

# Viduranga Shenal Landers

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## Education

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- University of Colombo School of Computing** – *BSc (Hons) in Computer Science* 2023 – 2027
- GPA: 3.95/4.00 (Highest) • Director's List (Sem 1,2,3,4) • Faculty Award (Year 1)
  - Leadership: Chairperson (ACM), Executive Committee (ISACA), Divisional Manager (SEDS)
- QWorld and University of Latvia** – *QClass 23/24 (6 ECTS, Graduate Level)* 2023 – 2024
- Courses: Elements of Quantum Computing and Programming (100%), Elementary Quantum Algorithms (81.4%)
- D.S. Senanayake College** – *Secondary Education* 2013 – 2022
- G.C.E. Advanced Level: 2A 1B 1C (Rank: 2256) • SAT: 1490 (790 M, 700 EBRW)

## Publications & Patents

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- 10 Publications:** 6 Conference Papers (IAC, ICGS3), 3 Book Series Chapters (Springer), 1 Policy Brief
- Quantum e-voting system using QKD and enhanced Quantum Oracles (2024, ICGS3) [🔗](#)
  - Symmetrically Entangled Quantum oracles for Quantum Key Distribution (2023, Pre-Print) [🔗](#)
  - Quantum Revolution in Space: Enhancing Space Technology (2024, Springer Space Law and Policy Series) [🔗](#)
- 2 Patents:** Autonomous Adjustable Grousers (LK21653), Extendable Drill System (LK21652)

## Key Achievements

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- Quantum:** QHack Top 40 • Quantum Internet Application Challenge Top 3 • IBM Quantum Challenge Top Scorer  
**Space:** Asia Pacific Space Leader Award • NASA GLEE Winner • NASA SpaceApps Global Nominee  
**Technical:** IEEE Xtreme 2nd/4th in Sri Lanka • European Rover Challenge Finalist • ICGS3 Keynote Speaker

## Technical Skills

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- Programming:** C/C++, Python, Java, Scala, Octave, MERN Stack, VHDL, Verilog, Arduino  
**Quantum:** Qiskit, QNE-ADK, SquidASM, PennyLane  
**Engineering:** CAD/FEM (SolidWorks, Inventor), DEM (Altair EDEM), MBSE (Capella), FPGA, IoT

## Selected Projects

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- Quantegrity: Quantum-Secure E-Voting System** - *Research Project*
- Designed and developed a novel e-voting system leveraging Quantum Key Distribution (QKD) and enhanced quantum oracles to ensure information-theoretic security. Published at ICGS3-24 [C.1].
- HA-FPGA: Hybrid Analog-FPGA Architecture** - *Team Aerolite*
- Developing a novel hybrid computing architecture on an FPGA for high-efficiency, radiation-tolerant satellite data processing. Project selected as a semi-finalist in the ACHIEVED competition.
- Quantum Circuit & Network Simulator** - *Personal Project*
- Built a full quantum circuit simulator from scratch in JavaScript to model quantum gates using a drag and drop layout, and a quantum network simulator to demonstrate basic network protocols.

## Professional Development

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- Electronics:** FPGA Embedded Systems (ACCIMT) • ASIC/FPGA Design (UoM) • IoT Product Design (UoM)  
**Quantum:** QBronze, QZinc, QMercury, QNickel (QWorld) • IBM Qiskit Global Summer School (4x)

*See appendix for detailed project descriptions, complete publications list, and additional achievements*

# APPENDIX - DETAILED INFORMATION

## Publications

C=Conference, P=Pre-print, B=Book Chapter, PB=Policy Brief

- [C.1] Landers V.\* (2024). **Quantum e-voting system using QKD and enhanced quantum Oracles**. *16th Annual International Conference on Global Security, Safety and Sustainability, ICGS3*, Nov 25-27, 2024. [🔗](#)
- [C.2] Landers V\*, Pathirana O, et al. (2024). **Economical Lunar Sample Return Mission with Soil Penetration Darts**. *75th International Astronautical Congress*, Milan, Italy, Oct 14-18, 2024. IAC-24,A3,IP,118,x89101. [🔗](#)
- [C.3] Landers V.\*, Campioli S., et al. (2023). **High-technology Operation for Planetary Exploration - uRanian mOons impActoR (HOPE-ROAR) mission: an innovative in-depth study of the Uranian satellites**. *74th International Astronautical Congress*, Baku, Azerbaijan, Oct 2-6, 2023. IAC-23,B4,8,12,x76984. [🔗](#)
- [C.4] Landers V.\*, Pathirana O., et al. (2022). **Soil Penetration Darts (SPDs) for Deep Soil Sampling**. *73rd International Astronautical Congress*, Paris, France, Sep 18-22, 2022. IAC-22,A3,IPB,30,x72590. [🔗](#)
- [C.5] Rao S.\*, Landers V., et al. (2022). **Mercury Sample Return Mission Design Utilizing Innovative Systems & Technologies**. *73rd International Astronautical Congress*, Paris, France, Sep 18-22, 2022. IAC-22,A3,5,1,x69552. [🔗](#)
- [C.6] Landers V.\*, Pathirana O., et al. (2021). **A Self Adapting Wheel System for Space Exploration Rovers**. *72nd International Astronautical Congress*, Dubai, UAE, Oct 25-29, 2021. IAC-21,E2,3-GTS,4,2,x65366. [🔗](#)
- [B.1] Landers V.\* (2024). **Quantum Revolution in Space: Enhancing Space Technology**. Jahankhani H., Kendzierskyj S., et al. (Eds.), *Space Law Principles and Sustainable Measures*, Space Law and Policy Series, Springer. [🔗](#)
- [B.2] Landers V.\* (2024). **Quantum Technologies for Space and Aerial Vehicles**. Jahankhani H., Kendzierskyj S., et al. (Eds.), *Space Governance: Challenges, Threats and Countermeasures*, Space Law and Policy Series, Springer. [🔗](#)
- [P.1] Landers V.\* (2023). **Symmetrically Entangled Quantum Oracles for Quantum Key Distribution**. Pre-print. Submitted to 25th International Conference on Advances in ICT for Emerging Regions (ICTer), Colombo, Sri Lanka, Nov 19-20, 2025. [🔗](#)
- [P.2] Landers V.\* (2025). **Planetary Penetrators for Space Mining**. Accepted for Jahankhani H., Kilpin D., et al. (Eds.), *Space Mining: Humanities Quest for Equity*, Space Law and Policy Series, Springer. [🔗](#)
- [PB.1] Fonseka A.\*, Landers V (2025). **Opportunities for Digitization of Sri Lanka's Public Sector**. *Policy Tribune Vol 1 - Issue 2*, Bandaranaike Academy for Leadership and Public Policy. [🔗](#)


## Patents

- A Wheel that includes Autonomous Adjustable Grousers** (Sri Lankan Patent No: LK21653 – Oct 2023)
- A Fully Autonomous Extendable Drill and Method Thereof** (Sri Lankan Patent No: LK21652 – July 2024)


## Research & Project Experience

- Quantegrity: Quantum E-Voting System** [🔗](#) – Research Project 2024 - Present
- Developed a novel quantum-secure e-voting protocol, leading to a conference paper and a preprint; selected as a notable application (top 3) at the Quantum Internet Application Challenge.
  - Work & Tools:** Implemented a Symmetrically Entangled Oracle based QKD protocol and a mixnet based voting system using Python, Qiskit, and the SquidASM quantum network simulator.
  - Related Publications:* [C.1], [P.1]
- Quantum Circuit & Network Simulator** [🔗](#) – Personal Project 2025 - Present
- Built a client-side computational quantum computing simulator from scratch and a quantum network simulator with multiple node entanglement capabilities. Hoping to contribute as a library to Ballerina Language.
  - Work & Tools:** Developed entirely in JavaScript, featuring a visual circuit builder, state-vector simulation, and support for basic quantum network protocols.
- Hybrid Analog-FPGA Computing Architecture** [🔗](#) – Lead, Team Aerolite 2024 - Present
- Developing a Hybrid Analog-FPGA computing architecture for satellite systems; selected as a semi-finalist in the ACHIEVED competition;
- Soil Penetration Darts** [🔗](#) – Project Lead, Nexus Aurora Corporation Aug 2022 – Present
- Leading an international team to develop planetary penetrators for deep soil sampling missions.
  - Work & Tools:** Hyper-velocity impact simulation using Discrete Element Method (Altair EDEM), mission analysis (Python), Model-Based Systems Engineering (Capella), and CAD/FEA (SolidWorks).
  - Related Publications:* [C.2], [C.4], [P.2]
- Great Lunar Expedition for Everyone (GLEE)** [🔗](#) – Team Lead, Team Aerolite May 2022 – Present
- Led a team in a NASA Artemis Challenge, winning "Best Overall Proposal" for the L-SPyDer, a deployment module designed to disperse 100 ChipSats on the lunar surface.

- **Work & Tools:** Directed mission design, system innovation, power budget analysis (Python), and payload programming (Arduino).

**ACHIEVED Research Initiative**  – *Project Co-Lead / Subsystem Lead. SGAC* Jan 2022 – Dec 2023

- Co-led an international team designing a CubeSat mission to a Uranian moon (HOPE) and led the structures/thermal design for a Mercury sample-return mission concept (RAISE).
- **Work & Tools:** Utilized MBSE (Capella) for system architecture, CAD (SolidEdge), and Python for thermal analysis and mission budgeting.
- *Related Publications:* [C.3], [C.5]



**Lunarbot**  – *Founder & Team Leader* 2020 – 2024

- Founded a team to develop innovative rover instruments, resulting in two patents and a publication for a Self-Adapting Wheel System (SAWS) that was prototyped and to be field-tested in the Arctic.
- **Work & Tools:** Led prototyping, terramechanic simulations (Altair EDEM), FEA, self-locking gear system design, and navigation/control algorithm development.
- *Related Publication:* [C.6]

**Taprobane Rover**  – *Technical Lead, Robotics and Rover Division, SEDS Sri Lanka* Jan 2022 - Apr 2025

- Directing a 50+ member university student team in developing Taprobane, Sri Lanka's first analog Mars rover, for the European Rover Challenge.
- **Work & Tools:** Overseeing full system design, subsystem integration, and preparation of technical design documentation (PDR/CDR).

**Selected Coursework Projects** – *University of Colombo School of Computing* 2023 – Present

- **Quantum Educational Platform:**  Developed a full-stack (MERN) educational tool featuring a client-side quantum circuit simulator built from scratch in JavaScript.
- **Low-Level Systems Programming:** Built a custom memory allocator ('malloc' emulator) in Python and developed a simple compiler front-end using Flex & Bison to parse a custom C-like language.
- **Software Architecture from Scratch:**  Engineered a comprehensive ERP system using a Java-based microservices architecture and a custom front-end framework (mini-React), without external libraries.

**FPGA/ASIC Design & Low-Level Systems** - *Coursework & Personal Projects*

- Implemented various digital systems on FPGAs (Cyclone II, Max 10) using VHDL/Verilog and completed certified training in ASIC/FPGA design, embedded systems, and IoT product development.

## Work Experience

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**Technical Assistant - Part Time** – *iRentTech* Sep 2023 – Present

- Overseeing delivery and repairs (software & hardware) of Laptops

## Honors and Awards

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**Faculty Award for Best Performing Student (Year 1)** – University of Colombo School of Computing (2024)

**Asia Pacific Space Leader Award** – Space Generation Advisory Council (2023)

**Keynote Speaker** – 15th International Conference on Global Security, Safety & Sustainability (2023)

## Achievements

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- 2025** ◦ **Top 3 Notable Applications** – Quantum Internet Application Challenge, Quantum Internet Alliance
- 2024** ◦ **Winner (Overall Category)** – Lunar Deployment Challenge (Team), NASA's GLEE Mission
- **1st Runner Up** – Predicta (Team), Data Science Hackathon
- **2nd - Sri Lanka (75th - Global)** – IEEE Xtreme 18.0 (Team), Competitive Programming Hackathon
- **40th Global (AWS \$500 Powerup)** – QHack 2024 (Team), Quantum Machine Learning Hackathon
- 2023** ◦ **4th - Sri Lanka (152nd - Global)** – IEEE Xtreme 17.0 (Team), Competitive Programming Hackathon
- **Best 3 Applications** – Quantum Network Explorer Application Challenge
- 2022** ◦ **Finalist Team (17th)** – European Rover Challenge - On-site edition (Team)
- 2021** ◦ **Distinction Award** – Singapore Space Challenge 2021 (Team)
- **Top Scorer** – IBM Quantum Challenge, Quantum Computing Hackathon
- 2020** ◦ **Global Nominee** – NASA Space Apps Challenge 2020 (Team)
- **Silver Award** – Hong Kong International Math Olympiad
- 2019** ◦ **Gold Medalist** – Sri Lankan Astronomy & Astrophysics Olympiad

## Professional Training

SC=Short Course ( $\leq 3M$ ), LC=Long Course ( $\leq 1Y$ ), CC=Certificate Course, WS=Workshop, SS=Summer School, V=Virtual, P=Physical, H=Hybrid

[SC/V]	CMOS Analog IC Design and Simulation '25. <i>ENTC, University of Moratuwa</i>	Jun - Aug 2025
[SC/V]	{System}Verilog for ASIC/FPGA Design & Simulation '25. <i>ENTC, University of Moratuwa</i>	Jan - May 2025
[SC/V]	Embedded Product Design for IoT '25. <i>ENTC, University of Moratuwa</i>	Jan - May 2025
[CC/P]	FPGA Embedded System Design. <i>Arthur C Clarke Institute for Modern Technologies</i>	July 2024
[CC/V]	QBronze, QZinc, QMercury, QNickel Diplomas in Quantum Computing Technologies. <i>QWorld</i>	2020 - 2024
[LC/V]	Quantum Hardware Certificate, Quantum Software Certificate. <i>Womanium Quantum</i>	2023
[SC/V]	Introduction to Programming with Neutral Atoms. <i>QuEra</i>	Aug 2023
[LC/V]	Introduction to Quantum Computing & Programming. <i>Coding School, Qubit x Qubit, IBM</i>	2020 - 2021
[SS/V]	Qiskit Global Summer School - x4 times. <i>IBM</i>	2021, 2022, 2023, 2025
[LC/V]	Systems Engineering, Launch & Operations, Space Mission Design & Analysis, Payload Design. <i>ACHIEVED Academy, SGAC</i>	Mar - August 2024
[SC/H]	CubeSat Development and Ground Station Control. <i>SEDS Pera, IEEE MTT-S, Orion Space</i>	May - Jun 2021
[WS/P]	CubeSat Workshop and Lecture Series. <i>SEDS Pera, Orion Space, University of Peradeniya</i>	7-10 Mar 2020

## Volunteering

<b>National Point of Contact, Sri Lanka</b> – <i>Space Generation Advisory Council</i>	Oct 2023 – Present
◦ Representing Sri Lanka in SGAC in support of the United Nations program on Space Applications, coordinating national space-related activities, and fostering international collaboration.	
<b>STEM Outreach &amp; Mentorship</b>	2020 – Present
◦ Led and contributed to multiple initiatives promoting STEM in Sri Lanka, including coordinating the SEDS Juniors chapter (~1000 members), co-authoring a national policy brief on digitalization, and organizing educational donation projects benefiting over 1500 rural students.	
<b>Citizen Scientist</b> – <i>International Astronomical Search Collaboration</i>	2020 – 2021
◦ Discovered 4 provisional asteroids through analysis of astronomical data sets from the Pan-STARRS telescope.	

## Additional Information

### Mathematical Art Publications [🔗](#):

- **SpiraL & Collatz Feather 2.0** [🔗](#) Exhibition of Mathematical Art, Joint Mathematics Meetings 2023.
- **Collatz Fractals** [🔗](#) Anomalous Mathematical Patterns Sci-Art Contest 2025, Isaac Newton Institute, UK.

**Interests:** Quantum Computing, Space Technology, Computer Architectures, Hardware Security, Planetary Robotics