

# Pruthviraj (Pruthvi) Acharya

*Ph.D. in Earth and Space Science*

## Skills

- Programming Proficient in Python, MATLAB, UNIX, C++, Machine Learning, Computer Vision, Data Visualization, Weather Modelling
- Software MS Office, Integrated Software for Imagers and Spectrometers (ISIS)
- Soft Skills Project Management, Communication Skills, Attention to Detail

## Education

- 2022–2024 **Ph.D. in Earth and Space Science**, *York University*, Toronto, Canada, *August 2024*.  
Dissertation Title: Analyzing Mars' Polar Anomalies: Computer Vision Techniques for Seasonal Changes and Polar Dynamics
- 2020–2022 **MSc. in Earth and Space Science**, *York University*, Toronto, Canada, *August 2022*.  
Thesis: On the Formation of North Polar Anomalies of Mars - Switched to Ph.D in 2022
- 2015–2020 **B.Sc. in Physics and Astronomy**, *York University*, Toronto, Canada, *Honors Stream*.

## Professional Experience

- 2024–Present **Postdoctoral Researcher**, *Univeristy of Nevada-Reno*, Reno, United States of America.
  - Developing image analysis tools for processing raw Martian observations
  - Tracking the formation and retreat of the Northern and Southern Polar Seasonal Caps of Mars
- 2020–2024 **Graduate Researcher**, *York University*, Toronto, Canada.
  - Automated image processing using Python and UNIX, improving processing efficiency by 200%.
  - Employed automated techniques to process 2000+ Martian images within 3 days.
  - Simulated Martian weather using a mesoscale model (1-10 km resolution).
- 2020 **Lead Physicist**, *York University*, Toronto, Canada.
  - Designed and developed an antimatter containment unit for an undergraduate research course.
  - Simulated various project components using MATLAB and electrical systems.
- 2019–2020 **Undergraduate Researcher (Martian Polar Science)**, *York University*, Toronto, Canada.

## Publications

✉ [pruthvi.acharya.54@gmail.com](mailto:pruthvi.acharya.54@gmail.com) • [acharyapruthvi.github.io](https://github.com/acharyapruthvi)  
in [pruthviraj-acharya-8a231611b](#) • [acharyapruthvi](#)

- 2024 **Acharya, P. J.**, Smith, I. B., & Calvin, W. M. (2024). "Tracking the South Polar Seasonal Cap Retreat of Mars Using Computer Vision." *Icarus*. DOI: 10.1016/j.icarus.2024.116104 - Front Cover of Issue
- 2023 **Acharya, P. J.**, Smith, I. B., & Calvin, W. M. (2023). "Tracking the Northern Seasonal Cap Retreat of Mars Using Computer Vision." *Icarus*, vol. 390, Jan. 2023, p. 115295. DOI: 10.1016/j.icarus.2022.115295
- 2023 Chojnacki, M., Vaz, D. A., **Acharya, P. J.**, Silvestro, S., & Smith, I. B. (2023). "Revelations of Interannual Dune Evolution from the Swiftest Aeolian System on Mars by MRO/HiRISE Long-Term Monitoring." *Icarus*, pages 115863. DOI: 10.1016/j.icarus.2023.115863
- 2023 Landis, M. E., **Acharya, P. J.**, Alsaeed, N. R., et al. (2023). "Polar Science Results from Mars Reconnaissance Orbiter: Multiwavelength, Multiyear Insights." *Icarus*, pages 115794. DOI: 10.1016/j.icarus.2023.115794
- 2020 Smith, I. B., Guzewich, S. D., Smith, D. E., Diniega, S., et al. including **Acharya, P. J.** (2020). "Solar-System-Wide Significance of Mars Polar Science."

## Intrenships

- 2023 **Visting Graduate Researcher**, *The Laboratoire de Meteorologie Dynamique*, Paris, France.
- Running high-resolution simulations on the Polar Regions of Mars.
  - Testing the stability of the Mars Mesoscale Model.
  - Verifying model results with high-resolution orbital observations

## Conferences

- 2024 **Acharya, P. J.**, Smith, I. (2024). "Formation and Evolution of Cold and Bright Anomalies and Warm and Dark Anomalies on the North Polar Residual Cap." Presented at *Eighth International Conference on Mars Polar Science and Exploration*, Jul. 2024
- 2024 **Acharya, P. J.**, Smith, I.B., & Calvin, W. (2024). "Tracking the Southern Polar Seasonal Cap Retreat of Mars Using Computer Vision." Presented at *Tenth International Conference on Mars*, Jul. 2024
- 2023 Smith, I., Isen, J., & **Acharya, P. J.** (2023). "New Insights Into the Properties of the Cryptic Terrain of the South Polar Seasonal Cap of Mars through Laboratory Investigations and Orbital Data." Presented at *AAS/Division for Planetary Sciences Meeting Abstracts*, vol. 55, Oct. 2023, 300.01.
- 2022 **Acharya, P. J.**, Smith, I. B., & Calvin, W. (2022). "Interannual Variations in the Retreat of the Northern Seasonal Cap of Mars Using Computer Vision." Presented at *Seventh International Workshop on the Mars Atmosphere: Modelling and Observations*, Jun. 2022, 3306.
- 2022 **Acharya, P. J.**, & Smith, I. B. (2022). "Seasonal Variation of the Cold and Bright Anomalies on the North Polar Layered Deposits." In *Seventh International Workshop on the Mars Atmosphere: Modelling and Observations*, Jun. 2022, page 3534.

- 2021 **Acharya, P. J.**, Smith, I.B., & Calvin, W. (2021). "Using Computer Vision to Monitor the Recession of the Northern Seasonal Cap." Presented at the *AGU Fall Meeting Abstracts*, Dec. 2021, P35A-01.
- 2021 **Acharya, P. J.** & Smith, I. B. (2021). "Seasonal Variations of the Cold and Bright Anomalies on the North Polar Layered Deposits." Presented at the *52nd Lunar and Planetary Science Conference*, Mar. 2021, 2541.

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## Teaching

- 2020–2024 **Teaching Assistant**, *York University*, Toronto, Canada.
- Assisted and led lab groups for undergraduate physics and astronomy courses.
  - Marked assignments and exams, providing timely feedback to students.