

Timothy Carleton

Academic Positions

- 2023 **Assistant Research Scientist**, *Arizona State University*, Phoenix, AZ.
- 2020–2023 **Postdoctoral Fellow**, *Arizona State University*, Phoenix, AZ.
- 2018–2020 **Postdoctoral Researcher**, *University of Missouri*, Columbia, MO.
- 2015–2018 **Graduate Student Researcher**, *UC Irvine*, Irvine, CA.
- 2014–2018 **Graduate Outreach Coordinator**, *UC Irvine*, Irvine, CA.
- 2012–2015 **Teaching Assistant**, *UC Irvine*, Irvine, CA.

Education

- 2018 **Ph.D., Physics**, *University of California, Irvine*, Irvine, CA.
Diffuse Gas and Diffuse Galaxies – Investigations into the State of Molecular Gas in High- z Galaxies and the Origin of Ultra-Diffuse Galaxies
- 2014 **M.S., Physics**, *University of California, Irvine*, Irvine, CA.
- 2012 **B.S., Physics and Astronomy**, *University of Arizona*, Tucson, AZ.

Research Interest

I am primarily interested in how galaxies evolve and how they are related to their dark-matter halos. Given recent observations highlighting their unusual properties, I am particularly interested in low-mass (dwarf) and diffuse galaxies. To study these objects, I use both observations (primarily utilizing data from the Hubble Space Telescope and James Webb Space Telescope) and simulations (primarily the Illustris-TNG cosmological simulation).

Approved Proposals and Awards

Proposals

- 2023 **Co-I**, *ArchExtract: Maximizing Hubble's Archival Legacy of Slitless Spectroscopy*, HST Archival.
- 2022 **PI**, *LBT: Deep U+R-band Imaging of the Lensing Cluster MACS1149+2223*, 1 Night Band B time.
- 2022 **Co-I**, *Keck DEIMOS - Unravelling the origins of ultra-diffuse galaxies in the Perseus cluster*, 3 Nights.
- 2020 **PI**, *HST-AR-16605*, HST: Hot or Cold? Improving Constraints on the Thermal Foreground of HST, \$109,975.

- 2020 **Co-PI**, *HST-AR-16604*, Resolved Stellar Populations and the Multi-Wavelength Structure of Dwarf Galaxies in the Frontier Fields, \$97,416.
- 2019 **Co-I**, *HST-AR-15798*, UV Light Reveals the Life of Giant Star-forming Clumps.
[Awards](#)
- 2018 **Postdoctoral Travel Grant**, **University of Missouri**, \$250.
- 2015–2017 **ARCS Scholar**, **University of California, Irvine**, \$15,000.

Teaching/Mentoring

- 2020–2022 **Python in Astronomy**, *Arizona State Univeristy*.
Developed 14 projects to help teach python and demonstrate how it can be used in astronomy. They were used as a teaching tool for 30 weeks of python instruction with undergraduate/graduate students
- 2018–2019 **Programming Mentor**, *University of Missouri*.
Organized weekly python tutorials with junior graduate students and served as resource for students who need help with coding
- 2014, 2016, **COSMOS Teaching Assistant**, *University of California, Irvine*.
2017 Led high school students through a summer research project
- 2012–2016 **Teaching Assistant**, *University of California, Irvine*.
Led discussions and labs for introductory physics and astronomy classes; provided weekly tutoring sessions
- 2014 **Educator Consultant**, *ESCAPE Summer Institute in Earth Science*.
Assisted K-12 educators in the development of new STEM lessons

Mentored Students

- 2021–2023 **Alex Pigarelli**, *ASU Graduate Student*.
- 2022–2023 **Isabel McIntyre**, *ASU Graduate Student*.
- 2020–2023 **Delondrae Carter**, *ASU Graduate Student*, Space Grant Intern, Graduate College IEF fellowship winner, Served on his Senior Thesis Committee.
- 2020–2023 **Jessica Berkheimer**, *ASU Undergraduate/Graduate Student*, Space Grant Intern, LEAP Scholar.
- 2020–2022 **Rosalia O'Brien**, *ASU Graduate Student*.
- 2021–2023 **Daniel Henningson**, *ASU Undergraduate*.
- 2020–2023 **Zak Goisman**, *ASU Undergraduate*.
- 2021–2023 **Hanga Andras-Letanovszky**, *UA Undergraduate*.
- 2021–2023 **Purvansh Bhati**, *BASIS High School Scottsdale*.
2023 **Tejovrash Acharya**, *ASU Undergraduate*.
2023 **Arnav Gahlot**, *ASU Undergraduate*.
2023 **Badahri Krishna**, *ASU Undergraduate*.
- 2020–2022 **Scott Tompkins**, *ASU Undergraduate/UWA Graduate Student*.
- 2020–2022 **Andi Swirbul**, *ASU Undergraduate*, Space Grant Intern.

- 2020–2022 **Rushabh Pawnikar**, *BASIS High School Peoria*.
- 2020–2022 **Darby Kramer**, *ASU Graduate Student*.
- 2020–2021 **Junehyoung Jeon**, *ASU Undergraduate/UT Graduate Student*.
- 2020–2021 **Ci'mone Rogers**, *ASU Undergraduate, Space Grant Intern*.
- 2020 **Haley Abate**, *ASU Undergraduate Student*.
- 2020 **Teja Teppala**, *UM Graduate Student*.
- 2018–2020 **Sarah Parker**, *UM Graduate Student*.
- 2019 **Alec Martin**, *UM Undergraduate Student*.

Outreach

- 2014–2018 **Graduate Outreach Coordinator**, *UCI Observatory*.
Hosted public nights at the observatory; scheduled over 50 events with local schools and organizations with programming tailored to meet specific needs
- 2012 **Public Telescope Operator**, *Raymond E. White Telescope*.
Observed and annotated astronomical objects to general education students and the public

Community Service

- 2022-2023 **Primary Organizer**, *SESE Internal Symposium*.
- 2023 **Primary Organizer**, *SESE Extragalactic Journal Club*.
- 2021-2023 **Co-Organizer**, *SESE Summer Extragalactic Talk Series*.
- 2020–2022 **Co-Organizer**, *SESE Extragalactic Journal Club*.
- 2021 **Co-Organizer**, *First SESE Internal Symposium*.
- 2020–2021 **Member**, *SESE JEDI Task Force*.
- Reviewer**, *NASA, STScI, ApJ, MNRAS, PRL, NSF Galaxy Evolution Theory, NSF Galaxy Evolution Observations, Swinburne University*.

Selected Talks

- [1] *Low Density Galaxies at $z=0.87$* . The Sunrise of Ultra-Diffuse Galaxies: June 26-30, 2023.
- [2] *Ultra-Diffuse Galaxies Observed in the El-Gordo Cluster with JWST*. First Science Results with JWST: Dec 12-15, 2022.
- [3] *Ultra-Diffuse Galaxies: Solutions and problems*. UC Santa Cruz: April 18, 2022, *Invited*.
- [4] *First Results from the SKYSURF Project*. SphereX Team Meeting: May 24, 2022, *Invited*.
- [5] *Ultra Diffuse Galaxies and the SKYSURF Project*. Swinburne University: Sept 1, 2021, *Invited*.
- [6] *The SKYSURF Project Overview*. Macquarie University: Aug 13, 2020, *Invited*.

- [7] *The formation of Ultra-diffuse galaxies through tidal heating*. STSCI Lunch Talk: Oct 4, 2019, Invited.
- [8] *Evidence for Stochastic Quenching in Massive Galaxies at $z \sim 1$* . MARAC Meeting: April 12, 2019.
- [9] *The Big Bang to the Periodic Table*. Nuclear Science & Engineering for Secondary Science Teachers: June 10, 2019.
- [10] *The Origins of Ultra-Diffuse Galaxies*. CANDELS Meeting: October 24, 2018.
- [11] *Tidally Disrupted Halos as the Hosts of Ultra-Diffuse Galaxies*. GalFRESCA: August 25, 2017.
- [12] *Searching for Ultra-Diffuse Galaxies in the Bolshoi Simulation*. Santa Cruz Galaxy Workshop: August 10, 2017.
- [13] *The CO-H₂ Conversion Factor at $z < 1.5$* . Multi-Scale Star Formation Conference: April 5, 2017.
- [14] *Star Formation in Young Galaxies*. ARCS Research Symposium: March 16, 2017.
- [15] *The Sky Tonight*. ASUCI Student Night at the UCI Observatory: May 22, 2013.
- [16] *Meteor Showers and Solar System Debris*. Perseid Meteor Shower Visitor Night at the UCI Observatory: August 11, 2013.

Publication List

Lead Author

- [1] *PEARLS: A Potentially Isolated Quiescent Dwarf Galaxy with a TRGB Distance of 31 Mpc.* 2023. **Carleton, T.** et al. arXiv:2309.16028.
- [2] *PEARLS: Low Stellar Density Galaxies in the El Gordo Cluster Observed with JWST.* 2023. **Carleton, T.** et al. ApJ, 953, 83.
- [3] *SKYSURF: Constraints on Zodiacal Light and Extragalactic Background Light through Panchromatic HST All-Sky Surface-Brightness Measurements: II. First Limits on Diffuse Light at 1.25, 1.4, and 1.6 microns.* 2022. **Carleton, T.** et al. AJ, 164, 170.
- [4] *An excess of globular clusters in Ultra-Diffuse Galaxies formed through tidal heating.* 2021. **Carleton, T.** et al. MNRAS, 502, 394.
- [5] *Evidence for Non-smooth Quenching in Massive Galaxies at $z \sim 1$.* 2020. **Carleton, T.** et al. MNRAS, 491, 2822.
- [6] *The Formation of Ultra Diffuse Galaxies in Cored Dark Matter Halos Through Tidal Stripping.* 2019. **Carleton, T.** et al. MNRAS, 485, 382.
- [7] *PHIBSS: exploring the dependence of the CO-H₂ conversion factor on total mass surface density at $z < 1.5$.* 2017. **Carleton, T.** et al. MNRAS, 476, 4886.

Student Papers

- [1] *JWST NIRC*am* Photometry: A Study of Globular Clusters Surrounding Bright Elliptical Galaxy VV 191a at $z = 0.0513$.* 2023. Berkheimer, J., **Carleton, T.** et al. arXiv:2310.16923.
- [2] *Magellanic System Stars Identified in the SMACS J0723.3-7327 JWST ERO Images.* 2023. Summers, J., Windhorst, R., Cohen, S., Jansen, R., **Carleton, T.** et al. arXiv:2306.13037.
- [3] *Searching for Intragroup Light in Deep U-band Imaging of the COSMOS Field.* 2023. McCabe, T., Redshaw, C., Otteson, L., Windhorst, R., Jansen, R., Cohen, S., **Carleton, T.**, et al. PASP, 135, 064101.
- [4] *SKYSURF-4: Panchromatic Full Sky Surface Brightness Measurement Methods and Results.* 2022. O'Brien, **Carleton, T.**, et al. AJ, 165, 230.
- [5] *Testing Crowded Object Catalogs in the Hubble eXtreme Deep Field Mosaics to Study Sample Incompleteness from an Extragalactic Background Light Perspective.* 2022. Kramer, **Carleton, T.**, et al. ApJ, 940L, 15.
- [6] *SED Analysis of 47 Spectroscopically Confirmed Galaxies at $z \simeq 6$ to Constrain Possible Relationships between UV Slope, Dust attenuation, and Escape Fraction.* 2020. Jeon, J., Windhorst, R., Cohen, S., Jansen, R., Smith, B., **Carleton, T.** et al. arXiv:2011.05918.

Contributing Author

- [1] *Are JWST/NIRCam color gradients in the lensed $z = 2.3$ dusty star-forming galaxy El Anzuelo due to central dust attenuation or inside-out galaxy growth?*. 2023. Kamieneski, P., Frye, B., Pascale, M., Cohen, S., Windhorst, R., Jansen, R., Yun, M., Cheng, C., Summers, J., **Carleton, T.**, et al. ApJ, 955, 91.
- [2] *Dwarf galaxies show little ISM evolution from $z \sim 1$ to $z \sim 0$: A spectroscopic study of metallicity, star formation, and electron density*. 2023. Pharo, J.; Guo, Y.; Barro Calvo, G., Teppala, T., Bian, F., **Carleton, T.**, et al. arXiv:2310.16651.
- [2] *The Lyman Continuum Escape Fraction of Star-forming Galaxies at $2.4 \lesssim z \lesssim 3.7$ from UVCANDELS*. 2023. Wang, X., et al., arXiv:2308.09064.
- [3] *JWST PEARLS. Prime Extragalactic Areas for Reionization and Lensing Science: Project Overview and First Results*. 2023. Windhorst, R., et al. AJ, 165, 13.
- [4] *The GOGREEN survey: constraining the satellite quenching time-scale in massive clusters at $z > 1$* . 2022. Baxter, T., Cooper, M., Balogh, M., **Carleton, T.**, et al. MNRAS, 515, 5479.
- [5] *Deep Large Binocular Camera r-band Observations of the GOODS-N Field*. 2022. Ashcraft, T., McCabe, T., Redshaw, C., Windhorst, R., Jansen, R., Cohen, S., **Carleton, T.**, et al. PASP 135, 1044.
- [6] *The Dwarf Galaxy Population at $z \sim 0.7$: A Catalog of Emission Lines and Redshifts from Deep Keck Observations*. 2022. Pharo, J., Guo, Y., Calvo, G., **Carleton, T.**, et al. ApJS, 261, 12.
- [7] *SKYSURF: Constraints on Zodiacal Light and Extragalactic Background Light through Panchromatic HST All-Sky Surface-Brightness Measurements: I. Survey Overview and Methods*. 2022. Windhorst. R., **Carleton, T.**, et al. AJ. 164, 141.
- [8] *Seeing-Sorted Large Binocular Camera U-band Imaging of the Extended Groth Strip*. 2022. Redshaw, C., McCabe, T., Otteson, L., Windhorst, R., Jansen, R., Cohen, S., **Carleton, T.**, et al. 2022RNAAS, 6, 63R.
- [9] *Galaxy Science with ORCAS: Faint Star-Forming Clumps to $AB \leq 31$ mag and $r_e \geq 0.01''$* . 2021. Windhorst. R., **Carleton, T.**, et al. arXiv:2106.02664.
- [10] *Implications of Increased Central Mass Surface Densities for the Quenching of Low-mass Galaxies*. 2021. Guo, Y., **Carleton, T.**, et al. ApJ, 914, 7G.
- [11] *Astrophysical Tests of Dark Matter with Maunakea Spectroscopic Explorer*. 2019. Li, T., Kaplinghat, M., Bechtol, K., Bolton, A., Bovy, J., **Carleton, T.**, et al. arXiv:1903.03155.
- [12] *Ground-based near-UV observations of 15 transiting exoplanets: constraints on their atmospheres and no evidence for asymmetrical transits*. 2016. Turner, J., **Carleton, T.**, et al. MNRAS, 459, 789.
- [13] *Near-UV and optical observations of the transiting exoplanet TrES-3b*. 2013. Turner, J., Smart, B., Hardegree-Ullman, K., **Carleton, T.**, et al. MNRAS, 428, 678.

- [14] *Variability of the blazar 4C 38.41 (B3 1633+382) from GHz frequencies to GeV energies.* 2012. Raiteri, C., et al. *A&A*, 545, A48.
- [15] *The Unusual Variable Hot B Subdwarf LS IV-14°116.* 2011. Green, E. M., Guvenen, B., O'Malley, C, O'Connell, C., Baringer, B., Villareal, A. **Carleton, T.**, et al. *ApJ*, 734, 59.
- [16] *C₆₀ in reflection nebulae.* 2010. Sellgren, K., Werner, M., Ingalls, J., Smith, J., **Carleton, T.**, et al. *ApJL*, 722, L54..