Roberto Aguilar
Address: Lunar and Planetary Laboratory, University of Arizona, Tucson, AZ. roberto@lpl.arizona.edu

Education

2022—2027 (expected) PhD Planetary Sciences - Lunar and Planetary Lab, University of Arizona
- Research direction: retrieving subsurface properties of debris-covered glaciers on Earth and Mars
- MRO SHARAD Team Member producing and delivering clutter simulations to the NASA PDS
- Leading the development of a drone-based radar sounder with application on planetary analogs
- GPA: 4.0 (course requirements and comprehensive exam completed)

2018—2020 MSc Space Systems and Engineering - Skoltech (Summa cum laude)
(concurrently) MSc Traffic Control Systems and Navigation - Moscow Inst. of Physics and Tech.
- Thesis topic: Deep-learning-based lake ice detection using ESA Sentinel-1 SAR data
  - Visiting student at the Photogrammetry and Remote Sensing lab, **ETH Zurich**
- Internship at WiseTechnique: developed an automated landing guidance system for small aircraft using Computer Vision

2011—2015 BSc Computer Science - University of Costa Rica
- T.A.: Operating systems and Compilers & Automata lectures
- Founding member of the Aerospace Engineering Group of the university (rocketry club)

Professional experience

September 2017—May 2022 Aerialytics SRL www.aerialytics.ai
Co-founder / GIS Specialist
- Led geospatial projects on extensive agricultural fields, including mapping, inventorying, and monitoring using drone photogrammetry, multispectral satellite imagery, and AI platforms.
- Integrated drone mapping with spraying drones (DJI Agras and Hylio) for precision operations in extensive agricultural fields, optimizing application time and reducing water usage.
- Mentored four interns (two undergraduate and two technical high school students) in field visits for drone surveys and data processing with Agisoft and QGIS
- Awarded 1st place in the acceleration program *Programa de Innovación Tecnológica (PITs) 2020* from the University of Costa Rica with the project Suelo Fertil

June 2015—September 2017. Hewlett Packard Enterprise (R&D Center)
Embedded Software Engineer II / Scrum Master
- Developed a low-level feature for the Aruba Networking Operating System in C/C++
- Participated in different testing phases of the application: unit, integration, and system
- Received an *excellent* evaluation in the annual review for 2 years consecutively

August 2015—December 2015. University of Costa Rica
Lecturer (course: Information Systems Design)

October 2010—December 2010. Ad Astra Rocket Company
Electronics Technician (High school internship)

Funding sources

2024—2027 NASA FINESST (Planetary Sciences) “Searching for the oldest mid-latitude ice on Mars”

Awards

April 2025 College of Science Galileo Circle Scholarship
March 2025 LPL nominee for the College of Science Graduate Student Scholarship Award
June 2018 Skoltech President Scholarship
March 2018 1st place in the workshop *International Space Exploration Forum 2* organized by JAXA

Awards & Travel Grants

August 2024 Best of SAGEEP + travel grant provided by HydroGEOPHYSICS ($1,500)
May 2024 Mars Student Travel Award by the Mars Science Office at JPL ($1,500)
March 2024 Lunar and Planetary Lab Curson Travel Award ($1,000)
February 2024 Graduate Professional and Student Council Travel Award ($1,000)

Fieldwork experience

Sourdough Rock Glacier, AK (2023). Galena Creek Rock Glacier, WY (2022, 2023, 2024). Steindalsbreen Glacier, Norway (2023). Juneau Icefield, AK (2024). Channeled Scablands, WA (2024).

Scientific Publications Google Scholar

- T.M. Meng, B.S. Tober, **R. Aguilar**, M.F. Daniel, R.A. Jacobo-Bojorquez, S. Nerozzi, J. W. Holt. *Effects of rock glacier dynamics on surface morphology and deformation*. JGR Earth Surface 2025
- T.M. Meng, **R. Aguilar**, M.S. Christoffersen, E.I. Petersen, C.F. Larsen, J.S. Levy, and J.W. Holt. *Photogrammetric Monitoring of Rock Glacier Motion Using High-Resolution Cross-Platform Datasets: Formation Age Estimation and Modern Thinning Rates.* Remote Sensing, 2023.
- **R. Aguilar*,** M. Tom*, P. Imhof, S. Leinss, E. Baltsavias, K. Schindler, *Lake Ice Detection from Sentinel-1 SAR with Deep Learning,* ISPRS Annals 2020: **GitHub**. * Equal contribution.
- V. Mosin, **R. Aguilar,** A. Platonov, A. Vasiliev, A. Kedrov, A. Ivanov, *Remote Sensing and Machine Learning for Tree Detection and Classification in Forestry Applications.* ERS19 SPIE Remote Sensing, Strasbourg, France, 2019 **GitHub**

Conference Abstracts (listing only abstracts as first-author)

- **R. Aguilar**, T. M. Meng, M. S. Christoffersen, S. Nerozzi, J. W. Holt. Revealing Ice Age Sequences in Mars-Analog Glaciers with Drone-Based Sounding Radar and Photogrammetry. LPSC 2025, #1693
- **R. Aguilar**, T. M. Meng, M. S. Christoffersen, S. Nerozzi, J. W. Holt. Subsurface Investigations of Debris-Covered Glaciers as Mars Analogs with Drone-Based Ground Penetrating Radar. EPSC 2024.
- **R. Aguilar**, S. Nerozzi, M.S. Christoffersen, and J.W. Holt. New insights on internal layering of Martian mid-latitude glaciers with SHARAD, Mars Polar 2024, #6064
- **R. Aguilar**., T. M. Meng, M. S. Christoffersen, S. Nerozzi, J. W. Holt. Retrieving Subsurface Properties of Mars-analog Glaciers with Drone-based GPR. Proceedings of the Symposium for the Application of Geophysics for Environmental and Engineering Problems, SAGEEP 2024.
- **R. Aguilar**, S. Nerozzi, M.S. Christoffersen, E. Quartini, and J.W. Holt. Investigating Englacial Debris Bands on Mars with SHARAD, Using High Resolution Clutter Simulations and Slope Resolvability Analysis, LPSC 2024, #2479

Public Outreach

- Science outreach on space exploration for elementary and high school students in Costa Rica and Tucson (Spanish and English). Topics: operating planetary missions (landers, rovers, drones, orbiters), future robotic and human missions, habitability, resource utilization.
- Completed the LPI Planetary ReaCH workshop (outreach at the Boys & Girls Club of Tucson)

Press Releases

- One Costa Ricans Path to Success in the Space Industry and Startup thecostaricanews.com
- The story of Roberto Aguilar crhoy.com
- Rocketry club University of Costa Rica vinv.ucr.ac.cr

Voluntary work

2024 - 2025 National Museum of Costa Rica. Advisor on ground penetrating radar (GPR) and drone photogrammetry data analysis for geo-archaeology in pre-Columbian sites
2016 – 2018 National Point of Contact, Space Generation Advisory Council
2015 - 2016 Mentor of robotics at Intel ClubHouse (Cedes Don Bosco High School)
2010 – 2017 Member of the Central American Association of Aeronautics and Space

Languages

English (Professional Proficiency), Spanish (Native language), Russian (Intermediate), French (Basic)

Hobbies

Hiking, biking (actively riding on The Tucson Loop), diving (PADI Open Water)