Crisel Suarez

Curriculum Vita

criselsuarez@gmail.com

Education

Vanderbilt University, Nashville, TN. Expected Spring 2025
Doctor of Philosophy in Physics

Fisk University, Nashville, TN. December 2019
Master of Arts in Physics

St. Edward's University, Austin, TX May 2017
Bachelor of Science, Mathematics,
Minors: Physics, Global Studies

Research Positions

- **Smithsonian Astrophysical Observatory (SAO) Hinode/X-Ray Telescope Chief Observer**
  Center for Astrophysics | Harvard & Smithsonian September 2021- Present
- **Smithsonian Astrophysical Observatory (SAO) Predoctoral Fellow**
  Center for Astrophysics | Harvard & Smithsonian July 2020- Present
- **Fisk-Vanderbilt Masters to PhD Bridge Research Assistant**
  Fisk University and Vanderbilt University August 2017-Present
- **Fisk-Vanderbilt-Smithsonian Astrophysical Observatory (SAO) Bridge Program Fellow**
  Center for Astrophysics | Harvard & Smithsonian May-August 2018 & May-August 2019
- **St. Edward's University McNair Scholar**
  St. Edward's University November 2015-May 2017
- **Mathematics Research Assistant**
  St. Edward's University August 2015-May 2017
- **Computer Science Research Assistant**
  Texas Tech University June 2016-August 2016
- **Physics Research Assistant**
  St. Edward's University August 2016-Decemeber 2016
- **Computer Science Research Assistant**
  St. Edward's University May 2014-June 2014

Teaching Positions

- **Mathematics Tutor**
  Cambridge Math Circle, Cambridge, MA September 2023- Present
- **Mathematics Tutor**
  Harris Elementary School, Austin, TX March 2022- June 2022
- **Computer Programing Fisk-Vanderbilt Bridge Program Bootcamp Instructor**
  Fisk University/Vanderbilt University, Nashville, TN August 2021
- **Teaching Assistant, Physics Lab I**
  Vanderbilt University, Nashville, TN August 2017-May 2019
- **Mathematics Tutor**
  St. Edward's University, Austin, TX August 2015-May 2017
- **Calculus I Teaching Assistant**
  St. Edward's University, Austin, TX August 2016-December 2016
- **Calculus I Supplemental Instructor**
  St. Edward's University, Austin, TX August 2016-December 2016

Certificates/Training

- **International Coaching Federation (ICF), FUNDinnova** January 2023
  Coaching and Mentoring Certificate
  Mexico City, Mexico
- **Austria Research Promotion Agency (FFG)** July 2022
  Alpbach Summer School Comparative Plasma Physics in the Universe
  Alpbach, Austria
- **European Space Agency (ESA) Academy** November 2022
  Post-Alpbach Summer School Concurrent Engineering
  Libin, Belgium, ESEC-Galaxia
- **Software Carpentry** January 2022
  Certified Instructor
  https://carpentries.org/
- **Vanderbilt University- Center for Teaching and the Graduate School** April 2021
  Certificate in College Teaching
  Nashville, TN
- **University of Texas at Austin** December 2017
  Hands-on Nanotechnologies Certificate
  Austin, TX

Honors/Awards

- **Education and Public Outreach Solar Eclipse Grant**
  American Astronomical Society/Solar Physics Division (AAS/SPD) March 2024
- **Metclaf Student Travel Award**
  American Astronomical Society/Solar Physics Division (AAS/SPD)
  Waves and Instabilities in the Solar Atmosphere (WISA) Workshop June 2023
- **American Geophysical Union Student Travel Award**
  American Geophysical Union Chapman Conference-Advances
  in Understanding Alfvén Waves in the Sun and the Heliosphere May 2023
- **Post-Alpbach Summer School Student Travel Award**
  European Space Agency (ESA) Academy November 2022
- **Alpbach Summer School Student Travel Award**
  Luxembourg National Research Fund (FNR) July 2022
- **SHINE Student Travel Award**
  Solar Heliospheric and INterplanetary Environment (SHINE) Workshop June 2022
- **McMinn Research Award**
  Vanderbilt University Spring 2020
- **St. Edward's University Outstanding Student in Mathematics Leadership**
  St. Edward's University 2016-2017
- **St. Edward's University Honors Scholar**
  St. Edward's University 2013-2017
- **St. Edward's University Dean's Achievement Scholarship**
  St. Edward's University 2013-2017
- **St. Edward's University Dr. M. Jean McKemie Endowed Scholarship**
  St. Edward's University 2013-2017
- **St. Edward's University Outstanding First-Year Mathematics Student**
  St. Edward's University 2013-2014
- **Optimist Club Scholarship**
  Austin TX 2013

Publications

- "Estimations of Elemental Abundances during Solar Flares Observed in Soft X-Rays by the MinXSS-1 CubeSat Mission," **Crisel Suarez**; Christopher S. Moore, The Astrophysical Journal, 2023-11-01, DOI: 10.3847/1538-4357/acf0c2

- "Quasi-periodic pulsations in solar flares: a key diagnostic of energy release on the Sun," Andrew Inglis et al., Vol. 55, Issue 3 (Heliophysics 2024 Decadal Whitepapers), 2023-07-31, DOI: 10.3847/25c2cfeb.55d6b861

- "Zoobot: Adaptable Deep Learning Models for Galaxy Morphology," Mike Walmsley et al., Journal of Open Source Software, 2023-05-08, DOI: 10.21105/joss.05312

- "Probing for Bias: Comparing Populations Using Item Response Curves," Paul Walter; Edward Nuhfer; **Crisel Suarez**, Numeracy, 2021-01, DOI: 10.5038/1936-4660.14.1.1357

- "Simulating Solar Flare Irradiance with Multithreaded Models of Flare Arcades," Jeffrey W. Reep; Harry P. Warren; Christopher S. Moore**; Crisel Suarez**; Laura A. Hayes, The Astrophysical Journal, 2020-05-21, DOI: 10.3847/1538-4357/ab89a0

- "Online SPARC for Drawing and Animation. Online SPARC for Drawing and Animation," Marcopoulos, Elias ; Rayatidamavandi, Maede ; **Suarez, Crisel** ; Zhang, Yuanlin, *Proceedings of the Seventh Symposium on Educational Advances in Artificial Intelligence (EAAI-17)*, NSF CNS1359359, (2017). *https://doi.org/10.1609/aaai.v31i1.10555*

Invited Presentations

- **C. Suarez**, C. Moore, MinXSS Team, "Science Results from the MinXSS CubeSats"
  235th American Astrophysical Society (AAS), Honolulu, HI — January 6, 2020

Students Mentored

- Brendan D'Aquino (Co-mentored w/ Christopher S. Moore)
  Harvard-Smithsonian/Northeastern U Co-Op program) — Fall 2022-Present
- Carleano Libretto (Co-mentored w/ Christopher S. Moore)
  Harvard-Smithsonian Latino Initiative Program — Summer 2020

Outreach and Public Understanding of Science

Harris Elementary School, Austin, TX
Volunteer (Apr. 2-8, 2024)

- Organized bilingual eclipse lesson "The Moon's Shadow for Pre-K to 5th grade
- Support students by building positive and authentic relationships with students
- Assist students to gain better understanding of solar eclipse
- Provide hands-on experiments for kids

Saturday Academy, National Air and Space Museum at Smithsonian Center, Washington DC
Volunteer (Jan. 12, 2019, Sept. 21, 2019)

- Organizing public outreach at the National Air and Space Museum for families.
- Activities are geared to be bilingual for English Language Learning families

Vanderbilt Students Volunteer for Science, Vanderbilt University, Nashville, TN
Volunteer (2017-2019)

- Participate in inquiry-based, hands-on science lessons to middle-school students.
- Help set-up and volunteer at the Nashville Science Center's Robotics Day

St. Edward's University Math Club, St. Edward's University, Austin, TX
President (2017-2016)*, Vice-President* (2016-2015)*, Secretary* (2015-2014)

- Organized social events, Mathematics workshops and outreach events
- Volunteered at local elementary
- Participated in professional mathematics conferences (TUMC, MAA, JMM)

St. Edward's University Computer Science Club, St. Edward's University, Austin, TX
Event Coordinator (2016-2017)

- Organized social events and Computer Science workshops

Posada Esperanza, Austin, TX
Volunteer (2015-2016)

- Tutored and mentor 3 students of low socio-economic background in Mathematics and English

Selected Presentations

- C. Suarez, C.S. Moore, "As Seen from a Small Space Box - Hot, Bright and the Number of Tiny Sun Pieces from Flashes of the Sun," American Geophysical Union, San Francisco, CA, December 12, 2023.

- C. Suarez, C.S. Moore, J.W. Reep, L.A. Hayes, H. Warren, "Multiwavelength Analysis of Quasi-Periodic Pulsations for the July 23, 2016 M7.2 Flare," American Geophysical Union, San Francisco, CA, December 11, 2023.

- C. Suarez, A. Chen, X. Xie, J. Velasquez, C.S. Moore, K.K. Reeves, "Plasma Diagnostics of Solar Flares from the Miniature Xray Solar Spectrometer (MinXSS)-1 CubeSat and the Hinode/X-ray Telescope (XRT)," Hinode 16/IRIS 13, Niigata, Japan, September 25-29, 2023.

- C. Suarez, C.S. Moore, "Quasi-Periodic Pulsation (QPP) in Soft X-ray Emission from the July 23, 2016 M5.0 flare," Waves and Instabilities in the Solar Atmosphere (WISA), Northumbria University, Newcastle Upon Tyne, UK, June 20-23, 2023.

- C. Suarez, C.S. Moore, "Elemental Abundance Analysis of Solar Flares Observed by MinXSS-1 Cubesat," American Geophysical Union Chapman Meeting, Berlin, Germany, May 28 - June 2, 2023.

- *Maraqten, N. and Kutnohorsky, V. and the MVSE Mission Team: MVSE Mission Phase A/0 Study: A Proposal for Understanding the Dynamics of Induced Magnetospheres, EGU General Assembly 2023, Vienna, Austria, 24–28 Apr 2023, EGU23-8206, https://doi.org/10.5194/egusphere-egu23-8206, 2023.

- *Maurer, M., Byrne, L., Falk-Petersen, U., Hamdoun, A., Hénaff, G., Huber, K., Ilas, A., Reisinger, N., Sinjan, J., Suarez, C., Szilágy-Sándor, A., Tarvus, V., Tsindis, M., and Vaganov, M.: CASPER: A Space Mission Concept to Investigate Transient Luminous Events and Terrestrial Gamma Ray Flashes, EGU General Assembly 2023, Vienna, Austria, 24–28 Apr 2023, EGU23-12033, https://doi.org/10.5194/egusphere-egu23-12033, 2023.

- C. Suarez, C. Moore, "Elemental Abundance Deviations for Solar Flares Observed by the MinXSS-1 CubeSat Mission," American Geophysical Union, Chicago, IL, December 13, 2022.

- MVSE Mission Team, Magnetospheric Venus Space Explorers (MVSE), Post-Alpbach Summer School 2022, ESA Academy, Libin, Belgium, ESEC-Galaxia, November 25, 2023

- C. Suarez, C. Moore, “Solar Flare Elemental Abundance Deviations Obtained by the MinXSS-1 CubeSat Mission,” COmmittee on SPAce Research (COSPAR) Scientific Assembly, Athens, Greece, July 22, 2022.

- Byrne, L., Falk-Petersen, U., Hamdoun, A., Hénaff, G., Huber, K., Ilas, A., Maurer, M., Reisinger, N., Sinjan, J., Suarez, C., Szilágy-Sándor, A., Tarvus, V., Tsindis, M., and Vaganov, M.: CASPER: A Space Mission Concept to Investigate Transient Luminous Events and Terrestrial Gamma Ray Flashes, Alpbach, Summer School, July 22, 2022

- C.Suarez, B. Schwab, A. Kumar, MinXSS Team, “MinXSS Tutorial,” Solar Physics High Energy REsearch (SPHERE) Workshop, Virtual, July 13, 2022.

- C. Suarez, C. Moore, MinXSS Team “Solar Flare Elemental Abundance Deviations Obtained by the MinXSS-1 CubeSat Mission,” Solar Physics High Energy REsearch (SPHERE) Workshop, Virtual, July 12, 2022.

- C. Suarez, C. Moore, MinXSS Team “Solar Flare Plasma Transport Inferred from Elemental Abundance Changes using Soft X-ray Spectra,” Solar Heliospheric and INterplanetary Environment (SHINE) Workshop, Honolulu, HI, June 29, 2022.

- *C.Libretto, C.Moore, C. Suarez, “Analysis of the Distribution of flare Loop Emission Using Multiple Channels of SDO/AIA Observations,” Latino Initiative Program Symposium, Smithsonian Astrophysical Observatory (SAO), Cambridge, MA, August 6, 2020.

- *C.Goettlicher, C.Moore, C. Suarez, S. Saar, “Solar Flare Soft X-Ray Time Series Spectrum Reconstruction,” Solar Research Experience for Undergraduates Symposium, Smithsonian Astrophysical Observatory (SAO), Cambridge, MA, August 7, 2019.

* Mentored (*) or Collaborative Projects

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Research Experience

Smithsonian Astrophysical Observatory (SAO), Cambridge, MA
Predoctoral Research Fellow, 07/2020 - Present
Summer Researcher, 05/2018 -08/2018 & 05/2019-08/2019

- Analyze solar flare observations form the Miniature X-ray Solar Spectrometer (MinXSS) CubeSats
- Quantify solar flare variations in elemental abundances and soft X-Ray (SXR) spectra.

Fisk University, Nashville, TN
Research Scientist, 08/2017 -

- Implemented first-principles software (ABINIT) in high performance computing to optimize crystal structure of A_2BX_6 scintillators
- Calculated the Band Structure and Density of States of different Cs_2HfX_6 scintillators

St. Edward's University, Austin, TX
Physics Research Assistant, 09/2016 - 12/2016

- Created software to calculate Item Response Curves of a Science Literacy Exam
- Analyzed how student's answers changed in the Science Literacy Concept Inventory

Mathematics Research Assistant, 08/2015 - 05/2017

- Formed diagrams to analyze winning strategies for TETRIS using the O,S,Z,T-tetromino
- Showed how gap number and cap of different tetrominos are used to find winning TETRIS games
- Examined the gap cap for the S-tetromino

Computer Science Research Assistant, 05/2014 - 08/2014

- Developed software to calculate the expected value and probability of the different properties in Monopoly
- Calculated trade values of all Monopoly properties
- Analyze different Monopoly trading scenarios

Texas Tech University, Lubbock, TX
*Computer Science Research Assistant***,** 06/2016- 08/2016

- Developed innovated software motivated to teach High School students about Answer Set Programming
- Implemented a free online environment to use and preform animations and drawings in Answer Set Programming
- Publish results at *Proceedings of the Seventh Symposium*
- Trained using SPARC and JAVA

Development, and Mentoring Experience

Austin Independent School District, Austin TX
Elementary School Tutor, (03/2023-06/2023)

- Tutor students from 3rd to 5th grade in a positive and enriching environment
- Supporting students by building positive and authentic relationships with students
- Assist students to gain better understanding of concepts taught in the classroom

- Provide feedback and positive reinforcements to motivate students

Vanderbilt University, Nashville, TN
Computer Programming Bootcamp Instructor
- Taught students through collaborative learning and critical thinking
- Developed complementary programming lesson plans to students

Smithsonian Astrophysical Observatory, Cambridge, MA
Hinode/X-ray Telescope, Chief Observer (XRT-CO), 09/2021- Current
- Conducted daily operations, performed data verification
- Planned and coordinated solar observation

Co-Research Mentor, 06/2020-08/2020
- Co-mentored Carleano Libretto in solar physics as part of the Latino Initiative Program
- Provided feedback on research and presentation skills
- Final presentation at SAO: "Analysis of the Distribution of flare Loop Emission Using Multiple Channels of SDO/AIA Observations"

Co-Research Mentor, 06/2019-07/2019
- Co-mentored Carson Goettlicher in solar physics as part of the Solar REU program
- Provided feedback on research and presentation skills
- Final presentation at SAO: "Solar Flare Soft X-Ray Time Series Spectrum Reconstruction"

Mentor, 05/2018 – 08/2018
- Peer-mentor to REU Solar students and Latino Initiative interns

St. Edward's University, Austin, TX
Calculus I Supplemental Instructor, 08/2016 - 12/2016
- Lead students through group discussion and evaluation of higher-level ideas and concepts
- Organized weekly one-hour of collaboration between Calculus I students
- Developed complementary material and study guides for Calculus I students

Calculus I Teaching Assistant, 08/2016 - 12/2016
- Assisted professors during Calculus I lab
- Help students through collaborative learning and critical thinking

Mathematics Tutor, 08/2015 - 05/2017
- Walk-in tutoring to students in basic math courses, up to and including Calculus II
- Help students through collaborative learning and critical thinking

Research Assistant, 05/2014 - 07/2014
- Developed Python software to calculate the expected value and probability of the different properties in Monopoly

Outreach and Public Understanding of Science

Saturday Academy, National Air and Space Museum at Smithsonian Center, Washington DC
Volunteer (Jan. 12, 2019, Sept. 21, 2019)
- Organizing public outreach at the National Air and Space Museum for families.
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Event Coordinator (2016-2017)

- Organized social events and Computer Science workshops

Posada Esperanza, Austin, TX
Volunteer (2015-2016)

- Tutored and mentor 3 students of low socio-economic background in Mathematics and English

Skills

Fluent in Spanish
Proficient in Java, Python, IDL and ABINIT

Professional Memberships/Affiliations

Vanderbilt's Students Volunteer for Science (VSVS) (2017-Present), American Physics Society (APS), *Member* (2017-Present), Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS), *Member* (2017-Present), St. Edward's University Math Club, *President* (2016-2017), *Vice-President* (2015-2016), *Secretary* (2014-2015), *Member* (2013-2014) St. Edward's University Computer Science Club, *Event Coordinator* (2016-2017), *Member* (2015-2016).
St. Edward's University Model United Nations, *Coordinator* (2014-2015).
Leadershape "Inspire Change," St. Edward's University, 2014.

Research Projects

- Magnetospheric Venus Space Explorers, MVSE Team, Post Alpbach Summer School 2022.
- The CASPER mission Chasing ghosts in the atmosphere Summer School Alpbach, 2022
- C. Suarez, J. Callahan, "Tiling with TETRIS."
- C. Suarez, P.J. Walter, "Modeling the Flow of Refugees in the Middle East and Europe."
- C. Suarez, P.J. Walter, G. Morris, E.B. Nuhfer, "Item Response Curves for the Science Literacy Concept Inventory."
- C.Suarez, M.U. Kart, "North Carolina and Pennsylvania for Boardwalk? Trade Values for Monopoly Real Estate."
- Marcopoulos, Elias & Rayatidamavandi, Maede & **Suarez, Crisel** & Zhang, Yuanlin, "Online SPARC for Drawing and Animation. Online SPARC for Drawing and Animation," *Proceedings of the Seventh Symposium on Educational Advances in Artificial Intelligence (EAAI-17).*
- C. Suarez, Mycobacterium Phage Liberty, *Actinobacteriophage Database* http://phagesdb.org/phages/Liberty/.
- GenBank Submission, LadyBird, 9.23.2015, Callejon, A.C., Douglas, D., Fox, D.J., Harper, M., Hyde, N.V., Lerma, J.F., Parsons, S.C., **Suarez, C.**, Walsh, M.A., Kart, M., Hauser, C.R., Hughes, L.E., Bradley, K.W., Asai, D.J., Bowman, C.A., Russell, D.A., Pope, W.H., Jacobs-Sera, D., Hendrix, R.W. and Hatfull, G.F., *Mycobacterium phage LadyBird*, complete genome. GenBank Accession Number KT588442.

Selected Presentations

- C. Suarez, C.S. Moore, "As Seen from a Small Space Box - Hot, Bright and the Number of Tiny Sun Pieces from Flashes of the Sun," American Geophysical Union, San Francisco, CA, December 12, 2023.

- C. Suarez, C.S. Moore, J.W. Reep, L.A. Hayes, H. Warren, "Multiwavelength Analysis of Quasi-Periodic Pulsations for the July 23, 2016 M7.2 Flare," American Geophysical Union, San Francisco, CA, December 11, 2023.

- C. Suarez, A. Chen, X. Xie, J. Velasquez, C.S. Moore, K.K. Reeves, "Plasma Diagnostics of Solar Flares from the Miniature Xray Solar Spectrometer (MinXSS)-1 CubeSat and the Hinode/X-ray Telescope (XRT)," Hinode 16/IRIS 13, Niigata, Japan, Spetember 25-29, 2023.

- C. Suarez, C.S. Moore, "Quasi-Periodic Pulsation (QPP) in Soft X-ray Emission from the July 23, 2016 M5.0 flare," Waves and Instabilities in the Solar Atmosphere (WISA), Northumbria University, Newcastle Upon Tyne, UK, June 20-23, 2023.

- C. Suarez, C.S. Moore, "Elemental Abundance Analysis of Solar Flares Observed by MinXSS-1 Cubesat," American Geophysical Union Chapman Meeting, Berlin, Germany, May 28 - June 2, 2023.

- *Maraqten, N. and Kutnohorsky, V. and the MVSE Mission Team: MVSE Mission Phase A/0 Study: A Proposal for Understanding the Dynamics of Induced Magnetospheres, EGU General Assembly 2023, Vienna, Austria, 24–28 Apr 2023, EGU23-8206, https://doi.org/10.5194/egusphere-egu23-8206, 2023.

- *Maurer, M., Byrne, L., Falk-Petersen, U., Hamdoun, A., Hénaff, G., Huber, K., Ilas, A., Reisinger, N., Sinjan, J., Suarez, C., Szilágy-Sándor, A., Tarvus, V., Tsindis, M., and Vaganov, M.: CASPER: A Space Mission Concept to Investigate Transient Luminous Events and Terrestrial Gamma Ray Flashes, EGU General Assembly 2023, Vienna, Austria, 24–28 Apr 2023, EGU23-12033, https://doi.org/10.5194/egusphere-egu23-12033, 2023.

- C. Suarez, C. Moore, "Elemental Abundance Deviations for Solar Flares Observed by the MinXSS-1 CubeSat Mission," American Geophysical Union, Chicago, IL, December 13, 2022.

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- Byrne, L., Falk-Petersen, U., Hamdoun, A., Hénaff, G., Huber, K., Ilas, A., Maurer, M., Reisinger, N., Sinjan, J., Suarez, C., Szilágy-Sándor, A., Tarvus, V., Tsindis, M., and Vaganov, M.: CASPER: A Space Mission Concept to Investigate Transient Luminous Events and Terrestrial Gamma Ray Flashes, Alpbach, Summer School, July 22, 2022

- C.Suarez, B. Schwab, A. Kumar, MinXSS Team, "MinXSS Tutorial," Solar Physics High Energy REsearch (SPHERE) Workshop, Virtual, July 13, 2022.

- C. Suarez, C. Moore, MinXSS Team "Solar Flare Elemental Abundance Deviations Obtained by the MinXSS-1 CubeSat Mission," Solar Physics High Energy REsearch (SPHERE) Workshop, Virtual, July 12, 2022.

- C. Suarez, C. Moore, MinXSS Team "Solar Flare Plasma Transport Inferred from Elemental Abundance Changes using Soft X-ray Spectra," Solar Heliospheric and INterplanetary Environment (SHINE) Workshop, Honolulu, HI, June 29, 2022.

- *C.Libretto, C.Moore, C. Suarez, “Analysis of the Distribution of flare Loop Emission Using Multiple Channels of SDO/AIA Observations,” Latino Initiative Program Symposium, Smithsonian Astrophysical Observatory (SAO), Cambridge, MA, August 6, 2020.

- *C.Goettlicher, C.Moore, C. Suarez, S. Saar, “Solar Flare Soft X-Ray Time Series Spectrum Reconstruction,” Solar Research Experience for Undergraduates Symposium, Smithsonian Astrophysical Observatory (SAO), Cambridge, MA, August 7, 2019.

* Mentored (*) or Collaborative Projects

- **AstroHack Week** October 2022
  Heidelberg, Germany