Diego , La Jolla, CA, USA Doctor of Philosophy (Ph.D.) in Physics Thesis: “Kinematics, Multiplicity, Rotational Dynamics, and Population Properties of Ultracool Dwarfs Inferred from High-Resolution Near-Infrared Spectroscopy” Advisor: Adam Burgasser Expected June 2022
	National Tsing Hua University , Hsinchu, Taiwan Bachelor of Science (B.S) in Physics June 2014
RESEARCH INTERESTS	lowest-mass stars; brown dwarfs; exoplanets; medium-/high-resolution spectroscopy; very low-mass binaries; stellar populations; stellar kinematics; stellar rotation
RESEARCH EXPERIENCE	Graduate Research Student 2016–present Center for Astrophysics and Space Sciences, UC San Diego, La Jolla, CA Advisor: Adam Burgasser
	Research Assistant 2015–2016 Institute of Astronomy, National Tsing Hua University, Hsinchu, Taiwan Supervisor: Huei-Ru “Vivien” Chen
	Undergraduate Research Student 2013–2014 Physics Department, National Tsing Hua University, Hsinchu, Taiwan Advisor: Kingman Cheung
ACADEMIC HONORS & AWARDS	Friends of the International Center fellowship (\$2,000) 2020 UC San Diego, La Jolla, CA Awarded for promoting international friendship, understanding, and cooperation.
	Carol and George Lattimer Award for Graduate Excellence (\$4,000) 2019–2020 UC San Diego, La Jolla, CA Awarded to graduate students in the Divisions of Physical Sciences who seek interdisciplinary approaches to problem-solving and have a strong commitment to education, mentorship, and service.
	Physics Chair’s Challenge Award * 2 (\$500) 2017–2018 UC San Diego, La Jolla, CA Awarded for supporting educational excellence and training for physics students.
	Physics Excellence Award (\$9,200) 2016 UC San Diego, La Jolla, CA Awarded to highly qualified students admitted to the Physics PhD program.
	College of Science Elite Student Award * 3 2012–2014 National Tsing Hua University, Hsinchu, Taiwan Awarded to the top student of class based on academic achievements.

Academic Achievement Award * 5

2011–2014

National Tsing Hua University, Hsinchu, Taiwan
 Awarded to top 5 % of class.

College of Science Scholarship

2013

National Tsing Hua University, Hsinchu, Taiwan
 Awarded to one student in College of Science based on academic achievements.

**FIRST AUTHOR
PUBLICATIONS**

- [4] **Hsu, C.**; Burgasser, A. J.; Theissen, C. A.; Gelino, C. R.; Birky, J. L.; Diamant, S. J. M.; Bardalez Gagliuffi, D. C.; Aganze, C., Blake, C. H., Jacqueline K. Faherty, “The Brown Dwarf Kinematics Project (BDKP). VI. Radial and Rotational Velocities of late-M and L Dwarfs from Keck/NIRSPEC High-Resolution Spectroscopy”, in prep.
- [3] **Hsu, C.**; Burgasser, A. J.; Theissen, C. A.; Birky, J. L.; Aganze; Schmidt, S. J. ; C., Blake, C. H.; Covey, K. R., “Ultracool Dwarf Radial and Rotational Velocity Survey with SDSS/APOGEE High-Resolution Spectrometer”, in prep.
- [2] **Hsu, C.**; Burgasser, A. J.; Bardalez Gagliuffi, D. C.; Sahlmann, Johannes; Theissen, C. A., “2MASS J21265916+7617440: A Long Period Brown Dwarf Binary System”, in prep.
- [1] **Hsu, C.**; Burgasser, A. J.; Theissen, C. A.; Gelino, C. R.; Birky, J. L.; Diamant, S. J. M.; Bardalez Gagliuffi, D. C.; Aganze; C., Blake, C. H., Jacqueline K. Faherty, “The Brown Dwarf Kinematics Project (BDKP). V. Radial and Rotational Velocities of T Dwarfs From Keck/NIRSPEC High-Resolution Spectroscopy”, accepted in ApJS, arXiv:2107.01222.

**CONTRIBUTING
AUTHOR
PUBLICATIONS**

- [9] Aganze, Christian; Burgasser, Adam J ; Malkan, Mathew; Theissen, Christopher A; Tejada Arevalo, Roberto A; **Hsu, Chih-Chun**; Bardalez Gagliuffi, Daniella C; E Ryan, Russell, Jr; Holwerda, Benne, “Beyond the Local Volume I: Surface Densities of Ultracool Dwarfs in Deep HST/WFC3 Parallel Fields”, accepted in ApJ, arXiv:2110.07672
- [8] Schneider, Adam C.; Meisner, Aaron M.; Gagne, Jonathan; Faherty, Jacqueline K.; Marocco, Federico; Burgasser, Adam J.; Kirkpatrick, J. Davy; Kuchner, Marc J.; Gramaize, Leopold; Rothermich, Austin; Brooks, Hunter; Vrba, Frederick J.; Bardalez Gagliuffi, Daniella; Caselden, Dan; Cushing, Michael C.; Gelino, Christopher R.; Line, Michael R.; Casewell, Sarah L.; Debes, John H.; Aganze, Christian Ayala, Andrew; Gerasimov, Roman; Gonzales, Eileen C.; **Hsu, Chih-Chun**; Kiman, Rocio; Popinchalk, Mark; Theissen, Christopher; Backyard Worlds: The Planet 9 Collaboration, “Ross 19B: An Extremely Cold Companion Discovered via the Backyard Worlds: Planet 9 Citizen Science Project”, accepted in ApJ, arXiv:2108.05321
- [7] Theissen, C. A.; Konopacky , Q. M.; Lu, J. R.; Kim D.; Zhang, S. Y.; **Hsu, C.**; Chu, L.; Wei, L., “The 3-D Kinematics of the Orion Nebula Cluster: NIRSPEC-AO Radial Velocities of the Core Population”, accepted in ApJ, arXiv:2105.05871
- [6] Meisner, Aaron M.; Schneider, Adam C.; Burgasser, Adam J.; Marocco, Federico; Line, Michael R.; Faherty, Jacqueline K.; Kirkpatrick, J. Davy; Caselden, Dan; Kuchner, Marc J.; Gelino, Christopher R.; Gagne, Jonathan; Theissen, Christopher; Gerasimov, Roman; Aganze, Christian; **Hsu, Chih-Chun**; Wisniewski, John P.; Casewell, Sarah L.; Bardalez Gagliuffi, Daniella C.; Logsdon, Sarah E.; Eisenhardt, Peter R. M., “New Candidate Extreme T Subdwarfs

from the Backyard Worlds: Planet 9 Citizen Science Project”, accepted in ApJ, arXiv:2106.01387, June 2021

- [5] J. Davy Kirkpatrick; Christopher R. Gelino; Jacqueline K. Faherty; Aaron M. Meisner; Dan Caselden; Adam C. Schneider; Federico Marocco; Alfred J. Cayago; R. L. Smart; Peter R. Eisenhardt; Marc J. Kuchner; Edward L. Wright; Michael C. Cushing; Katelyn N. Allers; Daniella C. Bardalez Gagliuffi; Adam J. Burgasser; Jonathan Gagne; Sarah E. Logsdon; Emily C. Martin; James G. Ingalls; Patrick J. Lowrance; Ellianna S. Abrahams; Christian Aganze; Roman Gerasimov; Eileen C. Gonzales; **Chih-Chun Hsu**; Nikita Kamraj; Rocio Kiman; Jon Rees; Christopher Theissen; Kareem Ammar; Nikolaj Stevnbak Andersen; Paul Beaulieu; Guillaume Colin; Charles A. Elachi; Samuel J. Goodman; Leopold Gramaize; Leslie K. Hamlet; Justin Hong; Alexander Jonkeren; Mohammed Khalil; David W. Martin; William Pendrill; Benjamin Pumphrey; Austin Rothermich; Arttu Sainio; Andres Stenner; Christopher Tanner; Melina Thevenot; Nikita V. Voloshin; Jim Walla; Zbigniew Wedracki; “The Field Substellar Mass Function Based on the Full-sky 20-pc Census of 525 L, T, and Y Dwarfs”, ApJS, 253, 7, March 2021
- [4] Sahlmann, Johannes; Dupuy, Trent J.; Burgasser, Adam J.; Filippazzo, Joseph C.; Martín, Eduardo L.; Bardalez Gagliuffi, Daniella C.; **Hsu, Chih-Chun**; Lazorenko, Petro F.; Liu, Michael C., “Individual Dynamical Masses of DENIS J063001.4–184014AB Reveal A Likely Young Brown Dwarf Triple”, MNRAS, 500, 5453, January 2021
- [3] Meisner, Aaron M.; Faherty, Jacqueline K.; Kirkpatrick, J. Davy; Schneider, Adam C.; Caselden, Dan; Gagné, Jonathan; Kuchner, Marc J.; Burgasser, Adam J.; Casewell, Sarah L.; Debes, John H.; Artigau, Étienne; Bardalez Gagliuffi, Daniella C.; Logsdon, Sarah E.; Kiman, Rocio; Allers, Katelyn; **Hsu, Chih-Chun**; Wisniewski, John P.; Allen, Michaela B.; Beaulieu, Paul; Colin, Guillaume Durantini Luca, Hugo A.; Goodman, Sam; Gramaize, Léopold; Hamlet, Leslie K.; Hinckley, Ken; Kiwy, Frank; Martin, David W.; Pendrill, William; Rothermich, Austin; Sainio, Arttu; Schümann, Jörg; Andersen, Nikolaj Stevnbak; Tanner, Christopher; Thakur, Vinod; Thévenot, Melina; Walla, Jim; Wedracki, Zbigniew; Aganze, Christian; Gerasimov, Roman; Theissen, Christopher; The Backyard Worlds: Planet 9 Collaboration, “Spitzer Follow-up of Extremely Cold Brown Dwarfs Discovered by the Backyard Worlds: Planet 9 Citizen Science Project”, ApJ, 889, 123, August 2020
- [2] Schneider, Adam C.; Burgasser, Adam J.; Gerasimov, Roman; Marocco, Federico; Gagné, Jonathan; Goodman, Sam; Beaulieu, Paul; Pendrill, William; Rothermich, Austin; Sainio, Arttu; Kuchner, Marc J.; Caselden, Dan; Meisner, Aaron M.; Faherty, Jacqueline K.; Mamajek, Eric E.; **Hsu, Chih-Chun**; Greco, Jennifer J.; Cushing, Michael C.; Kirkpatrick, J. Davy; Bardalez-Gagliuffi, Daniella Logsdon, Sarah E.; Allers, Katelyn; Debes, John H.; Backyard Worlds: Planet 9 Collaboration, “WISEA J041451.67-585456.7 and WISEA J181006.18-101000.5: The First Extreme T-type Subdwarfs?”, ApJ, 989, 77, July 2020
- [1] Paudel, R. R., Gizis, J. E., Burgasser, A. J., **Hsu, C.**, “2MASS J10274572+0629104: the very short period young M6 dwarf binary system identified in K2 data”, MNRAS, 486, 4144, July 2019
- [1] Low, Ryan; Burgasser, Adam J.; Reylé, Céline; Gerasimov, Roman; **Hsu, Chih-Chun**; Theissen, Christopher A, “Spectroscopic Confirmation of an M6 Dwarf Companion to the Nearby Star BD-08 2582”, RNAAS, 5, 26, February 2021

NON-
REFEREED
PUBLICATIONS

TALKS

“Radial and Rotational Velocities of T Dwarfs from Keck/NIRSPEC High-Resolution Spectroscopy” September 9, 2021
Keck Science Meeting, UC San Diego

“Precise Radial and Rotational Velocities of Ultracool Dwarfs with the APOGEE High-Resolution Spectrometer” August 11, 2021
2021 SDSS Collaboration Meeting, Virtual

“Radial Velocities and Kinematic Ages of Nearby T Dwarfs from Keck/NIRSPEC High-Resolution Spectroscopy” January 15, 2021
AAS 237 Meeting, Virtual

“Ultracool Dwarf Kinematics and Ages Revealed by High-Resolution Spectroscopy”
November 13, 2020
CASS Journal Club, UC San Diego, La Jolla, CA

“Precise Radial and Rotational Velocities of Ultracool Dwarfs Using a Forward-Modeling Method with High-Resolution Spectroscopy” February 4, 2020
High-Resolution Infrared Spectroscopy for Exoplanet Characterization Hackathon, Caltech, Pasadena, CA

“Radial and Rotational Velocities of Ultracool Dwarfs From High-Resolution Spectroscopy” March 5, 2019
AMNH Astrophysics seminar, American Museum of Natural History, New York, NY

“Radial and Rotational Velocities of Ultracool Dwarfs From High-Resolution Spectroscopy” February 15, 2019
CASS Journal Club, UC San Diego, La Jolla, CA

POSTERS

“Radial Velocities and Kinematic Ages of Nearby T Dwarfs from Keck/NIRSPEC High-Resolution Spectroscopy” March 2021
The 20.5 Cambridge Workshops of Cool Stars, Stellar Systems and the Sun, Virtual

“Precise Radial and Rotational Velocities for over 440 Ultracool Dwarfs Observed with NIRSPEC” September 2020
Keck Science Meeting 2020, Virtual

“Precise Radial and Rotational Velocities for T Dwarfs Using NIRSPEC High-Resolution Spectrometer” September 2019
Keck Science Meeting 2019, UCLA, Los Angeles, CA

“Precise Radial and Rotational Velocities of Ultracool Dwarfs with APOGEE High-Resolution Spectra” June 2019
SDSS-IV/V Collaboration Meeting 2019, Ensenada, Mexico

“Radial and Rotational Velocities for 300+ Ultracool Dwarfs from NIRSPEC High-Resolution Spectroscopy” January 2019
AAS 233 Meeting, Seattle, WA

“Toward Measurements of Radial and Rotational Velocities of 300+ Ultracool Dwarfs from NIRSPEC High-Resolution Spectroscopy” September 2018
Keck Science Meeting 2018, Caltech, Pasadena, CA

	<p><i>“Precise Radial Velocities to Detect Exoplanets around Ultracool Dwarfs Using the NIRSPEC High-Resolution Spectrograph”</i> September 2018 ExSoCal 2018, Caltech, Pasadena, CA</p> <p><i>“Refined Measurements of Radial and Rotational Velocities of 300+ Ultracool Dwarfs from NIRSPEC High-Resolution Spectroscopy”</i> July 2018 Cool Stars 20, Boston University, Cambridge, MA</p>	
PRESS COVERAGE	<p><i>“Here’s how cool a star can be and still achieve lasting success”</i>, Science News, August 2021</p>	
WORKSHOPS	<p><i>Future Keck IR Spectroscopy Workshop</i> January 27 2021 Virtual</p> <p><i>High-Resolution Infrared Spectroscopy for Exoplanet Characterization Hackathon</i> February 4–6 2020 Caltech, Pasadena, CA</p> <p><i>Telluric Line Hack Week Workshop</i> February 25–28 2019 Flatiron Institute, New York, NY</p> <p><i>2017 Kraft Observational Astronomy Workshop</i> October 12–16 2017 Lick Observatory, Mount Hamilton, CA</p> <p><i>SciCoder Workshop</i> July 31–August 4 2017 Vanderbilt University, Nashville, TN</p>	
TELESCOPE TIME AWARDED	<p><i>W. M. Keck Telescopes, Keck II 10-meter</i> Co-I: 2021B: “Galactic Archaeology with Ultracool Dwarfs: Kinematic Structure Among L Dwarfs” <ul style="list-style-type: none"> • 1.75 nights awarded (NIRSPEC) </p> <p>Co-I: 2021B: “The Old and the Quick: A Search for Halo Brown Dwarfs with Backyard Worlds” <ul style="list-style-type: none"> • 2 nights awarded (NIREs) </p> <p>Co-I: 2019B–2020B: “Completing the Kinematic Census of Local T Dwarfs” <ul style="list-style-type: none"> • 5.75 nights awarded (NIRSPEC) </p> <p>Co-I: 2018B–2021A: “NIREs Follow-up of Young T Dwarfs from Backyard Worlds” <ul style="list-style-type: none"> • 9 nights awarded (NIREs) </p> <p><i>NASA InfraRed Telescope Facility (IRTF)</i> Co-I: 2018A–2019B: “Training the Cannon: Calibrating APOGEE Observations of Ultracool Dwarfs” <ul style="list-style-type: none"> • 6 nights awarded (iSHELL) </p>	
ADDITIONAL OBSERVING EXPERIENCE	<p><i>Keck II 10-meter/NIRSPEC 7 nights</i> 2017–2018</p> <p><i>Keck I 10-meter/HIRES 0.5 nights</i> 2018</p> <p><i>Shane Telescope 3-meter</i> <ul style="list-style-type: none"> • Kast Double Spectrograph: 22 nights 2018–2021</p>	

	<ul style="list-style-type: none"> • ShaneAO/ShARCS: 1 night 	2019
	<i>NASA InfraRed Telescope Facility (IRTF)/SpeX 0.5 nights</i>	2021
UNDERGRAD MENTORSHIP	Brigette Vazquez, UC San Diego	2021–Present
	Delilah Jacobsen, UC San Diego	2021–Present
	Tianxing “Sky” Zhou, UC San Diego	2021–Present
TEACHING	<i>Teaching assistant for PHYS 2D</i>	Spring 2021
	UC San Diego, La Jolla, CA	
	<ul style="list-style-type: none"> • lower-division modern physics lecture for engineering/physical science majors 	
	<i>Teaching assistant for PHYS 5</i>	Fall 2020
	UC San Diego, La Jolla, CA	
	<ul style="list-style-type: none"> • lower-division introductory stellar astrophysics lecture for non-physics major 	
	<i>Teaching assistant for PHYS 2DL</i>	Spring & Fall 2017, 2019, Spring 2020, Fall 2021
	UC San Diego, La Jolla, CA	
	<ul style="list-style-type: none"> • lower-division modern physics lab for engineering/physical science majors 	
	<i>Teaching assistant for PHYS 1A</i>	Spring 2018
	UC San Diego, La Jolla, CA	
	<ul style="list-style-type: none"> • lower-division mechanics lab for life-science majors 	
	<i>Teaching assistant for PHYS 160</i>	Winter 2018, Fall 2018
	UC San Diego, La Jolla, CA	
	<ul style="list-style-type: none"> • upper-division introductory stellar astrophysics lecture for physics major 	
	<i>Teaching assistant for PHYS 2BL</i>	Fall 2016, Winter 2017
	UC San Diego, La Jolla, CA	
	<ul style="list-style-type: none"> • lower-division electricity & magnetism lab for engineering/physics major 	
	<i>California Professoriate for Access to Physics Careers (CPAPC)</i>	
	<i>Southern California Physics GRE Bootcamp</i>	August 2017
	<ul style="list-style-type: none"> • UC San Diego, La Jolla, CA 	
PUBLIC OUTREACH	Python Workshop for Physics Undergraduate Students	November 2019, November 2020
	<ul style="list-style-type: none"> • UC San Diego, La Jolla, CA 	
	2019 Institute for Scientist & Engineer Educations (ISEE)	
	Professional Development Program (PDP)	March–September 2019
	UC Santa Cruz/UC Los Angeles, CA	
	<ul style="list-style-type: none"> • Professional development team focused on effective and inclusive teaching, including mentoring, and also includes training in professional skills such as communication, teamwork, collaboration, and leadership. 	
	Institute of the Americas (IOA) Science Innovation Camp	July 20 2017
	UC San Diego, La Jolla, CA	
	<ul style="list-style-type: none"> • Physics outreach for Latin American high school students (14–18 year old) 	
	The Barrio Logan Science & Art Expo	March 16 2019
	Mercado del Barrio, San Diego, CA	

- Physics outreach for Mexican families from around southern San Diego

PROFESSIONAL AFFILIATIONS American Astronomical Society (AAS)

2018–Present

SKILLS Python, L^AT_EX, Github, HTML; Languages: Mandarin (native), English (fluent)

REFERENCES **Dr. Adam Burgasser**
 Professor of Physics
 University of California San Diego
 9500 Gilman Drive 0424, La Jolla, California 92093-0424, USA
 aburgasser at ucsd.edu

Dr. Quinn Konopacky
 Associate Professor of Physics
 University of California San Diego
 9500 Gilman Drive 0424, La Jolla, California 92093-0424, USA
 qkonopacky at ucsd.edu

Dr. Cullen Blake
 Associate Professor of Physics and Astronomy
 University of Pennsylvania
 209 South 33rd Street, Philadelphia, PA 19104, USA
 chblake at sas.upenn.edu

Dr. Christopher Theissen
 NASA Sagan Postdoctoral Fellow
 University of California San Diego
 9500 Gilman Drive 0424, La Jolla, California 92093-0424, USA
 ctheissen at ucsd.edu

[CV compiled on 2021/10/19]