

DHWANIL PATEL

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PERSONAL DETAILS

Birth: 11th May 2001

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EDUCATION

University of Toronto, Ontario, Canada

September 2019 - April 2023

H.B.Sc. Astronomy and Physics Specialist; Mathematics Minor

Upper years GPA: 3.35/4.00

Leiden University, South Holland, Netherlands

February 2024 - Present

MSc. Astronomy and instrumentation

Expected graduation: January 2026

RESEARCH PUBLICATIONS ([Google Scholar](#))

First author list

End-to-end simulations of photonic phase correctors for adaptive optics systems, *Opt. Express* 32, 27459–27472 (July 2024). [DOI](#)

Design of efficient high-order immersed meta-gratings using an evolutionary algorithm, *Opt. Express* 33, 53982-53997 (December 2025). [DOI](#)

Performance estimation of photonic integrated wavefront corrector for single-mode fiber coupling, *Proc. SPIE 13097, Adaptive Optics Systems IX, 130975G (27 August 2024)* [DOI](#)

RESEARCH EXPERIENCE

Simultaneous coronagraphy and wavefront sensing using a single focal plane meta-optic

January 2025 - December 2025

Leiden Observatory - Masters thesis project

Supervisors: Dr. Sebastiaan Haffert

Explored metasurfaces to use as a complex mask coronagraph and Zernike wavefront sensor with Phase Induced Amplitude Apodization (PIAA) framework. Thesis can be found [here](#)

High efficiency immersion meta-grating.

February 2024 - December 2024

SRON Netherlands Institute for Space Research (SRON)

Leiden Observatory - First masters research project

Co-Supervisors: Dr. Ralf Kohlhaas and Prof. Bernhard Brandl.

Designed immersed meta-gratings to improve high-order diffraction efficiencies and reduce polarization sensitivity for SWIR-3 band applications.

Research Lab Assistant

September 2023 - January 2024

Dunlap Institute of Astronomy and Astrophysics, University of Toronto

Assisted with the projects at the Dunlap Institute's Spectroscopic High Angular Resolution/Photonics (SHARP) imaging lab. Specifically, I worked on the simulations for the photonic-based phase corrector. Additionally, also assisted with the environmental (thermal-vacuum) testing of the [LUVCAM](#); a small UV space telescope.

Photonic Adaptive Optics

May 2023 - August 2023

Dunlap Institute of Astronomy and Astrophysics, University of Toronto

Summer undergraduate research program (SURP) Fellowship

Co-Supervisors: Dr. Momen Diab and Prof. Suresh Sivandanam.

Carried extensive simulations of a photonic-integrated chip that can efficiently couple the light into a single-mode fibre by correcting for phase distortions by atmospheric turbulence to estimate its performance.

Coherent beam combiners for photonic adaptive optics

September 2022 - April 2023

University of Toronto - Undergrad Research Project (AST425)

Co-Supervisors: Dr. Momen Diab and Prof. Suresh Sivandanam.

Designing toy models of beam combiners for simulations of Photonic Integrated Circuit (PIC) used for phase correction.

FELLOWSHIPS AND AWARDS

Summer undergraduate research program fellowship

May 2023 - August 2023

Dunlap Institute of Astronomy and Astrophysics at University of Toronto

Received a fellowship during summer 2023 to conduct research under Dr. Momen Diab and Prof. Suresh Sivandanam on Photonic Adaptive Optics.

TECHNICAL SKILLS

- Programming: Python, MATLAB, L^AT_EX, R; C++, Nazca-Design (beginner)
- Softwares: Lumerical, RSoft CAD, KLayout, Solidworks
- Operating Systems: MacOS, Linux, and Windows
- Miscellaneous Experience: Microcontroller scripting, Electronics, Optical bench

CONFERENCES & SUMMER SCHOOLS

SPIE Astronomical telescopes and instrumentation, Yokohama 2024

June 2024

Instrumentation-focused conference where I authored a proceeding and was a co-author in two other proceedings for the conference, which can be found on the [SPIE website](#).

Dunlap institute instrumentation Summer School

August 2023

Fully-funded summer school aimed at different aspects of instrumentation, including in-lab components for some hands-on experience.

European Adaptive Optics Summer School

June 2023

A week-long summer school covering aspects of Adaptive optics (AO) such as wavefront sensing, correction, calibration and control to a complete AO system aimed at graduate students.

EXTRA-CURRICULAR EXPERIENCE AND OUTREACH

Kaiser spring lectures talk - Astronomy and modern optics

April 2025

As part of the series of lectures, I gave a public lecture on synergy between modern optics tools such as photonics and subwavelength optics, and Astronomy. The talk can be found on [L.A.D. 'F.Kaiser's YouTube](#)

Quaestor and Assessor Promo: Kaiser Spring lecture committee

October 2024 - May 2025

Responsible for managing funds and also doing outreach for the annual Spring lectures held in Leiden.

Private Tutor

August 2020 - Present

Working one-on-one with high school students on subjects of Math and Science.

Events Director - Astronomy And Space Exploration society @ UofToronto May'20 - May'22
Organizing Monthly online events for the club.