Marielle R Eduardo

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Education

University of Victoria *Victoria, Canada*

PhD Candidate in Astrophysics *Sept 2022 - Present*

Thesis Title: Exploring the Trans-Neptunian Space with JWST

Supervisor* and Committee members: Dr. Wesley Fraser*, Dr. Ruobing Dong, Dr. JJ Kavelaars, Dr. Maria Womack

National Central University *Taoyuan, Taiwan*

Master of Science in Astronomy *Feb 2019 - Jan 2021*

Thesis Title: Hunting Trans-Neptunian Objects with the Hyper Suprime – Cam Subaru Strategic Program (HSC-SSP) Deep and UltraDeep Layers

Supervisor* and Committee members: Prof. Wen-Ping Chen*, Dr. Shiang-Yu Wang*, Dr. Wing-Huen Ip

University of the Philippines *Baguio, Philippines*

Bachelor of Science in Physics *June 2013 - July 2018*

Thesis Title: Correlation of the New Sunspot Number and Geomagnetic aa Index in the Years 1900-2013

Supervisor* and Committee members: Prof. Bhazel Ann R. Pelicano*, Prof. Alladin C. Jasmin*, Dr. Quirino M. Sugon Jr., Dr. Reinabelle Reyes

Current Research Projects

A Pencil Beam approach to Search for ultra-faint TNOs with JWST

- is a 3-epoch JWST pencil beam survey (Cycle 1 program 1568) that observed the sky with NIRCam, which aims to search and characterize the smallest TNOs to explore never before probed regions of the TNO size distribution.

TNO search with PANORAMIC data

- With PANORAMIC(Parallel wide-Area Nircam Observations to Reveal And Measure the Invisible Cosmos, Cycle 1 program 2514) we will maximize the opportunity of pure parallel observing with JWST's NIRCam and obtain an unprecedented wide-area imaging dataset at $1-5\,\mu$m wavelength range.

Are dark, red, small KBOs devoid of volatiles?

- is a JWST Cycle 2 program (3979) that will fill out the spectro-photometric informationof small KBOs, investigating for the first time their dominant surface compositions from 0.5-5μm.

Collaboration Memberships

Vera C. Rubin Observatory Legacy Survey of Space and Time - Solar System Science Collaboration (LSST-SSSC)

Team Member *May 2024 - Present*

- The LSST SSSC is an international telescope collaboration focused on leveraging the LSST's capabilities and data to enhance our understanding of the Solar System through detailed studies of its objects.

A combined HST and JWST study of the composition of the faintest TNOs

Team Member *Sept 2022 - Present*

- This project aims to test various Solar System formation theories by measuring the colors of the smallest TNOs from HST- and JWST-obtained images.

Classical and Large-A Solar SYstem (CLASSY) survey

Team Member *Sept 2022 - Present*

- CLASSY is a 2-year program on the Canada-France-Hawaii Telescope to search for Kuiper Belt Objects (KBOs) and extreme Trans-Neptunian Objects (eTNOs)

Cosmological Advanced Survey Telescope for Optical and uv Research (CASTOR)

Team Member *Sept 2022 - Present*

- CASTOR is a proposed telescope mission by the Canadian Space Agency (CSA) that would survey the sky at optical and ultraviolet (UV) wavelengths

Research Experience

Research Assistant *Feb 2021 - July 2022*

Academia Sinica Institute of Astronomy and Astrophysics *Taipei, Taiwan*

- Was part of the Planetary Science group where I focused on searching and characterizing TNOs using the Hyper Suprime Cam – Subaru Strategic Program (HSC-SSP) dataset.

Summer Research Student *July 2017 - Aug 2017*

Academia Sinica Institute of Astronomy and Astrophysics *Taipei, Taiwan*

- Have independently written a series of code for two techniques (Phase Dispersion Minimization and Power Spectral Density) in analysing light curves of OSSOS detected TNOs.
- Was part of the group who remotely observed and gathered data to analyze an O-Rich AGB star using the Submillimeter Array (SMA) telescopes.

Summer Intern *June 2016 - July 2016*

PAGASA Astronomical Observatory *Manila, Philippines*

- Developed skills and sufficient knowledge in astrophotography, telescope manipulation and sunspot number data gathering were developed.

Teaching Experience

Department of Physics and Astronomy *University of Victoria*

Laboratory Instructor *Sept 2022 - Present*

- Currently teaching the laboratory component of Physics and Astronomy elective classes to non-physics majors.

Department of Physical Sciences *University of the Philippines*

Lecturer in Physics II *Sept 2021 - Jan 2022*

- Taught fundamental and computational physics laboratory courses and Solar System astronomy to undergraduate students in the fall semester of 2021.

Successful Observing Proposals

Exploring the Colors and Lightcurve of a Potential Contact Binary TNO

Principal Investigator *Gemini-N 2025 A*

- Granted a 3.47-hour observation through the Gemini-North Fast Turnaround (FT) program to study a potential contact binary TNO identified in our HST and JWST data.

The Supremely Deep TNO survey: A critical test of planet formation models

Co-Investigator *JWST Cycle 4 GO*

- This JWST Treasury Program was awarded 135.1 hours to carry out a supremely deep program focused on measuring the size distribution of the smallest cold classical TNOs (down to 1 km in diameter) to place strong constraints on the processes of planet formation.

Invited Talks

New Horizons Science Team Meeting *Boulder, USA*

A Pencil Beam Approach To Search For Ultra-Faint Trans-Neptunian Objects Using JWST: Preliminary Results *Sept 2024*

Contributed Talks

Progress in Understanding the Pluto System: 10 Years After Flyby *Baltimore, USA*

The Luminosity Function od Ultra-Faint Cold Classical Trans-Neptunian Objects Detected by JWST *July 2025*

UVic Astronomy Research Center *Victoria, Canada*

The Luminosity Function od Ultra-Faint Cold Classical Trans-Neptunian Objects Detected by JWST *June 2025*

Trans-Neptunian Solar System 2024 *Taipei, Taiwan*

A Pencil Beam Approach To Search For Ultra-Faint Trans-Neptunian Objects Using JWST: Preliminary Results *June 2024*

Asteroids, Comets, Meteors Conference *Flagstaff, USA*

A Pencil Beam Approach To Search For Ultra-Faint Trans-Neptunian Objects Using JWST *June 2023*

Astronomical Society of Republic of China Annual Meeting *Taipei, Taiwan*

Hunting Trans-Neptunian Objects with the Hyper Suprime-Cam Deep Layers *Sept 2021*

IAU Symposium 340: Long-term Datasets for the Understanding of Solar and Stellar Magnetic Cycles *Jaipur, India*

Correlation of the New Sunspot Number and Geomagnetic aa Index in the Years 1900-2013 *Feb 2018*

Posters

Asteroids, Comets, Meteors Conference *Flagstaff, USA*
A Pencil Beam Approach To Search For Ultra-Faint Trans-Neptunian Objects Using JWST *June 2023*

Canada Astronomical Society Annual Meeting *Penticton, Canada*
A Pencil Beam Approach To Search For Ultra-Faint Trans-Neptunian Objects Using JWST *June 2023*

Taiwan Physical Society Annual Meeting *Pingtung, Taiwan*
Hunting Trans-Neptunian Objects with the Hyper Suprime-Cam DEEP Layer: Preliminary Results *Feb 2020*

Workshops and Schools

Rubin Data Academy 2025 *July 2025*
Virtual, Vera C. Rubin Observatory

Summer School in Statistics for Astronomers *June 2024*
Virtual, Pennsylvania State University

Intermediate Python for Astronomical Software Development *July 2024*
Virtual, LSST-TVS Software Task Force

6th Bryurakan International Summer School *Sept 2018*
Byurakan, Armenia

Publications

Refereed Journals

NSF-DOE Vera C. Rubin Observatory Observations of Interstellar Comet 3I/ATLAS (C/2025 N1)
Colin Orion Chandler, Pedro H Bernardinelli, Mario Jurić, Devanshi Singh, Henry H Hsieh, Ian Sullivan, R Lynne Jones, Jacob A Kurlander, Dmitrii Vavilov, Siegfried Eggl, et al. (incl. **Marielle R Eduardo**)
arXiv preprint arXiv:2507.13409. 2025

The CASTOR mission
Patrick Côté, Tyrone E Woods, John B Hutchings, Jason D Rhodes, Rubén Sánchez-Janssen, Alan D Scott, John Pazder, Melissa Amenouche, Michael Balogh, Simon Blouin, et al. (incl. **Marielle R Eduardo**)
Journal of Astronomical Telescopes, Instruments, and Systems pp. 042202–042202. Society of Photo-Optical Instrumentation Engineers, 2025

A Low-inclination Neutral Trans-Neptunian Object in an Extreme Orbit
Ying-Tung Chen, **Marielle R Eduardo**, Marco A Muñoz-Gutiérrez, Shiang-Yu Wang, Matthew J Lehner, Chan-Kao Chang
The Astrophysical Journal Letters p. L22. IOP Publishing, 2022

OSSOS. XII. Variability Studies of 65 Trans-Neptunian Objects Using the Hyper Suprime-Cam
Mike Alexandersen, Susan D Benecchi, Ying-Tung Chen, **Marielle R Eduardo**, Audrey Thirouin, Megan E Schwamb, Matthew J Lehner, Shiang-Yu Wang, Michele T Bannister, Brett J Gladman
The Astrophysical Journal Supplement Series p. 19. IOP Publishing, 2019

Conference Proceedings

Correlation of the New Sunspot Number and Geomagnetic aa Index in the Years 1900-2013
Marielle R Eduardo, Quirino M Sugon, Bhazel Anne R Pelicano
Proceedings of the International Astronomical Union pp. 43–46. Cambridge University Press, 2018

Scholarships and Awards

Canada	**Dr. Margaret "Marmie" Perkins Hess Graduate Fellowship**, 2x $15,000	*2024 & 2025*
Canada	**University of Victoria Graduate Fellowship (Doctoral)**, $7,240	*2025*
Canada	**University of Victoria Graduate Fellowship (Doctoral)**, $6,207	*2024*
Canada	**University of Victoria Graduate Fellowship (Doctoral)**, 2x $5,000	*2022 & 2023*
Taiwan	**Astronomical Society of the Republic of China (ASROC) Annual Meeting Best Poster Presentation Award**, $NT3,000	*2020*