

**Name:** Carlos E. Cruz-Arce

**Code:** 693

**Home institution:** SURA

**Name of task:** Theoretical Exoplanet Surface Characterization & Exoplanet Modeling and Analysis Center (EMAC) Science Support Team

**Role in task/What do you do for CRESST:**

My research focuses on characterization of surfaces on Earth-like exoplanets in reflected light. I make models of rocky, atmosphere-rich exoplanets to find an atmospheric parameter space where new generation space telescopes will be able to characterize surfaces. Additionally, I am also a part of the Exoplanet Modeling and Analysis Center's (EMAC) Science support team where I help review new tools/resources added to the site and curate YouTube video tutorials for said tools.



**What is your background:**

I have a B.A. in Astronomy focusing on Physics and Astrophysics from the University of Colorado Boulder (CU). I started exoplanet research as a Center for Astrophysics and Space Astronomy (CASA) intern at CU under Dr. Zachory Berta-Thompson and Dr. Jessica Libby-Roberts working on the LHS 1140 system in 2018. I have been working on theoretical surface characterization with Dr. Avi Mandell and Dr. Geronimo Villanueva at NASA Goddard Space Flight Center since the summer of 2020. As a proud Mexican immigrant my goal is to contribute to humanity in the form of important scientific discoveries and more importantly, to inspire the next generation of scientist and engineers especially those from marginalized communities like my own.

**Favorite part of being a CRESST Scientist:**

The culture! I love being able to come to work to nerd out about the latest astronomical discoveries.

**Highlight of research as a CRESST Scientist:**

I have been fortunate enough to present my research at multiple astronomical conferences, but my biggest highlight has been doing outreach work for aspiring scientist and seeing the hope and ambition the next generation has!

**Selected list of recent publications and presentations:**

**Cruz-Arce, C. E.,** Mandell, A. M., Villanueva, G. L., Liuzzi, G., Smith, A. J. R. W., Moore, M. D., *“Simulating Surface Albedos for Reflection Spectra of Rocky Exoplanets”*

- oral presentation (in prep) at [American Astronomical Society 239<sup>th</sup> Winter Meeting, January 2022](#)
- poster presented at [Chesapeake Bay Area Exoplanet Meeting, May 2021](#)
- poster presented at [SACNAS National Diversity in STEM Digital Conference, October 2021](#)

**Cruz-Arce, C. E.,** Libby-Roberts, J. E., Berta-Thompson, Z. K., Waalkes, W. *“Photometry of the Super-Earths Transiting the Nearby M Dwarf Star LHS 1140”*

- poster presented at [American Astronomical Society 235<sup>th</sup> Winter Meeting, January 2020](#)

Roberts, J. E., **Cruz-Arce, C.E.**, Berta-Thompson, Z “*Achieving Sub-Millimagnitude Precision from the Ground: The Capabilities of ARCTIC and the LHS 1140 System*”

- poster presented at Extreme Solar Systems IV, August 2019

**Cruz-Arce, C. E.**, Mandell, A. M., Villanueva, G. L., Liuzzi, G., Smith, A. J. R. W., Moore, M. D., “*Simulating Surface Albedos for Reflection Spectra of Rocky Exoplanets*” (paper in prep)

Dittmann, J.A., Irwin, J, et. al. (including **Cruz-Arce, C. E.**) “*A Search for Transit Variations and Exomoons around LHS 1140b with Spitzer, TESS*” (Paper in Prep)

#### **Outreach:**

“*NASA Community College Aerospace Scholars (NCAS) subject matter expert (SME) series chats*” – Speaker, NASA Community College Aerospace Scholars, June & November, 2021

“*Chemistry is For You*” – Speaker & Panelist, SySTEMic Flow, 2021

“*How Do We Detect Exoplanets?*” – Speaker, Bell Museum’s Virtual Space Fest, 2021

“*Virtual Connections with Students*” – Speaker, NASA & The U.S. Department of Education, 2020-21 (Bi-weekly)

“*STEM Chat*” – Speaker, BoSTEM / United Way Virtual Opportunities, 2020

#### **Grants Awarded:**

FAMOUS Travel Grant

*American Astronomical Society (2019)*

Grant for Summer Internship in Astrophysics & Astronomical Instrumentation

*INAOE*

**To contact Carlos to learn more about his work or to collaborate, you can reach him at:**

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