

Niyati Desai

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Education


- 2019 – present  **Ph.D. in Space Engineering**
California Institute of Technology, *GALCIT*
Advisor: Dimitri Mawet, Professor of Astronomy
- 2019 – 2020  **M.Sc. in Space Engineering**
California Institute of Technology, *GALCIT*
- 2015 – 2019  **B.Sc. in Physics**
Massachusetts Institute of Technology, *Physics Department*
-  **B.Sc. in Aerospace Engineering**
Massachusetts Institute of Technology, *Aero/Astro Department*

Research, Teaching and Engineering Positions


- 2020 – present  **Caltech Astronomy, Graduate Research Assistant**
Exoplanet Technology Lab: high contrast testbed experiments, vortex coronagraph design
- Mar – Jun 2022  **Caltech Astronomy, Graduate Teaching Assistant**
AY 105: Optical Astronomy Instrumentation Lab Class
- Feb – May 2023  **Jet Propulsion Laboratory, Optics Intern**
High Contrast Imaging Testbed Facility: wavefront sensing and control experiments
- Jun – Aug 2019  **Honeybee Robotics, Robotics Intern**
System Engineering: modular systems architecture for robotic motion control tasks
- Jun – Aug 2018  **Jet Propulsion Laboratory, Flight Instruments Intern**
Nancy Grace Roman Space Telescope: EMCCD cosmic ray detection/removal algorithms
- Jun – Aug 2017  **Northrop Grumman, Integration and Testing Intern**
James Webb Space Telescope: telemetry scripts for spacecraft command and data handling
- Jan – Jun 2016  **Computer Science and Artificial Intelligence Laboratory, Undergraduate Researcher**
Interactive Robotics Group: human and autonomous agent communication models


Scientific Publications

Peer-Reviewed Journal Articles (first author)



- 1 **N. Desai**, A. Bertrou-Cantou, G. Ruane, J. Llop-Sayson, A. E. Riggs, E. Serabyn, and D. Mawet, “Effects of adding radial phase mask dimples on scalar vortex coronagraphs,” *in prep*,
- 2 **N. Desai**, G. J. Ruane, J. D. Llop-Sayson, A. Bertrou-Cantou, A. Potier, A. E. Riggs, E. Serabyn, and D. Mawet, “Laboratory demonstration of the wrapped staircase scalar vortex coronagraph,” *Journal of Astronomical Telescopes, Instruments, and Systems*, vol. 9, no. 2, p. 025001, 2023.  DOI: 10.1117/1.JATIS.9.2.025001.

Conference Proceedings (first author)

- 1 **N. Desai**, A. Bertrou-Cantou, G. Ruane, J. Llop-Sayson, A. E. Riggs, E. Serabyn, and D. Mawet, “Achromatizing scalar vortex coronagraphs with radial phase mask dimples,” in *Techniques and Instrumentation for Detection of Exoplanets XI*, vol. 12680, 2023.
- 2 **N. Desai**, L. König, E. Por, R. Juanola-Parramond, R. Belikov, *et al.*, “Integrated photonic-based coronagraphic systems for future space telescopes,” in *Techniques and Instrumentation for Detection of Exoplanets XI*, vol. 12680, 2023.
- 3 **N. Desai**, A. Potier, G. Ruane, A. E. Riggs, P. K. Poon, M. Noyes, and C. Mejia Prada, “Experimental comparison of model-free and model-based dark hole algorithms for future space telescopes,” in *Techniques and Instrumentation for Detection of Exoplanets XI*, vol. 12680, 2023.
- 4 **N. Desai**, J. Llop-Sayson, A. Bertrou-Cantou, G. Ruane, A. E. Riggs, E. Serabyn, and D. Mawet, “Topological designs for scalar vortex coronagraphs,” in *Space Telescopes and Instrumentation 2022: Optical, Infrared, and Millimeter Wave*, vol. 12180, SPIE, 2022, 121805H.  DOI: 10.1117/12.2630950.

- 5 N. Desai, J. Llop-Sayson, N. Jovanovic, G. Ruane, E. Serabyn, S. Martin, and D. Mawet, “High contrast demonstrations of novel scalar vortex coronagraph designs at the high contrast spectroscopy testbed,” in *Techniques and Instrumentation for Detection of Exoplanets X*, SPIE, 2021.  DOI: 10.1117/12.2603953.

Other Co-authored Publications

- 1 L. König, S. Palatnick, N. Desai, O. Absil, M. Millar-Blanchaer, and D. Mawet, “Metasurface-based scalar vortex phase mask design in pursuit of 1e-10 contrast,” in *Techniques and Instrumentation for Detection of Exoplanets XI*, vol. 12680, SPIE, 2023.
- 2 J. Liberman, J. Llop-Sayson, A. Bertrou-Cantou, D. Mawet, A. J. E. Riggs, and N. Desai, “Implicit electric field conjugation for improved starlight rejection through a single-mode fiber,” in *Techniques and Instrumentation for Detection of Exoplanets XI*, vol. 12680, 2023.
- 3 P. Morrissey, L. Harding, N. Bush, *et al.*, “Flight photon counting electron multiplying charge coupled device development for the Roman Space Telescope coronagraph instrument,” *Journal of Astronomical Telescopes, Instruments, and Systems*, vol. 9, no. 1, p. 016 003, Jan. 2023.  DOI: 10.1117/1.JATIS.9.1.016003.
- 4 S. Palatnick, L. König, M. Millar-Blanchaer, J. K. Wallace, O. Absil, D. Mawet, N. Desai, D. Echeverri, D. John, and J. Schuller, “Prospects for metasurfaces in exoplanet direct imaging systems: From principles to design,” in *Techniques and Instrumentation for Detection of Exoplanets XI*, vol. 12680, SPIE, 2023.
- 5 S. R. Vaughan, T. D. Gebhard, K. Bott, *et al.*, “Chasing rainbows and ocean glints: Inner working angle constraints for the Habitable Worlds Observatory,” *Monthly Notices of the Royal Astronomical Society*, vol. 524, no. 4, pp. 5477–5485, Aug. 2023, ISSN: 0035-8711.  DOI: 10.1093/mnras/stad2127.

Research Talks and Invited Workshops

Oct 2023	 2nd International Vortex Workshop: Scientific Organizing Committee
	 2nd International Vortex Workshop: Two Contributed Talks
Aug 2023	 SPIE Optics and Photonics: Session Chair: Coronagraph Testbeds and Results I
	 SPIE Optics and Photonics: Contributed Talk
	 SPIE Optics and Photonics: Two Poster Presentations
Jun 2023	 Adaptive Optics for Extremely Large Telescopes: Contributed Poster
	 Group Seminar at Institut de Planétologie et d’Astrophysique de Grenoble
Feb 2023	 Lorentz Center Workshop: Optimal Exoplanet Imagers
Nov 2022	 Network of Young Researchers in Instrumentation for Astronomy (NYRIA) Workshop
	 Planetary & Stellar systems Imaging Lab Group Seminar at Université de Liège
Sept 2022	 Caltech Associates Keynote Speaker
	 Exoplanet Group Seminar at University of California Santa Barbara
Jul 2022	 SPIE Astronomical Telescopes + Instrumentation: Poster Presentation
Jun 2022	 Spirit of Lyot: Poster Presentation
	 High Angular Resolution for Astrophysics Seminar at the Paris Observatory
Aug 2021	 SPIE Optics and Photonics: Contributed Talk

Awards and Fellowships

Amelia Earhart Fellow, Zonta International (2023)

Three Minute Thesis: 1st Place Winner, Caltech Libraries (2023)

Hummel-Gray Award, Caltech Y (2023)

KISS Affiliate, Keck Institute for Space Studies (2021)

Admiral Luis de Florez Award for Original Thinking or Ingenuity, MIT Aero Astro (2019)

Outreach

Caltech Astronomy Outreach Volunteer (2019-present)

Women in GALCIT Organizer (2019-present)

Women in Engineering and Applied Science Volunteer (2021-present)

Caltech Space Challenge 2022 Organizer (2021-2022)

Caltech Science Olympiad Judge (April 2022)

Yucca Valley Hi-Desert Museum Outreach Talk (October 2022)

Pasadena Unified School District Innovation Expo Judge (December 2022)

STEM Summer Camp Mentor (Summer 2023)