RICCO CABRAL VENTEREA

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EDUCATION

BA Cornell University — Aug 2020 – Present
Astronomy with Astrophysics Concentration
Minor in Physics

RESEARCH EXPERIENCE

Cornell Center for Astrophysics and Planetary Science, Ithaca, NY Jan 2024 – Present
Student Research Assistant III, Professor Nicholas Battaglia

- Calculating spectral indices of select asteroids.

University of Minnesota, Twin Cities, Minneapolis, MN — Jun 2023 – Present
Research Assistant, William Benoit, Professor Michael Coughlin

- Current work in implementing machine learning algorithms to clean and analyze gravitational wave strain data collected from the Laser Interferometer Gravitational-Wave Observatory Livingston and Hanford sites.
- Generating constant-Q transforms for high signal-to-noise gravitational wave event simulations.
- Developed a user-interface to create distributions of black hole parameter simulations.

Nexus Scholars Program, Cornell University, Ithaca, NY — May 2022 – Jul 2022
Research Assistant, Professor Nicholas Battaglia

- Continued full-time research in measuring thermal emission of objects in the asteroid belt. Detected large asteroids with a high degree of confidence and generated light curves. Presented results at a symposium.

Cornell University, Ithaca, NY — Sep 2021 – Present
Research Assistant, Professor Nicholas Battaglia, Dr. John Orlowski-Scherer

- Built API asteroid thermal flux emission database using Amazon AWS.
- Determined flux measurements from thermal emission data of objects in the asteroid belt. Data collected by the Atacama Cosmology Telescope.

National Aeronautics and Space Administration — May 2021 – Aug 2021
Lucy Student Pipeline Accelerator and Competency Enabler
Mission Concept Academy
Astrophysicist

- Submitted a Preliminary Design Review on a science reconnaissance mission for water ice mapping in the lunar South Polar Region.

Summer Student Theoretical Physics Research Session, Brown University, Providence, RI
Jun 2021
Student Researcher, Professors Jim Gates, Kory Stiffler, Konstantinos Koutrolikos

- Learned topics in supersymmetry with a mathematical emphasis.
- Covered areas in group theory, Lie algebra, differential geometry, tensor algebra, Lagrangian dynamics, Clifford algebra, gauge theory, and supersymmetry algebra.
- Gained experience in LaTeX.

National Aeronautics and Space Administration Jan 2021 – Apr 2021
Lucy Student Pipeline Accelerator and Competency Enabler
Proposal Writing and Evaluation Experience Academy
Technical Team Member

- Submitted a research proposal on human health and performance in low-earth orbit.

Irondale High School Sep 2019 – Dec 2019
Student Researcher, Shane Wood

- Studied the effect of zenith angle on cosmic ray muon flux using the QuarkNet Cosmic Ray Muon Detector. Data collected at Irondale High School.
- Proposed and conducted an experiment in cosmic ray muons.

PUBLICATIONS

Journal Papers in Press

Orlowski-Scherer J, **Venterea R**, Battaglia N, Naess S, Bhandarkar T, Biermann E, et al. The Atacama Cosmology Telescope: Millimeter Observations of a Population of Asteroids or: ACTeroids. ApJ [Internet]. 2023 Jun 9;1–15. Available from: https://arxiv.org/pdf/2306.05468.pdf

Journal Publications

Venterea R, Orlowski-Scherer J, Næss S, Battaglia N. Sub-Millimeter Observations of Asteroids Using the Atacama Cosmology Telescope. American Astronomical Society Meeting Abstracts [Internet]. 2023 Jan 9;55(2):104.12. Available from: https://ui.adsabs.harvard.edu/abs/2023AAS...24110412V/abstract

Venterea R, Ekka U. An Introduction to Quantum Computing. JURP. 2022 Sep 13;31(1):11–3.

Journal Papers in Review

Venterea R, Ekka U. An Analysis of Muon Flux from Angle Variation of the QuarkNet Cosmic Ray Detector. TPT [Internet]. 2023 Oct 29;1–7. Available from: https://arxiv.org/abs/2306.13689

Journal Papers in Preparation

Venterea RC, Orlowski-Scherer J, Battaglia N, Naess S. The Atacama Cosmology Telescope: Deployment of the ACTeroids API. ApJS. 2024

Marx E, Benoit W, Gunny A, Omer R, Chatterjee D, **Venterea RC**, et al. A Machine-learning Pipeline for Real-time Detection of Gravitational Waves from Compact Binary Coalescences. Nat. Astro. 2024

Software

Venterea RC, Orlowski-Scherer J. A databaSe for millimeTeR ObservatioNs of Asteroids Using acT (ASTRONAUT). Cornell University; 2023. Available from: https://github.com/ricco-hub/API

Reports

Doku F, Ekka U, **Venterea R**. Executive Summary for the Spread of Misinformation and Levels of Censorship [Internet]. 2021 Nov p. 2. Available from: https://drive.google.com/file/d/1jiA36YSakDbzrzt4oefmR-C9DqojDQD8/view?usp=sharing

Muralidhar A, Medvec M, Fujishima B, **Venterea R**, Yilmaz S, McNulty C, et al. Preliminary Design Review - Ad Lunam Hopper [Internet]. National Aeronautics and Space Administration Lucy Student Pipeline Accelerator and Competency Enabler Mission Concept Academy; 2021 Jul p. 1–100. Available from: https://www.scribd.com/document/517622287/Preliminary-Design-Review-Ad-Lunam-Hopper

Mota A, Sin J, Garcia S, **Venterea R**, Kirby M, Perkins R, et al. Astronaut-Friendly 3 in 1 Edible Cutlery to Promote Bone Health. National Aeronautics and Space Administration Lucy Student Pipeline Accelerator and Competency Enabler Proposal Writing and Evaluation Experience Academy; 2021 Mar p. 1–16.

Magazine Articles in Review

Venterea R. The Importance of Astrosociology. Astrosociological Insights. 2021 May 28;1–4.

Manuscripts

He Y, **Venterea R**, Wu X. Food Distribution by Mobile Food Pantries: A Design for Optimized Schedule [Internet]. 2020. Available from: https://drive.google.com/file/d/1OkREIAAiRMBfwcJdWmZVU805NySEyl5o/view?usp=sharing

PRESENTATIONS AND INVITED LECTURES

Presentations

Marx E, Benoit W, Gunny A, Omer R, Chatterjee D, **Venterea R**, et al. An end to end search over O3 with aframe, a machine learning detection pipeline. APS April Meeting 2024; 2024 Apr 3; Sacramento, CA.

Venterea R. Millimeter Observations of Asteroids Using the Atacama Cosmology Telescope. Poster presented at: Undergraduate Research Poster Forum; 2023 May 11; Cornell University.

Venterea R. Millimeter Observations of Asteroids Using the Atacama Cosmology Telescope. Poster presented at: Cornell Undergraduate Research Board Spring Symposium; 2023 May 6; Cornell University.

Venterea R. Observations of Asteroids with ACT. Presentation presented at: 2nd Annual Undergraduate Astronomy Research Seminar; 2023 Apr 2; University of Rochester.

Venterea R. Asteroids and ACT. Presentation presented at: Atacama Cosmology Telescope Collaboration Meeting; 2022 Oct 21; Princeton University.

Venterea R. Looking at Asteroids. Presentation presented at: Nexus Scholars Program Capstone Presentations; 2022 Jul 20; Cornell University.

Venterea R. Curvature. Presentation presented at: DRP Talks; 2021 Dec 9; Cornell University.

Doku F, Ekka U, **Venterea R**. Problem C: Submitted a Tweet, Now What? [Internet]. Presentation presented at: SIMIODE Challenge Using Differential Equations Modeling; 2021 Nov 14; SIMIODE Challenge Using Differential Equations Modeling. Available from: https://youtu.be/F6pHgqJD1BE

Venterea R. A Brief Introduction to Quantum Field Theory [Internet]. Presentation presented at: DRP Talks; 2021 Sep 4; Cornell University. Available from: https://drive.google.com/file/d/19ZnRmkNBxiUj8w3v6H3jeNep1m6fPhOb/view?usp=sharing

Muralidhar A, Medvec M, Fujishima B, **Venterea R**, Yilmaz S, McNulty C, et al. Team 21 - Ad Lunam [Internet]. Presentation presented at: MCA PDR Presentation - Team 21; 2021 Aug 11; National Aeronautics and Space Administration Lucy Student Pipeline Accelerator and Competency Enabler Mission Concept Academy. Available from: https://docs.google.com/presentation/d/1sK8lIdFMOhZ9qCety8NkTf3ngUy7hzCtWlXiS4fFxEo/edit?usp=sharing

Doku F, Ekka U, **Venterea R**. Using Quantum Computing to Classify Solar Flares [Internet]. Presentation presented at HackUTD: The VII Seas; 2021 Feb 21; HackUTD: The VII Seas. Available from: https://docs.google.com/presentation/d/1PnCm0e_uoDUOm1Lxms2kNnpInC2QM66R33j9vFB1k4w/edit?usp=sharing

HONORS AND AWARDS

Fulbright U.S. Student Program Semi-Finalist	2024
Wells Fargo Foundation HSF Scholarship	2023
Discover Scholar at the University of Chicago	2023
Grainger Engineering MERGE Scholar	2023
ASPIRE Illinois Scholar at the University of Illinois Urbana-Champaign	2023
Dean's List of the College of Arts and Sciences for Excellence in Scholarship	2023
Hispanic Scholarship Fund Scholar	2023 – 2024
Summer Experience Grant	2023
Hispanic Scholarship Fund Finalist	2023 – 2024
Undergraduate Research Fund	2023
Einhorn Discovery Grant	2023
FOCUS Scholar at the Georgia Institute of Technology	2023
Alpha Phi Alpha Fraternity Memorial Scholarship	2022 – 2023
Society of Hispanic Professional Engineers Undergraduate Scholarship	2022 – 2023
Hispanic Scholarship Fund Scholar	2022 – 2023

Hispanic Scholarship Fund Finalist 2022 – 2023

Inaugural Session of the Nexus Summer Scholars Program 2022

Alpha Phi Alpha Fraternity Memorial Scholarship 2021 – 2022

Meritorious Award for Differential Equations Modeling SIMIODE Challenge 2021

D. E. Shaw Latitude Fellowship 2021

Alpha Phi Alpha Fraternity Memorial Scholarship 2020 – 2021

National Name Exchange 2021

Dean's List of the College of Arts and Sciences for Excellence in Scholarship 2021

Hispanic Scholarship Fund Scholar 2020 – 2021

COMMUNITY SERVICE

National Institute of Development Advancement Certified Chapter Leader Program
Facilitator, July 2023

National Academic Quiz Tournaments 2023 High School National Championship Tournament
Full-time scorekeeper, May 2023

Nexus Scholars Program Information Session 2023
Student panelist, October 2022

Zooniverse
Citizen scientist, 2022 – Present

PROFESSIONAL TRAINING

Coursework
Compute Ontario Advanced Research Computing Training, June 2022
Using JupyterLab

Coursework
Compute Ontario Advanced Research Computing Training, June 2022
Introduction to Python

Cornell University, Ithaca, New York, May 2022 – July 2022
Attended weekly meetings in professional development that emphasized career goals and improving communication and research skills

Coursework
SciNet High Performance Computing Consortium, January 2022
Databases in Scientific Computing

Coursework
SciNet High Performance Computing Consortium, January 2022
Introduction to GPU Programming

Coursework
SciNet High Performance Computing Consortium, December 2021
Intro to SciNet, Niagara, and Mist

Coursework
SciNet High Performance Computing Consortium, November 2021
Intro to the Linux Shell

PROFESSIONAL AFFILIATIONS

American Astronomical Society, 2021 – Present

American Physical Society, 2021 – Present

Association of Latino Professionals For America, 2021 – Present

National Society of Hispanic Physicists, 2021 – Present

Sigma Xi, 2022 – Present

Society for the Advancement of Chicanos and Native Americans in Science, 2023 – Present

Society of Hispanic Professional Engineers, 2021 – Present

Society of Physics Students, 2021 – Present

Union of Concerned Scientists, 2023 – Present

COMPUTER SKILLS

Programming: Python, MATLAB, R, Java, LaTeX, Unix shell

Applications: GitHub, Jupyter Notebook, JupyterLab, ArcGIS, Visual Studio Code, Google Docs Editors, Microsoft Office, MobaXterm, SigmaPlot, Zotero, Amazon AWS

EXTRACURRICULARS

Future GRADS MentorSHPE, 2023 – Present

Mentoring program for prospective graduate students from underrepresented backgrounds emphasizing networking and writing graduate application essays. Hosted by the Society of Hispanic Professional Engineers.

SIMIODE Challenge Using Differential Equations Modeling VI, 2021

Modeled the spread and censorship of misinformation on social media platforms via differential equations with an epidemiological approach. Presentation won Meritorious Award.

Directed Reading Program, 2021

Learned topics in quantum field theory. Learned topics in differential geometry. Presented on both subject areas.

HackUTD: The VII Seas, 2021

Collaborated in a team of three to implement a quantum computer algorithm to classify solar flare data. Successfully implemented with an accuracy of 98% 24 hours in advance.

Cornell Society of Physics Students, 2020 – Present

Cornell Math Club, 2020 – 2021

Cornell Astronomical Society, 2020 – Present

Cornell Chess Club, 2020 – Present

Competed in the 2023 United States Amateur East Championship.

Cornell Mathematical Contest in Modeling, 2020

Helped develop an algorithm to optimize scheduling for the Food Bank of the Southern Tier.

Cornell Undergraduate Research Board, 2020

Mentoring program for undergraduate students planning research careers emphasizing professional development, presenting research, and interacting with professors.

LANGUAGES

English: Native Language

Italian: Intermediate in Listening, Speaking, Reading, and Writing

HOBBIES

Stargazing, playing classical music, reading science fiction and classical literature, fishing for small mouth bass