

MARIA VINCENT

Graduate Student
Institute for Astronomy

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EDUCATION

University of Hawai'i, Manoa

Ph.D Astronomy, Institute for Astronomy

Anticipated: 2026

M.S. Astronomy, Institute for Astronomy

2023

University of California, Los Angeles

2020

B.S. Geophysics, B.S. Astrophysics

GPA: 3.91/4.00

Magna cum Laude

Highest Departmental Honors for both majors

DOCTORAL THESIS (In Progress)

Developments in Direct Imaging: Implementing Deformable Mirror Upgrade and Characterizing Protoplanetary Disks

- Testing and characterizing a high order deformable mirror as a part of WM Keck Observatory's High Order Advanced Keck AO upgrade. This upgrade will expand exoplanet detectability and protoplanet imaging.
- NIR survey of infrared bright protoplanetary disks (~ 10 – 13 mag targets) using Subaru/SCEXAO, that will constrain 3D disk structure (complementing ALMA data), grain based morphology, and planet signatures.

RESEARCH EXPERIENCE

Graduate Research Assistant

Institute for Astronomy

Jan 2022- Present

UH Manoa

Year 1 Project: High Contrast, Multi-Wavelength Imaging of a Debris Disk

Year 2 Project: Focal Plane Speckle Suppression at Keck

Visiting Student

Adaptive Optics Development

May 2024- Present

WM Keck Observatory

Project: High Order Keck Adaptive Optics Upgrade (part of Doctoral Thesis)

Undergraduate Researcher

Earth, Planetary & Space Sciences

April 2018- December 2020

Physics & Astronomy, UCLA

Jan - Dec '20: Investigation of Coma Morphology in Long & Short Period Comets; Unusual Activity of a Distant Long Period Comet (Undergraduate Honors Theses)

Jan - Dec '19: CCD Image Reduction and Comet Photometry

Apr - Sep '18: X-Ray Mapping of Carbonaceous Chondrites

Undergraduate Research Fellow

Dept. Geological, and Planetary Sciences

June 2019- August 2019

California Institute of Technology

Project: Formation of Snow on Planets as a Consequence of Gravity

Visiting Student Researcher

Physical Research Laboratory

January 2018-March 2018

Ahmedabad, India

Project: "Relevance of Argon, Krypton, Xenon in meteorites" conducted at national research facility under the Department of Space, Government of India.

Undergraduate Research Assistant

Dept. Earth Planetary and Space Sciences

August 2017-October 2017

UCLA

Prepared, imaged and mapped various meteorite samples, for meteorite analyses at the UCLA Secondary Ion Mass Spectrometry Lab.

TEACHING EXPERIENCE

Teaching Assistant, Physics & Astronomy, UH Manoa, Course: Survey of Astronomy (Fall '21 and Spring '22)– introduction to the astronomical universe: sky and celestial objects, planetary motion, galaxies, cosmology and the universe.

Code/Astro (Jun '24): Astronomy software development workshop where I taught sessions on Python libraries and advised student on developing open-source packages

Intro2Astro (Jun-Aug '22-'25): An introductory online course to teach aspiring astronomers, especially undergraduate students, the basics and rudimentary skills for research and get started on a career in this field.

OBSERVING TIME

PI, Subaru SCEExAO (S25B-UH011-A): Exploring extincted disks in Orion & Taurus
PI, Subaru SCEExAO (S25A-UH005-A), (S24A-UH007-A): Ophiuchus Disk Survey
PI, Subaru IRCS (S24B-UH013-A): Further Exploration of Dracula's Chivito
PI, Subaru SCEExAO (S23A-UH002-S): High Contrast, Multi-Wavelength Imaging of Circumstellar Disks
Co-I, Subaru SCEExAO (S23B-UH034-B, S23A-UH015-B2, S22B-UH027-B, S22A-UH029-A): High Contrast Spectropolarimetric Imaging of Protoplanetary Disks

TECHNICAL SKILLS

Programming & Computing: Nearly 10 years in Python (scientific data analysis, modular software architecture, contributions to data-reduction/analysis pipelines, and PyQt5 GUIs); 2+ years in MATLAB. Emphasis on testing, documentation, and version control (Git/GitHub).
Instrumentation & Hardware: Deformable mirrors (ALPAO DM3k), C-RED One, OCAM2K. Experience designing test plans and building lab workflows to test/characterize AO hardware on a bench; writing control and analysis code that interfaces with vendor-provided software development kits; real-time data capture, calibration, and performance verification.
Software & Scholarly Tools: Astronomical tools and databases including SAOImage DS9, NASA ADS, and SIMBAD; domain libraries such as Astropy where appropriate. \LaTeX for technical writing. Comfortable across Linux, macOS, and Windows environments.

GRANTS AND AWARDS

Exoplanet Explorers, NASA Exoplanet Exploration Program *2024*
Graduate Student Organisation Travel Grant, University of Hawai'i (*2023*)
International Travel Grant, American Astronomical Society (*2022*)
Handin Award for Academic Excellence, Department of Earth, Planetary and Space Sciences (EPSS), UCLA (*2020*)
Fall Meeting Student Travel Grant, American Geophysical Union (*2019*)
Summer Research Fellowship, California Institute of Technology (*2019*)
Vice-Provost Prize for Best Research Article in Physical Sciences, UCLA Undergraduate Science Journal (*2019*)
Vice-Provost Recognition for Undergraduate Research, UCLA Undergraduate Research Poster Day (*2018, 2019*)
Straus Family Award for Undergraduate Research, EPSS, UCLA (*2019*)
Donald Carlisle Undergraduate Research Endowment Fund, UCLA (*2018*)
Dean's Honors List, UCLA (*Fall 2016- Spring 2020*)
SEG Foundation Annual Scholarships, Society of Exploration Geophysicists (SEG) (*2016-2020*)

PUBLICATIONS

Vincent, M., et al. Subaru/IRCS view of "Dracula's Chivito": Infrared Imaging of the Protoplanetary Disk Around IRAS 23077+6707, (*in prep*)
Vincent, M. et al. High Order Keck Adaptive Optics: First results from lab integration and testing of the High Order Deformable Mirror, AO4ELT8, 2025 (*in prep*)
Williams, J.W., et al. (incl. **Vincent, M.**) Radiative Transfer Modeling of a Shadowed Protoplanetary Disk assisted by a Neural Network, ApJ, 2025 (*accepted*)
Lucas, M., et al. (incl. **Vincent, M.**) Dynamical Analysis of the HD 169142 Planet-Forming Disk: Twelve Years of High-Contrast Polarimetry, AJ, 2025 (*accepted*)
Lozi, J., et al. (incl. **Vincent, M.**) AO3k at Subaru: First on-sky results of the facility extreme-AO, SPIE, 2024.
Vincent, M., et al. SCEExAO/CHARIS Multi-Wavelength, High-Contrast Imaging of the BD+45°598 Debris Disk, AJ, Vol 168, No 1, 2024.
Guthery, C.E., et al. (incl. **Vincent, M.**) From Demonstration to Operation: High Contrast Imaging Tools at Keck Observatory, AO4ELT7, 2023.
Margot, J.L., et al. (incl. **Vincent, M.**) A Search for Technosignatures Around 11,680 Stars with the Green Bank Telescope at 1.15-1.73 GHz, AJ, Vol 166, No. 5, 2023.
Chen, M., et al. (incl. **Vincent, M.**) Post-processing CHARIS integral field spectrograph data with PYKLIP, RAS Techniques and Instruments, Vol 2, No 1, 2023.
Vincent, M., McCain, K., and McKeegan, K., X-Ray Mapping of Carbonaceous Chondrites: A Hunt for Carbonate Minerals, UCLA Undergraduate Science Journal, 2019.

FIRST AUTHORED PRESENTA- TIONS

Exo-ELT, 2025 (Upcoming, Contributed Talk). Subaru/IRCS view of “Dracula’s Chivito”: Infrared Imaging of the Protoplanetary Disk Around IRAS 23077+6707
AO4ELT8, 2025 (Upcoming, Contributed Talk). High Order Keck Adaptive Optics: First results from lab integration and testing of the High Order Deformable Mirror
NASA Exoplanet Explorers Science Talk, 2024. Entering a new Era of Adaptive Optics with more powerful Deformable Mirrors
Sagan Summer Workshop, Caltech, 2024 (Poster). Entering a new Era of Adaptive Optics with more powerful Deformable Mirrors
Protostars and Planets 7, Kyoto, 2023 (Poster). SCExAO/ CHARIS High Contrast, Mutli-Wavelength Imaging of the BD+45°598 Debris Disk.
AAS Division of Planetary Sciences Meeting, 2020 (Virtual Poster). The Investigation of Coma Morphology of Long and Short Period Comets.
Undergraduate Research Symposium, UCLA, 2020 (Talk). The Unusual Activity of a Distant Long Period Comet.
American Geophysical Union Fall Meeting, 2019 (Poster). Condensation and Formation of Ice on Planets as a Consequence of Gravity
Southern California Undergraduate Research Conference, 2018 (Poster). X-Ray Mapping of Carbonaceous Chondrites: A Hunt for Carbonate Minerals
LA Basin Student Research Symposium, 2018 (Talk). Survey of noble gases in Martian Meteorites

PROFESSIONAL DEVELOPMENT WORKSHOPS

AO Summer School (*Aug '23*): Astronomical instrumentation summer school to learn and gain experience on adaptive optics and its applications in astronomy and vision science.
AstroTech Summer School (*Aug '22, Jul '23*): Astronomical instrumentation summer school to learn and gain hands-on experience designing, building, and testing an optical instrument and building ethical teamwork skills.
Code/Astro (*Jun '22*): A week-long astronomy software development workshop to learn and develop fundamental software engineering skills and best practices for building sustainable open-source packages for astronomy applications.

MENTORSHIP AND GUIDANCE (*invited, ★talks)

Letters to Pre-Scientist (2025): A pen-pal program that pairs middle/high-school students with STEM professionals for yearlong letter exchanges to introduce students to STEM careers and give them guidance on pursuing scientific work and research.
Career Opportunities, Development and Enrichment, IHS, Dubai★★ (*Jan '23*): Talk and interactive session with middle and high school students at my alma mater on experiences in high school and beyond, and my career trajectory.
Career Talk, Dubai British School★★ (*Jan '23*): Guidance talk on academic path to becoming an astronomer, and what to expect in the job.
Mentor, Maunakea Scholars Program (*Oct '22 - '24*): Mentoring high school students on capstone projects, as well as on writing observing proposals.
Panelist, “Applying to Graduate School”, UH Manoa (*Nov '22*): Panel discussion for undergrads in Physics & Astronomy about grad school application process.
Panelist, “Undergraduate Research Experience”, UCLA* (*Nov '19*): Panel on undergrad research experience for underclassmen seeking research positions.

OUTREACH (*invited, ★talks)

Event Supervisor, Hawaii State Science Olympiad (*2022-'25*): Categories: Solar System (Middle School) and Astronomy (High School)
Judge- Hawaii State Science & Engineering Fair (*Mar '22, Apr '23, Apr '24*), Theoretical Sciences Junior Division
Journey through the Universe★ (*Mar '23, Feb '24 & '25*): Classroom talks geared towards promoting science education at Hawai'i Island school districts.
Guest Speaker, Exploring Life on other bodies, Dubai British School★★: Classroom talk for Year 8 to support STEM project to design a Mars Rover to assess habitability conditions on Mars.
Volunteer- Hawaii Astronomy Events with IfA (*Nov '21 - Present*): Astronomy events like IfA Open House, Astro Day (Hilo and Kona), Girls Scouts STEM Fest, and other public events in Honolulu (Ohana Stargazing, Hawaii Geek Meet, Makahiki Fair, Bishop Museum Night, Manoa Open House).

Skype-a-Scientist★ (*Sep '21 - Present*): Invited talks for classrooms in schools around the world (US, Europe, and Asia) virtually and in-person, as a part of a global program to connect various groups of the public to scientists.

Docent- UCLA Meteorite Gallery (*Jun '18 - Feb '20*) Guiding visitors across the gallery and talks for school students.

Volunteer- International Observe the Moon Night (*Oct '19*) Annual worldwide celebration of lunar science and exploration, where we engage the public in telescope observations and lectures on the moon and lunar exploration.

Volunteer- National Science Day Exhibition (*Feb '18*) at Physical Research Laboratory, India as a part of the nationwide celebration of science

Volunteer- Explore Your Universe(*Nov '16-'21*): An annual science outreach day held in UCLA with demos, and talks in many subfields.

Volunteer and Member- Dubai Astronomy Group (*2016*): a non-profit organization that promotes and encourages the study of Astronomy in the region.

COMMITTEES & PANELS (*invited)

Executive Secretary, Proposal Review Panel, NASA Science Mission Directorate (2025)
Grad Rep, Graduate Research Oversight Group, Institute for Astronomy, UH Manoa (*Sep '24- June '25*)

Grad Rep, Colloquium Committee, Institute for Astronomy, UH Manoa (*Sep '23- May '24*)

Undergraduate-Graduate Relations Working Group*, UH Manoa (*Mar '23- May '23*)

Faculty Mentor Program Working Group, Institute for Astronomy, UH Manoa (*Sep '22- Feb '23*)

REFERENCES

Michael Bottom
Assistant Astronomer, Institute for Astronomy

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University of Hawai'i

Jonathan Williams
Astronomer, Institute for Astronomy

jw@hawaii.edu
University of Hawai'i