

Saavidra Perera

3515 Fourth Avenue, San Diego CA 92103

EDUCATION

DURHAM UNIVERSITY DURHAM, UK
PhD 2013-2017
Thesis Title: "SHIMM: A Low-Cost Portable Seeing Monitor for Astronomical Observing Sites"
Supervisor: Prof. Richard Wilson

IMPERIAL COLLEGE LONDON LONDON, UK
MSci 2008-2012
Thesis Title: "Characterising the Atomic Fluctuations of Ovens Used in Ion Traps"
Supervisor: Prof. Richard Thompson

APPOINTMENTS

UNIVERSITY OF CALIFORNIA SANTA CRUZ BASED IN SAN DIEGO, USA
Assistant Project Scientist Nov 2024 - Present

- Co-leading the commissioning of the Gemini Planet Imager (GPI 2.0)
- Ground-based high-precision photometry
- Doppler mapping M-dwarfs
- Working in UCO Director Bruce Macintosh's group

UNIVERSITY OF CALIFORNIA SAN DIEGO SAN DIEGO, USA
Postdoctoral Researcher Jan 2021 - Nov 2024

- Leading the build, testing and integration of the new pyramid wavefront sensor for GPI 2.0
- Predictive work for adaptive optics
- Atmospheric profiling technique and instrument development
- Observational interests include young Jupiters and M-dwarfs

MAX PLANCK INSTITUTE FOR ASTRONOMY HEIDELBERG, GERMANY
Postdoctoral Researcher 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

DURHAM UNIVERSITY / PONTIFICIA UNIVERSIDAD DE CATÓLICA SANTIAGO, CHILE
Research Associate Jan 2018 - Jun 2018

- Commissioned the FASS-SHIMM instrument at Paranal Observatory

TELESCOPE TIME & GRANTS

- **Heising-Simons Science Program** 50,000 USD, "NYRIA 2024 Workshop: International network for early career researchers in astronomical instrumentation", Co-Investigator (2024)
- Awarded **Dean of Physical Sciences EDI Funds** 5,000 USD, "NYRIA 2024 Workshop: International network for early career researchers in astronomical instrumentation" (2024)
- **Shane 3-m Telescope** "Lucky Photometry: Overcoming Scintillation for Precise Ground-Based Transit Observations - ShaneAO/ShARCS", Co-Investigator S026 (2024B)
- **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**, 19,000 EUR, “AO telemetry as a remedy for the metapupil partial illumination issue”, Co-Investigator (2022)

ASTRONOMY COMMUNITY SERVICE

REVIEW PANELS

- NASA APRA Review Panelist

AO US STRATEGIC COMMITTEE

Postdoctoral Representative

2023

- Invited to attend and participate in a workshop with the end product being a white paper outlining a roadmap for AO support of the Astro2020 Decadal survey

SPIRIT OF LYOT DIVERSITY, EQUITY AND INCLUSION SURVEY

Member

2022 - Present

- Collating survey results regarding bullying and harassment in the high contrast imaging astronomy community
- Co-writing paper to publish work in a peer-reviewed journal.

PAPER REFEREE

Postdoctoral Representative

2021 - Present

- Reviewed papers for PASP and New Astronomy

NYRIA

Co-Founder

2015 - Present

- Network For Young Researchers in Instrumentation for Astronomy is a network created to support early career research in instrumentation
- Co-created and maintained the NYRIA website (<https://nyriastronomy.github.io>) between 2016 and 2021
- Organised international annual workshops and virtual events

DEPARTMENTAL SERVICE

UCSD A&A JUSTICE, EQUITY, DIVERSITY & INCLUSION AFFINITY GROUP

Postdoctoral Representative

2024 - Present

- To assess JEDI-related needs within the department.
- Formulate actionable items to create change for all members of the UCSD Astronomy and Astrophysics Department.

UCSD ASTRONOMY AND ASTROPHYSICS DEPARTMENT OUTREACH COMMITTEE

Postdoctoral Representative

2023 - Present

- Creating and building relationships with local schools and youth centres for underserved communities
- Leading organisation of outreach events
- Developing outreach content
- Creating pamphlets highlighting the department’s outreach, as well as creating posters/stickers highlighting women of colour in physics

UCSD PHYSICS GRADUATE STUDENT DIVERSITY AND INCLUSION GROUP

Postdoctoral Representative

2021 - 2022

- Facilitated student action items
- Wrote departmental proposal documents

MPIA CLIMATE WORKING GROUP

Postdoctoral Representative

2020

- Co-organised institute-wide surveys
- Co-organised diversiTEA, a forum to discuss diversity and equity-related topics within astronomy

DURHAM PHYSICS DIVERSITY AND EQUITY COMMITTEE

Post-graduate Student Representative

2015 - 2017

- Addressed the working climate
- Worked towards Athena Swan silver awards
- Looked at yearly trends of female postgraduate applicants, accepted positions and retention in the Physics department
- Looked at exam score trends for different undergraduate courses according to gender.

DOCU-FORUM AT DURHAM UNIVERSITY

Co-founder

2014 - 2015

- Organised viewings of documentaries regarding different social justice issues, e.g., climate change, the Bhopal disaster, animal cruelty, modern slavery, fair trade etc.
- Invited academic researchers in these fields to lead discussions regarding these topics.
- Chaired discussions.

DURHAM PHYSICS DEPARTMENT COUNCIL

Post-graduate Student Representative

2012 - 2017

- Organised departmental events to promote cohesion between the different groups
- Collected graduate student queries, concerns and suggestions and liaised with faculty.

MENTORSHIP & SUPERVISION

- **Zhenxi Du:** (*UCSD Senior*) Continued work carried out by Daniel and collaborating with the UCSC team on the Nickel-SHIMM. This work was presented at SPIE, Du et al., 2024. (2023 - 2024)
- **Isabella Real:** (*UCSD Senior*) 10-week research project on coherence time measurement from AO telemetry. (2023)
- **Taiqoor Ahmad:** (*Graduated UCSD*) 10-week research project on writing algorithms to characterise wavefront sensor performance. (2022)
- **Desiree Harvell:** (*Graduated CSUSB*) 10-week research project through Cal-bridge on characterising a shack-hartmann wavefront sensor. (2022)
- **Daniel Levinstein:** (*Now Graduate Student at UC Irvine*) Supervised Daniel for 18 months during his time as a staff research assistant at UCSD. Daniel worked on estimating coherence time from AO telemetry and how it relates to the wind butterfly effect seen in coronagraphic images. He presented his work in Levinstein et al., 2022. (2021 - 2022)
- **Algita Stankevičiūtė:** (*Graduate PhD at the University of Warsaw, now Optical Sales Engineer*) 4-week research project on centroiding for AO. (2019)

TEACHING

- **Undergraduate Optics Course** Writing part of the optics undergraduate course for the UCSD Astronomy & Astrophysics Department, and will teach part of the course in the Winter quarter of 2025
- **Invited Workshop Lecture** Wrote and gave a 90-minute lecture on atmospheric turbulence for the CfAO Summer School (2023 & 2024)
- **AstroTech** Co-authored and demonstrated introductory optics labs as part of a week-long workshop designed to promote instrumentation for students from underrepresented backgrounds (2021)
- **Computing Labs** Demonstrator for Python computation labs during my graduate studies. This included leading teaching in groups of 15 - 20 (2014 - 2015)
- **Marking** Marking undergraduate courses during graduate school (2013 - 2014)

SELECTED OUTREACH COMMUNITY ENGAGEMENT

- **15+ years** of outreach experience, dating back to before undergraduate university.
- As a UCSD A&A Outreach Committee member, I organise outreach events and create and build relationships with local youth groups and schools for under-served communities (2023 - present)
- At UCSD, organize and volunteer at booths at science fairs and campus outreach events, mainly focused on under-served and under-represented communities e.g. Bario Logan Science & Art Expo, STEM Girl Summer (2021 - present)
- Conduct planetarium shows for primary and secondary school students with the OIRLab (2022 - present)
- Work with UCSD Postdoctoral Association for in-person and virtual science outreach at underserved schools (2021 - 2023)
- Narrated a planetarium show for MPIA's Haus de Astronomie (<https://youtu.be/OxSEbM56E2U>) (2019)
- UK STEM Ambassador, demonstrated in science fairs and science festivals, visited secondary schools, organised lab tours throughout graduate school (2012 - 2017)
- Volunteered at the London Science Museum as a curatorial archiver (2009 - 2010)

TECHNICAL SKILLS

- **Programming:** Proficient in Python, basic programming in C/C++ and have experience in IDL, MATLAB and html.
- **Software Development:** Built software to interface with CCD and EMCCD detectors and optomechanical stages based on the vendor SDK. Developed data acquisition and real-time data analysis of multiple atmospheric profiling instruments.
- **Lab & Onsite Work:** Experienced in optical alignment. Worked with (EM)CCDs, liquid nitrogen, and vacuum pumps, and worked in cleanroom conditions. Assessed instrument performance both in the lab and on-sky. Commissioned the FASS-SHIMM. Facilitated LBTI observations by controlling SOUL AO system on the LBT.

SELECTED RECENT TALKS & PRESENTATIONS

Invited Institute & Conference Talks

Oct 2024	Queen Mary University of London Astronomy Seminar: "Imaging Jupiters with GPI2.0"
Jan 2024	Pepperdine University Natural Science Division Seaver College Seminar: "Why Do the Stars Twinkle?"
Dec 2023	UCSD Astronomy & Astrophysics Seminar: "Seeing Through the Atmosphere"
Nov 2023	(Keynote speaker) CfAO Fall Retreat: How to Utilise AO Telemetry
Sep 2023	Carnegie Institute Colloquium: Overcoming the Earth's Atmosphere to Find Young Jupiters
Aug 2023	SPIE Conference: Upgrade status of the Gemini Planet Imager
Jun 2023	University of Hertfordshire, Centre for Astrophysics Research Seminar: Imaging Jupiters with GPI 2.0,
Nov 2023	University of Hilo, IfA Seminar: Atmospheric Turbulence Profiling for Astronomy
Sep 2022	University of Notre Dame Astronomy Seminar: Atmospheric Turbulence Profiling for Astronomy
Apr 2022	CfAO Decadal AO Strategic Planning workshop: Atmospheric Profilers

Conference Contributions

Jun 2024	SPIE Talk: GPI 2.0: pre-integration results of the pyramid wavefront sensor
Jul 2023	AO4ELT7 Talk: Characterising the atmosphere with the SHIMM
Jul 2023	AO4ELT7: GPI 2.0: pyramid wavefront sensor status (Poster)
Apr 2023	Protostars and Planets VII: GPI 2.0: upgrade status of the Gemini Planet Imager (Poster)
Jul 2022	SPIE Talk: GPI 2.0: upgrade status of the Gemini Planet Imager (on behalf of J. Chilcote)
Jul 2022	SPIE: GPI 2.0: pyramid wavefront sensor status (Poster)
Jun 2022	Spirit of Lyot Talk: Upgrading the Gemini Planet Imager to GPI 2.0
Dec 2020	SPIE Recorded Talk: Testing P-REx on VLTi data

PUBLICATIONS

First & Second Author

- **Perera S.** et al., “GPI 2.0: pre-integrated pyramid wavefront sensor results”, Proc. SPIE 13097, Adaptive Optics Systems IX (2024) <https://doi.org/10.1117/12.3020360>
- Du Z., **Perera S.** et al., “Estimating atmospheric wind speeds from Gemini planet imager AO telemetry”, Proc. SPIE 13097, Adaptive Optics Systems IX (2024) <https://doi.org/10.1117/12.3020607>
- Do Ó C., **Perera S.** et al., “GPI 2.0: exploring the impact of different readout modes on the wavefront sensor’s EMCCD”, Proc. SPIE 13097, Adaptive Optics Systems IX (2024) <https://doi.org/10.1117/12.3019439>
- **Perera S.** et al., “Upgrading Gemini Planet Imager to GPI 2.0”, Proc. SPIE 12860, Techniques and Instrumentation for Detection of Exoplanets XI (2023) <https://doi.org/10.1117/12.2676960>
- Do Ó C., **Perera S.** et al., “GPI 2.0: Performance Evaluation of the Wavefront Sensor’s EMCCD”, Proc. AO4ELT7, (2023)
- **Perera S.** et al., “SHIMM - A Versatile Seeing Monitor for Astronomy”, MNRAS, Volume 520, 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 VLT/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 VLT 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

- Chilcote J., et al., “GPI 2.0: upgrade status of the Gemini Planet Imager”, Proc. SPIE 13096, Ground-based and Airborne Instrumentation for Astronomy X (2024) <https://doi.org/10.1117/12.3020642>
- Nguyen J., Maire J., **Perera S.** et al., “GPI 2.0: end-to-end simulations of the AO-coronagraph system”, Proc. SPIE 13097, Adaptive Optics Systems IX (2024) <https://doi.org/10.1117/12.3019213>
- Jackson O., van Kooten M., **Perera S.**, Jensen-Clem R. & Hinz P. “SHIMM as an atmospheric profiler on the Nickel telescope”, Proc. SPIE 12680, Techniques and Instrumentation for Detection of Exoplanets XI (2023) <https://doi.org/10.1117/12.2677510>
- Peng D. et al., “Testing and performance of IFS upgrades for GPI 2.0”, Proc. SPIE 12680, Techniques and Instrumentation for Detection of Exoplanets XI (2023) <https://doi.org/10.1117/12.2677675>
- Chilcote J. et al., “GPI 2.0: Upgrade Status of the Gemini Planet Imager”, Proc. SPIE 12184 Ground-based and Airborne Instrumentation for Astronomy IX, (2022) <https://doi.org/10.1117/12.2630159>
- 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 results and comparison with SCIDAR and MASS*”, Proc. SPIE 121851, Adaptive Optics Systems IX, (2022) <https://doi.org/10.1117/12.2628740>
- 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 μ s 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)
- Guesalaga A., **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)

TECHNICAL DOCUMENTATION

- (In Prep.) Contribution to White Paper for Adaptive Optics in the US (2023)
- **Perera, S.**, Chambouleyron V., Maire J., Do Ó C., Nuygen J. & Konopacky Q., W., “*GPI 2.0 PWFS Integration & Calibration Plan*” (2023)
- **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)