Saavidra Perera

Education

Durham University *Durham, UK*

PhD in Physics *Oct 2013 - Oct 2017*

"SHIMM: A Low-Cost Portable Seeing Monitor for Astronomical Observing Sites" - Successfully designed, developed and deployed the Shack-Hartmann Image Motion Monitor, a low-cost portable seeing monitor. The work included simulating the instrument and optical atmospheric propagation, aligning the optics, on-site testing at the La Palma observatory and comparing results with SCIDAR. **Supervisor** Dr R. Wilson

Imperial College London *London, UK*

MSci in Physics *Oct 2008 - Jul 2012*

"Characterising the Atomic Fluctuations of Ovens used in Ion Traps" - Optimising ovens used in the Imperial College Penning trap to produce calcium ions. Work entailed research into thin film physics, working with rotary and ion vacuum pumps and handling liquid nitrogen. **Supervisor:** Prof. R. Thompson

Work Experience

University of California, San Diego *San Diego, USA*

Post-doctoral Reseacher *Jan 2021 - Present*

- Leading the build, testing and integration of the new pyramid wavefront sensor for Gemini Planet Imager (GPI 2.0)
- Laboratory work includes optical alignment and detector characterisation, under class 1000 clean-room conditions.
- Write extensive documentation, liaise with vendors, and coordinate within the larger consortium.
- Conduct remote operational tests of the current GPI instrument.
- Observe with KPIC and NIRSPAO data to Doppler image magnetically active M dwarfs.
- Using ADI on LBTI data to obtain photometric measurement of HR8799e in the M band.
- Co-I for the SHIMM on the 1m Nickel Telescope at Lick Observatory, as part of a collaboration with Maaike von Kooten at UCSC.
- Co-I on INAF mini-grant at INAF-Padova to predict the phase of non-illuminated sub-apertures for multi-conjugate AO, improving the high-layer closed-loop performance of LINC-NIRVANA.
- **Supervisor:** Prof. Quinn Konopacky

Max Planck Institute for Astronomy *Heidelberg, Germany*

Post-doctoral Reseacher *Jul 2018 - Oct 2020*

- Worked on the Piston-Reconstruction Experiment (P-REx), which reconstructs the piston drift caused by the atmosphere for interferometric telescopes, such as LBTI and VLTI, using AO telemetry.
- Generated pseudo open loop CIAO WFS data for P-REx to compare with GRAVITY's fringe tracking data.
- Collaborated with Dr Steve Ertel at the Steward Observatory to analyse archival fringe tracking and science data from the LBTI nulling mode to characterise data quality with respect to telescope vibrations.
- Supported the SOUL AO observations for the LBTI.
- Collaborative work with Kalyan Radhakrishnan using LINC NIRVANA's MCAO telemetry data to develop a predictive wavefront technique for the partially illuminated high layer conjugated WFS.
- **Supervisor:** Dr Jörg-Uwe Pott

Durham University / Pontificia Universidad de Católica *Santiago, Chile*

Research Associate *Jan 2018 - Jun 2018*

- Collaborative work between Europen Southern Observatory (Marc Sarazin), Pontificia Universidad de Católica (Andres Guesalaga) and Durham University (Richard Wilson), funded to commission the FASS-SHIMM instrument.
- This included polar alignment, building a sky model, autoguiding, data acquisition, installation of the instrument and on-sky testing.
- Produced technical documentation, user manual and installation of the instrument and the software.
- **Supervisor:** Prof. Andrés Guesalaga

Supervision & Teaching

Daniel Levinstein Supervised post-bachelor student for 6 months. Continued supervision for an additional year as he became a staff research assistant. Daniel worked on estimating coherence time from AO telemetry (Levinstein et al., 2022).

EXPAND & CAMPARE Mentored and supervised several undergraduate students for computational and lab-based research projects. These programs aim to provide research experience and mentorship for underrepresented students.

Teaching Expecting to create a graduate adaptive optics course at UCSD for the spring term. Demonstrated in undergraduate Python computing labs.

Technical Skills

Programming Proficient in Python, basic programming in C++ and have experience in IDL, MATLab and html.

Software Development Built software to interface with CCD and EMCCD detectors based on the SDK of the providers. Co-developed the autoguiding software for a telescope (VX Mount). Developed data acquisition and real-time data analysis of the SHIMM.

Lab Work Experienced in optical alignment. Worked with (EM)CCDs, liquid nitrogen, vaccum pumps, and worked in cleanroom conditions.

Observations Observe with KPIC on Mauna Kea, and 1-m Nickel at Lick Observatory. Facilitated LBTI observations by controlling SOUL AO system on the LBT. Made observations with the SHIMM five times and FASS-SHIMM five times, at La Palma and Paranal Observatory.

Key Skills

Networking Co-founder of the Network of Young Researchers in Instrumentation for Astrophysics (NYRIA). Started and maintain the NYRIA website (https://nyriastronomy.github.io), and organised international annual workshops and virtual events.

Communication Working in a large consortium, communicating with observatory personnel, and presentations to varied audiences.

Outreach Work with the Postdoctoral Association on science outreach. Conduct planetarium shows for primary and secondary school students with the OIRLab. In the UK, I was UK STEM Ambassador, demonstrated in science fairs and science festivals, visited secondary schools, organised lab tours and volunteered at the London Science Museum as a curatorial archiver.

Committees Serve on the Graduate Student Diversity and Inclusion group. At Durham University I served as a post-graduate representative for three years, on the Diversity and Equality Committee for two years and basketball team's social secretary for two years.

Languages Native English speaker and basic Spanish.

Proposals

- **Keck: NIRSPAO** "Doppler Images of LP349-25AB", Co-Investigator U073 (2023B)
- **Nickel 1-m Telescope** "Continuing Atmospheric profiling at Mt. Hamilton using the Nickel Telescope", Principle Investigator N003 (2023A)
- **Keck: KPIC** "Doppler Images of LP349-25AB", Co-Investigator U080 (2022B)
- **Nickel 1-m Telescope** "Atmospheric profiling at Mt. Hamilton using the Nickel Telescope", Co-Investigator N009 (2022B)
- **INAF Mini-Grant** "AO telemetry as a remedy for the metapupil partial illumination issue", Co-Investigator (2022)

Recent Presentations

- **Presentation** Characterising the atmosphere with the SHIMM, AO4ELT7 Conference (2023)
- **Poster** GPI 2.0: pyramid wavefront sensor status, AO4ELT7 Conference (2023)
- **Invited Presentation** Imaging Jupiters with GPI 2.0, University of Hertfordshire Seminar (2023)
- **Invited Presentation** Atmospheric Turbulence Profiling for Astronomy, University of Hilo Seminar (2022)
- **Invited Presentation** Atmospheric Turbulence Profiling for Astronomy, University of Notre Dame Astronomy Seminar (2022)
- **Presentation** GPI 2.0: upgrade status of the Gemini Planet Imager, *On Behalf of J. Chilcote* SPIE (2022)
- **Presentation** Upgrading the Gemini Planet Imager to GPI 2.0, Spirit of Lyot (2022)
- **Poster** GPI 2.0: pyramid wavefront sensor status, SPIE (2022)
- **Recorded Presentation** Testing P-REx on VLTI data, SPIE (2020)

Publications & Writing

First & Second Author

- **Perera S.** et al., *"SHIMM - A Versatile Seeing Monitor for Astronomy"*, MNRAS, Volume 5, Issue 4 (2023) https://doi.org/10.1093/mnras/stad339
- **Perera S.** et al., *"Piston Reconstruction Experiment (P-REx) – II. Off-line performance evaluation with VLTI/GRAVITY"*, MNRAS Volume 511, Issue 4, (2022) https://doi.org/10.1093/mnras/stab3813
- **Perera S.** et al., *"GPI 2.0: pyramid wavefront sensor status"*, Proc. SPIE 12185, Adaptive Optics VIII (2022) https://doi.org/10.1117/12.2629062
- Levinstein D.M., **Perera S** et al., *"Estimating effective wind speed from Gemini Planet Imager's adaptive optics data using covariance maps"*, Proc. SPIE 12185, Adaptive Optics VIII (2022) https://doi.org/10.1117/12.2629677
- **Perera S.** et al., *"Testing P-REx on VLTI data"*, Proc. SPIE 11446, Optical and Infrared Interferometry and Imaging VII, (2020) https://doi.org/10.1117/12.2560105
- Santhakumari K.M.R., **Perera S.** et al., *"Wind estimates from layer-oriented MCAO telemetry: working towards wavefront prediction"*, Proc. SPIE 11448, Adaptive Optics Systems VII, (2020) https://doi.org/10.1117/12.2561368
- **Perera S.** et al., *"SHIMM: a seeing and turbulence monitor for astronomy"*, Proc. SPIE 9909, Adaptive Optics Systems V, (2016) https://doi.org/10.1117/12.2231680
- Guesalaga A., **Perera S.** et al., *"FASS: the full aperture seeing sensor"*, Proc. SPIE 9909, Adaptive Optics Systems V, (2016) https://doi.org/10.1117/12.2232012

Other Author

- Spalding E., Do-Ó C., Peng D., **Perera S.**, Chilcote J., Hamper R., et al., *"GPI 2.0: baseline testing of the Gemini Planet Imager before the upgrade"*, Proc. SPIE 12184 Ground-based and Airborne Instrumentation for Astronomy IX, (2022) https://doi.org/10.1117/12.2630580
- Peng D. et al., *"GPI 2.0: performance of upgrades to the Gemini Planet Imager CAL and IFS"*, Proc. SPIE 12184 Ground-based and Airborne Instrumentation for Astronomy IX, (2022) https://doi.org/10.1117/12.2630329
- Gibbs A. et al., *"Echelle simulation for the High-resolution Infrared Spectrograph for Exoplanet Characterization (HISPEC) at Keck"*, Proc. SPIE 12184 Ground-based and Airborne Instrumentation for Astronomy IX, (2022) https://doi.org/10.1117/12.2630403
- Guesalaga A., Ayancán B., Sarazin M., Wilson R. W., **Perera S.** & Le Louarn M., *"FASS: a turbulence profiler based on a fast, low-noise camera"*, MNRAS Volume 501, Issue 2, (2021) https://doi.org/10.1093/mnras/staa3823
- Rodeghiero G., Arcidiacono C., Pott J-U., **Perera S.**, Pariani G., Magrin D., et al., *"Performance and limitations of using ELT and MCAO for 50 μas astrometry"*, JATIS, Volume 7, Issue 3 (2020) https://doi.org/10.1117/1.JATIS.7.3.035005
- Ertel S. et al., *"The HOSTS Survey for Exozodiacal Dust: Observational Results from the Complete Survey"*, AJ Volume 159 (2020) https://doi.org/10.3847/1538-3881/ab7817
- Ertel S. et al., *"Overview and prospects of the LBTI beyond the completed HOSTS survey"*, Proc. SPIE 11446, Optical and Infrared Interferometry and Imaging VII (2020) https://doi.org/10.1117/12.2561849
- Rodeghiero G. et al., *"Development of the Warm Astrometric Mask for MICADO Astrometry Calibration"*, PASP Volume 131, Number 999 (2019) https://doi.org/10.1088/1538-3873/ab0c40
- Béchet C., Ayancán B., Badinez R., Guesalaga A., Sarazin M., **Perera S.**, et al., *"The Generalized FASS (Full Aperture Seeing Sensor): filling the lower altitudes of the Cn2 profile"*, Proc. AO4ELT5 (2017)
- Osborn J., Butterley T., **Perera S.**, Fohring D. & Wilson R. W., *"Observations of the dynamic turbulence above La Palma using Stereo-SCIDAR"*, Proc. AO4ELT4 (2015)

Instrument Documentation

- **Perera, S.**, Maire J., Do Ó C., Nuygen J. & Konopacky Q., W., *"GPI 2.0 PWFS Cabling"* (2023)
- **Perera, S.**, Maire J., Do Ó C. & Konopacky Q., W., *"GPI 2.0 PWFS Test Plan "* (2021)
- **Perera, S.** & Wilson, R. W., *"FASS-SHIMM Technical Document"* (2018)
- **Perera, S.**, Guesalaga, A. & Wilson, R. W. *"FASS-SHIMM Instrument: Commissioning Report and Results"* (2018)
- **Perera, S.**, Wilson, R. W. & Guesalaga, A., *"FASS-SHIMM Instrument: User Manual and Software System Description"* (2018)

References available upon request.