

DR. SIDDHARTH MAHARANA

siddharth.maharana@iucaa.in $\diamond$ <https://siddharth-maharana.github.io/>

APPOINTMENTS

Assistant Professor Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, India	from August 2026
Postdoctoral Research Assistant Department of Physics, University of Oxford, Oxford, United Kingdom	2025 – 2026
Postdoctoral Research Fellow (Independent) South African Astronomical Observatory (SAAO), Cape Town, South Africa.	2023 – 2025
Postdoctoral Research Fellow Institute of Astrophysics, Foundation for Research and Technology - Hellas (FORTH), Crete, Greece.	2022 – 2023

EDUCATION

PhD in Astrophysics Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, India Thesis Title: <i>Design and Development of Wide Field Optical Polarimeters for PASIPHAE Sky Survey</i> Thesis Advisor: <i>Prof. A. N. Ramaprabhakar</i> Thesis Defense: 31 May, 2022	2015 – 2022
Bachelor of Technology in Mechanical Engineering Guru Ghasidas Vishwavidyalaya, Bilaspur, India.	2011 – 2015

RESEARCH AREA

Astronomical Instrumentation & Observational Astrophysics

MOST SIGNIFICANT CONTRIBUTIONS

- Development of advanced astronomical instrumentation.** Led the conception, design and commissioning of *FiberPol*, a precision fiber-fed spectropolarimeter for astronomy at the South African Astronomical Observatory. During my PhD, I developed the optical, optomechanical and calibration design of the two Wide-field Linear Optical Polarimeter (WALOP) instruments for the PASIPHAE survey. I currently work on the development of advanced integral-field spectroscopic techniques for the direct imaging and characterization of Earth-like exoplanets as part of the Planetary Camera and Spectrograph (PCS) program for the 39 m Extremely Large Telescope (ELT). I also serve as Co-lead of the Instrument Concept and Design Work Package for the ELT-PCS R&D Roadmap project. Collectively, these activities span the complete astronomical instrumentation life-cycle, from optical and optomechanical design through commissioning and scientific exploitation.
- Precision calibration techniques for astronomical polarimetry.** Developed calibration methodologies and observational strategies that significantly improve both the precision and accuracy of astronomical polarimetric measurements. My work includes improving the polarimetric accuracy of the RoboPol instrument from approximately 0.15% to better than 0.05%, developing new wide-field polarimetric calibration sources using the polarized bright Moon sky, and contributing to the establishment of a new catalog of optical polarimetric standard stars.

3. Scientific applications of polarimetry to the interstellar medium.

Applied optical and near-infrared imaging polarimetry and spectropolarimetry to investigate interstellar dust, magnetic fields and grain alignment in the Milky Way. These studies combine observations from facilities including FiberPol on the SAAO 1.9 m Telescope, 10 m South African Large Telescope (SALT) and the 1.4 m InfraRed Survey Facility (IRSF) with theoretical models of interstellar dust.

HONOURS, AWARDS & RESEARCH FUNDING

PI , Technology Innovation Agency, South Africa Seed Grant for FiberPol project: ZAR 1 Million	2024
Co-I , Royal Society International Exchange Award, UK. 11.5 k GBPs	2026-2028
International Travel Grant, DST, India	2018

TELESCOPE TIME AWARDS

- **South African Large Telescope (SALT, 10 m)**
 - **PI**: 38.0 hours awarded across four programs (2023–2025), including spectropolarimetric studies of interstellar dust, AGB circumstellar envelopes, and grain growth.
 - **Director’s Discretionary Time**: Spectropolarimetry of the changing-look AGN NGC 1365 (2025; 1 hour; **co-I and Principal Contact**).
 - **Co-I**: 31-hour program on optical polarization in nearby galaxies for weak-lensing studies (2023).
 - **Co-I**: 40-hour program on Herbig Ae/Be stellar spectropolarimetry (2018).
 - **PI**: Long-term monitoring program of the Musca Molecular Cloud (2018–2021).
- **SAAO 1.9 m Telescope**
 - **PI**: FiberPol commissioning and early science (2025–present; >20 nights).
- **IRSF 1.4 m Telescope**
 - **PI**: Near-infrared polarimetry of the Southern Coalsack (2024; 7 nights).
- **Polarimetric Standards Program**
 - **Co-I**: Multi-year program establishing a new polarimetric standards catalog using:
 - * 1.3 m Skinakas Observatory, Greece (2017–2020),
 - * 1.0 m ARIES Telescope, India (2017–2018),
 - * 2.56 m Nordic Optical Telescope, La Palma (2020).
- **Skinakas Observatory (1.3 m)**
 - **PI**: Bright Moon polarimetric calibration program (2021–2022; ~5 nights).

SELECTED TALKS

Invited Conference Talks

- *Looking at the Polarized Universe: Past, Present and Future*, Crete, Greece (Online) 2021
- *AGN Polarimetry Research Symposium*, Strasbourg, France 2024

Invited Seminars & Colloquia

- Tata Institute of Fundamental Research, Mumbai, India 2025
- South African Astronomical Observatory, Cape Town, South Africa 2021, 2023
- Physical Research Laboratory, Ahmedabad, India 2023
- Indian Institute of Technology Bombay, India 2026

Selected Conference Talks

- SPIE Astronomical Telescopes+Instruments 2026, Copenhagen, Denmark 2026
- UK Exoplanet Community Meeting, Bristol, UK 2026
- Cosmic Dust: Origin and Fate of Dust in the Universe, Gothenburg, Sweden 2023
- SAGI Astrophysics Workshop on Dust Polarimetry and Applications in Astrophysics, Vietnam 2023
- Network of Young Researchers in Instrumentation for Astrophysics Workshop (Online) 2021
- Young Astronomers' Meet, India 2017, 2018, 2019

TEACHING, MENTORING & LEADERSHIP

Teaching

- **Instructor**, Master's Course in Astronomical Instrumentation 2024
At University of Cape Town. Inaugural course; co-developed and taught.
- **Demonstrator/Tutor** 2025–26
Physics Optics Laboratory, University of Oxford
- **Teaching Assistant**
 - Introduction to Astronomy and Astrophysics I, IUCAA-NCRA Graduate School 2016
 - Astronomical Techniques I, IUCAA-NCRA Graduate School 2019, 2020

Mentoring

- **Master's Student**
 - Chris Dennison-Farrar, University of Cape Town 2024–2026
First instrumentation-focused astronomy Master's student at University of Cape Town/SAAO
- **Undergraduate Research Projects**
 - Gundo Madiba, University of Cape Town 2023
 - Hardik Kuralkar, IISER Bhopal 2022–23
 - Rahul Sanghvi, Fergusson College, Pune 2018
 - Poorva Bhalerao, Cummins College, Pune 2018–19
 - Neeraj Dapurkar, Fergusson College, Pune 2020

Professional Service

- Work Package Co-lead, Instrument Concept and Design, PCS R&D Roadmap for Planetary Camera and Spectrograph (PCS) on 39m European Extremely Large Telescope.
- Reviewer, Canada–France–Hawaii Telescope (CFHT) Semester Time Allocation Committee.
- Reviewer, *Experimental Astronomy* Journal.

Academic Leadership

- Co-organizer, SAAO Weekly Colloquium 2023–24
- Founder, *Tuesday Astronomy Meetings* 2017–19
Weekly student and postdoctoral research talk series at IUCAA
- Co-founder, *Last Friday Talks* 2019–22
Monthly journal club at IUCAA

Outreach

- Public lectures during IUCAA National Science Day 2019, 2020
- Coordinator for exhibitions and public engagement for IUCAA Science Day 2019, 2020
- Member, *Let's Talk Astronomy* public outreach initiative 2020

PUBLICATIONS & PREPRINTS

Research Output Metrics	Count	Citation Metrics (Google Scholar)	Value
Refereed Publications	14	Total Citations	529
First/Second Author	5	h-index	11
SPIE Instrumentation Proceedings	6		
Preprints/submitted	2		

Selected Publications

1. **Maharana, S.**, Kypriotakis, J.A., Ramaprakash, A.N., et al. *WALOP-South: A Four-Camera One-Shot Imaging Polarimeter for PASIPHAE Survey. Paper I: Optical Design*. Journal of Astronomical Telescopes, Instruments, and Systems, **7**, 014004 (2021).
2. **Maharana, S.**, Anche, R.M., et al. *WALOP-South: Paper II – Polarimetric Modelling and Calibration*. Journal of Astronomical Telescopes, Instruments, and Systems, **8**, 038004 (2022).
3. **Maharana, S.**, Kiehlmann, S., Blinov, D., et al. *Bright-Moon Sky as a Wide-Field Linear Polarimetric Flat Source for Calibration*. Astronomy & Astrophysics, **679**, A68 (2023).
4. Kypriotakis, J.A., **Maharana, S.**[†], et al. *The WALOP-North Instrument I: Optical Design, Filter Design and Calibration*. Journal of Astronomical Telescopes, Instruments, and Systems, **10**, 044005 (2024).
5. **Maharana, S.**, Dennison-Farrar, K.C.J., Chattopadhyay, S., et al. *Commissioning and On-sky Performance of FiberPol: A fiber-fed Spectropolarimeter for the SAAO 1.9 m Telescope*. SPIE Astronomical Telescopes + Instrumentation (2026).
6. **Maharana, S.**, Chattopadhyay, S., Bershad, M. *FiberPol-6D: Spectropolarimetric Integral-Field Mode for the SAAO 1.9 m Telescope using fibers*. SPIE Astronomical Telescopes + Instrumentation (2024).
7. Blinov, D., **Maharana, S.**, et al. *The RoboPol Sample of Optical Polarimetric Standards*. Astronomy & Astrophysics, **677**, A144 (2023).
8. Andersson, B.-G., Minter, A., **Maharana, S.**, et al. *Possible Grain Growth in the Southern Coalsack Probed with Spectropolarimetry*. Under review, Monthly Notices of the Royal Astronomical Society.

[†] Corresponding author.