Óscar A. Chávez Ortiz
(He/Him/His)

chavezoscar009@utexas.edu

Department of Astronomy
University of Texas at Austin
2515 Speedway Austin, TX 78712

ORCID: [0000-0003-2332-5505](#)

GitHub: [chavezoscar009](#)

RESEARCH INTERESTS

My research focuses on understanding the relationship between galaxy properties and Lyman-alpha emission, with the goal of using Lyman-alpha as a probe of cosmic reionization. As the lead analyst for the TESLA survey, I am overseeing efforts to collect data on approximately 50,000 Lyman-alpha emitting galaxies (LAEs) to investigate correlations between galaxy properties and the emerged Lyman-alpha strength at redshifts 2–3.5. This work aims to identify key drivers that influence Lyman-alpha emission and to develop a predictive model for emerged Lyman-alpha strength based on spectral energy distribution (SED)-derived galaxy properties. Expanding this analysis to higher redshifts, I will integrate data from ongoing and future LAE studies to refine our understanding of Lyman-alpha's role in tracing reionization. Additionally, as a member of the CEERS team, I will leverage NIRSpec observations to probe the internal mechanisms that enable Lyman-alpha escape in these galaxies, deepening our insight into the physical processes that regulate this emission. Ultimately, my goal is to apply this predictive framework to galaxies at the epoch of reionization, facilitating accurate estimations of the neutral hydrogen fraction beyond redshift 6 and advancing our knowledge of the reionization era.

EDUCATION

Ph.D. in Astronomy   Expected Spring/Summer 2025
University of Texas at Austin (UTA)
Department of Astronomy
2515 Speedway, Stop C1400
Austin, Texas 78712-1205
Advisor: Dr. Steven Finkelstein

B.A. in Astrophsyics   Fall 2019
The University of California Berkeley (UCB)
501 Campbell Hall 3411
Berkeley, CA 94720-3411
Advisor: Dr. Mariska Kriek

PROJECTS

Project 1 NEP Pilot Study (Published): I was tasked with looking at a small patch of the North Ecliptic Pole field and testing the feasibility of a much larger analysis. My work involved using spectroscopic and photometric data to come up with a set of criteria to find a specific type of galaxy called Lyman-alpha Emitters and then study how their global galaxy properties correlate with emerged Lyman-alpha strength. For this project, I had to come up with a scalable code that would work on the small survey area I was working with but also work on an expanded data set once more data became available in an automated way. This work has been published in the Astrophysical Journal for anyone to look into the analysis.

Project 2 Spectroscopic Analysis of LAEs and non-LAEs (Accepted): This project revolved around studying the physical environments of galaxies with and without Lyα detections to determine what galaxy properties promote the observability of Lyα. To carry out this analysis, we

developed our own custom emission line modeling code. This code would take a grid of predicted emission line strengths for a variety of input galaxy properties and make an MCMC framework to explore this parameter space to determine the parameters that best match the observed data. We utilized the *emcee* package as our sampler and determined that galaxies with Lyα detected typically had less dust, less metals and a higher ionization parameter.

Project 3 AGN fraction of High Redshift Galaxies (In-Prep): We have the detection of high ionization lines of high redshift galaxies but whether these lines are powered by stars or AGN remains an open question. What I aim to do with this project is to use the BEAGLE code to fit photometry and spectra to determine the amount of the AGN contribution to certain emission lines and quantify the AGN fraction of high redshift sources.

Project 4 Expanding the TESLA Analysis (In-Prep): The TESLA survey has now reached full depths in the photometry giving us full access to the 10 deg^2 of the NEP field. We aim to perform the same analysis we did in the pilot study to the entire NEP field as well as incorporating other fields such as SHELA, EGS, GOODS-N and UDS. This will generate a large sample fo LAEs where we will correlate gaalxy properties to Lyα strength so that we can make predictions of high redshift galaxies as to how much Lyα they should be emitting based off of gaalxy properties.

HONORS & AWARDS

Mentoring Dean's Strategic Fellowship	$2020 - 2022$
Daniel Edward Wark Memorial Scholarship	Summer 2018
Dean's Honor List at Riverside City College	$2016 - 2017$

AWARDS & GRANTS

FY20-22	Mentoring Dean's Strategic Fellowship	$68K
FY18-19	Daniel Edward Wark Memorial Scholarship	$10K

REFEREED PUBLICATIONS

First Author ————————————————————————————————————

Introducing the Texas Euclid Survey for Lyα (TESLA) Survey:
Initial Study Correlating Galaxy Properties to Lyα Emission
galaxy, galaxy evolution // https://ui.adsabs.harvard.edu/abs/2023ApJ...952..110C/abstract
Chávez Ortiz, Óscar A. ; Finkelstein, Steven L.; Davis, Dustin ; Leung, Gene ; Mentuch Cooper, Erin; Bagley, Micaela ; Larson, Rebecca; Casey, Caitlin M.; McCarron, Adam P.; Gebhardt, Karl; Guo, Yuchen; Liu, Chenxu ; Laseter, Isaac ; Rhodes, Jason; Bender, Ralf ; Fabricius, Max ; Sánchez, Ariel G. ; Scarlata, Claudia; Capak, Peter; Zalesky, Lukas

The Lyα Dependence on Nebular Properties from the HETDEX and MOSDEF Surveys
Accepted to ApJ

Chávez Ortiz, Oscar A., Leung, Gene C. K., Finkelstein, Steven L.,Davis, Dustin, Sutherland, Ralph S., Nicholls, David C., Stephenson, Mabel, Mentuch Cooper, Erin,Bagley, Micaela, Gebhardt, Karl, House, Lindsay R., Liu, Chenxu, Ciardullo, Robin, Gronwall, Caryl, Hill, Gary J., Farrow, Daniel, Schneider, Donald P.

2$^{\text{nd}}$–4$^{\text{th}}$ Co-Author ————————————————————————————————

Stellar Populations of Ly-emitting Galaxies in the HETDEX Survey.
I. An Analysis of LAEs in the GOODS-N Field
https://ui.adsabs.harvard.edu/abs/2022ApJ...936..131M/abstract
The Astrophysical Journal, Volume 936, Issue 2, article id. 131
McCarren, Adam, Finkelstein, S, **Chavez Ortiz, O.**, Davis, Dustin, Mentuch Cooper, Erin

Co-Author ————————————————————————————————————

Broad-Line AGN at $3.5 < z < 6$: The Black Hole Mass Function and a Connection with Little Red Dots//
https://ui.adsabs.harvard.edu/abs/2024arXiv240906772T/abstract
Taylor, Anthony J.; Finkelstein, Steven L.; Kocevski, Dale D.; Jeon, Junehyoung; Bromm, Volker; Amorin, Ricardo O.; Arrabal Haro, Pablo; Backhaus, Bren E.; Bagley, Micaela B.; Bañados, Eduardo; Bhatawdekar, Rachana; Brooks, Madisyn; Calabro, Antonello; **Chavez Ortiz, Oscar A.**; Cheng, Yingjie; Cleri, Nikko J.; Cole, Justin W.; Davis, Kelcey; Dickinson, Mark; Donnan, Callum; Dunlop, James S.; Ellis, Richard S.; Fernandez, Vital; Fontana, Adriano; Fujimoto, Seiji; Giavalisco, Mauro; Grazian, Andrea; Guo, Jingsong; Hathi, Nimish P.; Holwerda, Benne W.; Hirschmann, Michaela; Inayoshi, Kohei; Kartaltepe, Jeyhan S.; Khusanova, Yana; Koekemoer, Anton M.; Kokorev, Vasily; Larson, Rebecca L.; Leung, Gene C. K.; Lucas, Ray A.; McLeod, Derek J.; Napolitano, Lorenzo; Onoue, Masafusa; Pacucci, Fabio; Papovich, Casey; Pérez-González, Pablo G.; Pirzkal, Nor; Somerville, Rachel S.; Trump, Jonathan R.; Wilkins, Stephen M.; Yung, L. Y. Aaron; Zhang, Haowen

The BoRG-JWST Survey: Program Overview and First Confirmations of Luminous Reionization-Era Galaxies from Pure-Parallel Observations//
https://ui.adsabs.harvard.edu/abs/2024arXiv240717551R/abstract

Roberts-Borsani, Guido; Bagley, Micaela; Rojas-Ruiz, Sofía; Treu, Tommaso; Morishita, Takahiro; Finkelstein, Steven L.; Trenti, Michele; Arrabal Haro, Pablo; Bañados, Eduardo; **Chávez Ortiz, Óscar A.**; Chworowsky, Katherine; Hutchison, Taylor A.; Larson, Rebecca L.; Leethochawalit, Nicha; Leung, Gene C. K.; Mason, Charlotte; Somerville, Rachel S.; Stiavelli, Massimo; Yung, L. Y. Aaron; Kassin, Susan A.; Soto, Christian

Detection of Ionized Hydrogen and Oxygen from a very luminous and young galaxy 13.4 billion years ago//
https://ui.adsabs.harvard.edu/abs/2024arXiv240310491Z/abstract

Zavala, Jorge A.; Castellano, Marco; Akins, Hollis B.; Bakx, Tom J. L. C.; Burgarella, Denis; Casey, Caitlin M.; **Chávez Ortiz, Óscar A.**; Dickinson, Mark; Finkelstein, Steven L.; Mitsuhashi, Ikki; Nakajima, Kimihiko; Pérez-González, Pablo G.; Arrabal Haro, Pablo; Buat, Veronique; Backhaus, Bren; Calabrò, Antonello; Cleri, Nikko J.; Fernández-Arenas, David; Fontana, Adriano; Franco, Maximilien; Giavalisco, Mauro; Grogin, Norman A.; Hathi, Nimish; Hirschmann, Michaela; Ikeda, Ryota; Jung, Intae; Kartaltepe, Jeyhan S.; Koekemoer, Anton M.; Larson, Rebeca L.; McKinney, Jed; Papovich, Casey; Saito, Toshiki; Santini, Paola; Terlevich, Roberto; Terlevich, Elena; Treu, Tommaso; Yung, L. Y. Aaron

The Web Epoch of Reionization Lyα Survey (WERLS). I. MOSFIRE Spectroscopy of z ∼ 7–8 Lyα Emitters
https://ui.adsabs.harvard.edu/abs/2024ApJ...970...50C/abstract

Cooper, Olivia R.; Casey, Caitlin M.; Akins, Hollis B.; Magee, Jake; Melendez, Alfonso; Fong, Mia; Urbano Stawinski, Stephanie M.; Kartaltepe, Jeyhan S.; Finkelstein, Steven L.; Larson, Rebecca L.; Jung, Intae; Bista, Ash; Champagne, Jaclyn B.; **Chávez Ortiz, Óscar A.**; Coffin, Sadie; Cooper, M. C.; Drakos, Nicole; Faisst, Andreas L.; Franco, Maximilien; Fujimoto, Seiji; Gillman, Steven; Gozaliasl, Ghassem; Harish, Santosh; Hutchison, Taylor A.; Koekemoer, Anton M.; Kokorev, Vasily; Lertprasertpong, Jitrapon; Liu, Daizhong; Long, Arianna S.; Papovich, Casey; Rich, R. Michael; Robertson, Brant E.; Talia, Margherita; Vanderhoof, Brittany N.; Weaver, John R.; Whitaker, Katherine E.; Zavala, Jorge

The Complete CEERS Early Universe Galaxy Sample: A Surprisingly Slow Evolution of the Space Density of Bright Galaxies at z 8.5–14.5//
https://ui.adsabs.harvard.edu/abs/2024ApJ...969L...2F/abstract

Finkelstein, Steven L.; Leung, Gene C. K.; Bagley, Micaela B.; Dickinson, Mark; Ferguson, Henry C.; Papovich, Casey; Akins, Hollis B.; Arrabal Haro, Pablo; Davé, Romeel; Dekel, Avishai; Kartaltepe, Jeyhan S.; Kocevski, Dale D.; Koekemoer, Anton M.; Pirzkal, Nor; Somerville, Rachel S.; Yung, L. Y. Aaron; Amorín, Ricardo O.; Backhaus, Bren E.; Behroozi, Peter; Bisigello, Laura; Bromm, Volker; Casey, Caitlin M.; **Chávez Ortiz, Óscar A.**; Cheng, Yingjie; Chworowsky, Katherine; Cleri, Nikko J.; Cooper, M. C.; Davis, Kelcey; de la Vega, Alexander; Elbaz, David; Franco, Maximilien; Fontana, Adriano; Fujimoto, Seiji; Giavalisco, Mauro; Grogin, Norman A.; Holwerda, Benne W.; Huertas- Company, Marc; Hirschmann, Michaela; Iyer, Kartheik G.; Jogee, Shardha; Jung, Intae; Larson, Rebecca L.; Lucas, Ray A.; Mobasher, Bahram; Morales, Alexa M.; Morley, Caroline V.; Mukherjee, Sagnick; Pérez- González, Pablo G.; Ravindranath, Swara; Rodighiero, Giulia; Rowland, Melanie J.; Tacchella, Sandro; Taylor, Anthony J.; Trump, Jonathan R.; Wilkins, Stephen M.

The Next Generation Deep Extragalactic Exploratory Public Near-infrared Slitless Survey Epoch 1 (NGDEEP-NISS1): Extragalactic Star-formation and Active Galactic Nuclei at 0.5 < z < 3.6//

https://ui.adsabs.harvard.edu/abs/2024ApJ...969...90P/abstract

   Pirzkal, Nor; Rothberg, Barry; Papovich, Casey; Shen, Lu; Leung, Gene C. K.; Bagley, Micaela B.; Finkelstein, Steven L.; Vanderhoof, Brittany N.; Lotz, Jennifer M.; Koekemoer, Anton M.; Hathi, Nimish P.; Cheng, Yingjie; Cleri, Nikko J.; Grogin, Norman A.; Yung, L. Y. Aaron; Dickinson, Mark; Ferguson, Henry C.; Gardner, Jonathan P.; Jung, Intae; Kartaltepe, Jeyhan S.; Ryan, Russell; Simons, Raymond C.; Ravindranath, Swara; Berg, Danielle A.; Backhaus, Bren E.; Casey, Caitlin M.; Castellano, Marco; **Chávez Ortiz, Óscar A.**; Chworowsky, Katherine; Cox, Isabella G.; Davé, Romeel; Davis, Kelcey; Estrada-Carpenter, Vicente; Fontana, Adriano; Fujimoto, Seiji; Giavalisco, Mauro; Grazian, Andrea; Hutchison, Taylor A.; Jaskot, Anne E.; Kewley, Lisa J.; Kirkpatrick, Allison; Kocevski, Dale D.; Larson, Rebecca L.; Matharu, Jasleen; Natarajan, Priyamvada; Pentericci, Laura; Pérez-González, Pablo G.; Snyder, Gregory F.; Somerville, Rachel S.; Trump, Jonathan R.; Wilkins, Stephen M.

The Next Generation Deep Extragalactic Exploratory Public (NGDEEP) Survey//
https://ui.adsabs.harvard.edu/abs/2024ApJ...965L...6B/abstract

   Bagley, Micaela B.; Pirzkal, Nor; Finkelstein, Steven L.; Papovich, Casey; Berg, Danielle A.; Lotz, Jennifer M.; Leung, Gene C. K.; Ferguson, Henry C.; Koekemoer, Anton M.; Dickinson, Mark; Kartaltepe, Jeyhan S.; Kocevski, Dale D.; Somerville, Rachel S.; Yung, L. Y. Aaron; Backhaus, Bren E.; Casey, Caitlin M.; Castellano, Marco; **Chávez Ortiz, Óscar A.**; Chworowsky, Katherine; Cox, Isabella G.; Davé, Romeel; Davis, Kelcey; Estrada-Carpenter, Vicente; Fontana, Adriano; Fujimoto, Seiji; Gardner, Jonathan P.; Giavalisco, Mauro; Grazian, Andrea; Grogin, Norman A.; Hathi, Nimish P.; Hutchison, Taylor A.; Jaskot, Anne E.; Jung, Intae; Kewley, Lisa J.; Kirkpatrick, Allison; Larson, Rebecca L.; Matharu, Jasleen; Natarajan, Priyamvada; Pentericci, Laura; Pérez-González, Pablo G.; Ravindranath, Swara; Rothberg, Barry; Ryan, Russell; Shen, Lu; Simons, Raymond C.; Snyder, Gregory F.; Trump, Jonathan R.; Wilkins, Stephen M.

NGDEEP Epoch 1: The Faint End of the Luminosity Function at z 9-12 from Ultradeep JWST Imaging//
https://ui.adsabs.harvard.edu/abs/2023ApJ...954L..46L/abstract

   Leung, Gene C. K.; Bagley, Micaela B.; Finkelstein, Steven L.; Ferguson, Henry C.; Koekemoer, Anton M.; Pérez-González, Pablo G.; Morales, Alexa; Kocevski, Dale D.; Yang, Guang; Somerville, Rachel S.; Wilkins, Stephen M.; Yung, L. Y. Aaron; Fujimoto, Seiji; Larson, Rebecca L.; Papovich, Casey; Pirzkal, Nor; Berg, Danielle A.; Lotz, Jennifer M.; Castellano, Marco; **Chávez Ortiz, Óscar A.**; Cheng, Yingjie; Dickinson, Mark; Giavalisco, Mauro; Hathi, Nimish P.; Hutchison, Taylor A.; Jung, Intae; Kartaltepe, Jeyhan S.; Natarajan, Priyamvada; Rothberg, Barry

RESEARCH NOTES

Lead-Author ——————————————————————————————————————

Six Local Analogs for High Redshift Galaxies
Research Notes of the AAS, Volume 3, Issue 11, pg. 180 (2029)
Oscar A. Chavez Ortiz and Micaela B. Bagley

SERVICE & OUTREACH ——————————————————————————————————

Department Level ————————————————————————————————————

Co-Founder of Cafecito Cosmico	UTA, 2024 – Present
Astronomy Graduate Student Representative	UTA, 2024 – Present

UGSPS Leader	UTA, 2022 – 2024
Cosmic Comrades,	UTA 2023 - Present
Co-Founder, current Maintainer	
GUMMY Mentor	UTA, 2021 - Present
Website Committee	UTA, Fall 2024 - Present
Invited Talk at ASA	UTA, Fall 2023
Invited Talk at ASA	UTA, Fall 2024
Grad Student Panelist at ASA	UTA, Spring 2024

Local Level ——

Invited talk at AoT	June 2024
Invited talk at Particle Pints	February 2024

CONFERENCES & PRESENTATIONS

Science Presentations

Talk: American Astronomical Society (NEW ORLEAN, LA)	January 2024
Talk: CEERS Meeting (AUSTIN, TX)	March 2023
Poster: American Astronomical Society #241 (SEATTLE, WA)	12 January 2023
Talk: Euclid Consortium	18 September 2022
Poster: American Astronomical Society #240 (PASADENA, CA)	14 June 2022
Talk: STSCI MOS	May 2022
Invited Talk: Yale Lunch Talk	28 April 2022
Poster: American Astronomical Society #235 (HONOLULU, HI)	5 January 2020

MENTORING

Undergraduate Students (7)

Galaxy Evolution Vertically Integrated Program, UT Austin
—— H. Lawson (Fall 2023 – Present)
—— A. Abramson (Fall 2023 – Present)
—— V. Vaniceck (Fall 2023 – Present)
—— L. Kokinakis (Fall 2023 – Present)
—— L. Chatur (Fall 2022 – Present)
—— A. Himantog (Fall 2021 – Spring 2023)
—— N. Davila (Fall 2021 – Spring 2023)
—— A. Himantog (Fall 2021 – Spring 2023)
—— T. Maina (Spring 2021 – Summer 2024)
—— V. Dartungo (Fall 2020 – Spring 2022)
—— D. White (Fall 2020 – Spring 2022)
REU/TAURUS
—— E. Lopez (Summer 2024)
—— D. Garza (Summer 2022)
—— C. Diaz (Summer 2021)

Teaching Experience

Teaching

— Instructor, Python for Astronomers DeCal   UC Berkeley, Fall 2019
— Mentor, Galaxy Evolution Vertically Integrated Program,   Fall 2021 - Present – UT Austin

Workshops

— VIP Python BootCamp Instructor   January 2023 - Present — UT Austin
— REU/TAURUS Python BootCamp, Instructor   June 2022 - Present – UT Austin

Teaching Assistant

— Teaching Assistant, Astronomy   UT Austin, Spring 2021