# Seamus Lombardo

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## Experience

**MIT Aeronautics and Astronautics – Earth Observation and Complex Systems Modeling,** *Cambridge, MA*
**PhD Research Assistant and Draper Scholar,** 6/2020 - present

• Natural Resource Management for the Yurok Tribe: Analyzing forest change and forest fire using satellite remote sensing and conducting carbon sequestration modeling.

• Coastal Resilience in Pekalongan, Indonesia: Analyzing mangrove restoration, flood inundation, and shoreline change using satellite remote sensing and conducting predictive flood risk modeling.

• Invasive Water Hyacinth Monitoring in Benin: Working with local business in Benin to analyze trends of invasive water hyacinth in Lake Nokoue. Efforts include validating algorithms and development of ground data collection.

• Stakeholder analysis: Conducted stakeholder interviews with government officials, foundations, businesses, NGOs, and academics to target satellite data products and analyses to user objectives.

• Ground and Aerial Data Collection: Engaged in fieldwork to collect ground and aerial data to supplement satellite remote sensing data in analyses.

• End-User Satisfaction Assessment: Performing in-depth user studies with case study end-users to assess whether analyses met stakeholder objectives towards iterating and improving outputs.

**Planet Labs,** *San Francisco, CA (remote)*
**Consulting Satellite Remote Sensing Researcher,** 6/2022 – present

• Evaluating Planet data for use in measuring changes in forest carbon sequestration
• Assessing Planet data and carbon metrics for use in climate risk disclosures of investment portfolios
• Conducting systematic review of remotely sensed biodiversity metrics towards applications with Planet data
• Analyzing and pursuing R&D opportunities with US government that advance Planet's technology roadmap

**NASA Goddard Spaceflight Center - Biospheric Sciences Lab,** *Greenbelt, MD (remote)*
**Research Intern,** 1/2022 – 6/2022

• Analyzed GEDI space-based LiDAR biomass estimates and other data products in R and Google Earth Engine
• Processed aerial LiDAR and ground plot data towards producing mangrove biomass models in multiple countries
• Writing journal publication on use of satellite remote sensing for forest management

**Office of Massachusetts State Senator Michael Barrett,** *Boston, MA*
**Research Intern- Climate and Energy Policy,** 1/2020 – 3/2020 (ended early due to COVID-19)

• Engaged with external experts to obtain data and inform policy
• Researched policy issues and prepared reports related to climate change and energy

**MIT Human Systems Lab – Spacesuit Research,** *Cambridge, MA*
**Graduate Research Assistant,** 7/2018-5/2020

• Wrote funding proposals and conducted a literature review related to spacesuit performance
• Conducted human spacesuit performance study and performed statistical analysis of results

**University at Buffalo Nanosatellite Program,** *Buffalo, NY*
**Program Manager**, 12/2015-2/2018

• Managed team of 100+ students responsible for building satellites for the Air Force and NASA
• Maintained multi-year program schedule and $200,000 budget
• Led technical reviews and interfaced with project stakeholders, vendors and the university

**NASA Langley Research Center,** *Hampton, VA*
**NASA Pathways Intern –Mechanical Systems Branch**, 08/2016 – 8/2017

• Worked on Climate Absolute Radiance and Refractivity Observatory small satellite project
• Developed vibration test plan to ensure that opto-mechanical mechanisms met system requirements for launch

**NASA Goddard Spaceflight Center,** *Greenbelt, MD*
**Attitude Control Systems Intern**, 6/2016 – 8/2016

- Analyzed Pointing Control for GEDI LiDAR instrument designed to measure forest structure for climate change
- Performed Monte Carlo analyses to determine which parameters may adversely affect performance

**Space Exploration Technologies (SpaceX),** *McGregor, TX*
**Data and Control Systems Intern**, 09/2015 – 12/2015

- Developed the testing process for fuel valve control electronics on the rocket engine test stands
- Programmed LabVIEW for automated testing of the relays and other circuitry

**Millennium Space Systems,** *El Segundo, CA*
**Avionics Intern**, 05/2015 – 08/2015

- Performed radiation testing of circuitry at Lawrence Berkeley National Laboratory.
- Developed procedure for TVAC testing and aided in TVAC testing of antenna positioning system

## Publications

- **Lombardo, S.**, Helmi M., Wirasatriya A., Setiwan J., Lagomasino D., Israel S., Siddiqi A., (2022). Increasing Satellite Data Use for Local Decision Support Towards Coastal Resilience in Indonesia (*In preparation for submission to Nature Sustainability peer-reviewed journal*)
- **Lombardo, S.**, Kinney J., Blake D., Maliton Q., Chase S., Stovall A., Israel S., Siddiqi A., de Weck O., (2022). Developing Accessible Satellite Remote Sensing Decision Support Systems for Forest Management: A Case Study of the Yurok Tribe (*In preparation for submission to Frontiers in Climate peer-reviewed journal*)
- **Lombardo, S.**, Israel S., Wood D., (2022). The Environment-Vulnerability-Decision-Technology Framework for Decision Support in Indonesia, *IEEE Aerospace (Peer-reviewed), Big Sky, MT*
- **Lombardo, S.**, Helmi M., Israel S., Siddiqi A., de Weck O., (2022). Collaborative Development and Evaluation of Remote Sensing Analyses to Support Decision Making Regarding Coastal Resilience in Pekalongan, Indonesia, *AGU Fall Meeting, Chicago, IL*
- **Lombardo, S.**, Kinney J., Israel S., Wood D., (2022). Utilizing Satellite Earth Observation Analyses and the Environment-Vulnerability-Decision-Technology Framework to Support the Yurok Tribe in Mitigating Climate Change Impacts Through Natural Resource Management, *International Astronautical Congress, Paris, France*
- **Lombardo, S.**, Israel S., Wood D., (2021). Development of Decision Support Systems Utilizing Earth Observation and the Environment-Vulnerability-Decision-Technology modeling framework Towards Natural Resource Management for the Yurok Tribe, *AGU Fall Meeting, New Orleans, LA*
- **Lombardo, S.**, Reid J., Israel S., Wood D., (2021). Accessible Decision Support Systems Utilizing the Environment-Vulnerability-Decision-Technology modeling framework, *International Astronautical Congress, Dubai, UAE*
- **Lombardo, S.**, Duda K., Stirling L.A., (2020). Evaluating the Effect of Spacesuit Glove Fit on Functional Tactility Task Performance. *IEEE Aerospace (peer-reviewed), Big Sky, MT,* **- Best Paper award winner**
- Maman, Z.S., Baghadi, A., **Lombardo, S**., Cavuoto, L.A., Megahed, F.M.(2020). A Data Analytic Framework for Physical Fatigue Management using Wearable Sensors. *Expert Systems with Applications (peer-reviewed)*
- **Lombardo, S.**, Fineman, R.A., McGrath T.M., Stirling L.A., (2019). Evaluating Human Dynamic Fit within the EMU During an Upper Body Cycle Ergometer Task. *49th ICES, Boston MA* – **2nd place, student competition**
- Desjardin I., **Lombardo S.**, Crassidis J., (2018). System Level Testing of the GLADOS Cubesat Using Low Cost Methods and COTS Components. *4S Symposium*, *Sorrento, Italy*.
- **Lombardo S.**, Crassidis J., (2016). A Low-Cost Method for Reaction Wheel Torque Characterization in Small Satellites. *Small Satellite Conference, Logan, UT* – **2nd place, Student Paper Presentation Competition**

## Skills - Remote Sensing Data Processing and Analysis

**Programming Language Experience**

- Expert – Javascript (Google Earth Engine), Matlab | Proficient – Python, R, Bash

**Sensor Data Processing Experience**

- GEDI, Planetscope, Sentinel-1 SAR, Sentinel-2 MSI, Landsat, VIIRS, MODIS, Aerial LiDAR (point clouds) & imagery

**Relevant Software Experience**
• ArcGIS Pro, ArcGIS Online, QGIS, Collect Earth, Terrset, Microsoft Office and Google Office Suite

## Awards and Fellowships

**Fellowships**
• Draper Scholar (2018-present) – Draper, Cambridge, MA
• Priscilla King Gray Center Fellow (2022-present) – MIT, Cambridge, MA

**Awards**
• 2021 International Astronautic Congress – Next Generation Plenary, Space for Climate Change
• 2018 AIAA/Aviation Week "Tomorrow's Technology Leaders: The 20 Twenties" Award

## Education

**Candidate for Doctoral degree in Aeronautical and Astronautical Engineering,** *Cambridge, MA*
*Massachusetts Institute of Technology – Engineering Systems Lab*, 6/2020-present, GPA 5.0/5.0

**Master's degree in Aeronautical and Astronautical Engineering,** *Cambridge, MA*
*Massachusetts Institute of Technology*, 5/2020, GPA 5.0/5.0

**Bachelor of Science in Aerospace Engineering,** *Buffalo, NY*
*University at Buffalo*, May 2018, GPA 4.0/4.0

## Leadership and Volunteer Experience

**Graduate Student Council External Affairs Board,** *Cambridge, MA*
**Co-Chair – Federal Affairs Subcommittee,** 5/2020 – 6/2022
• Conducted meetings with legislative and executive staff to advocate for graduate student issues
• Coordinated joint advocacy efforts with graduate student governments at other universities

**MITvote,** *Cambridge, MA*
**Co-chair,** 12/2018 – 10/21
• Lead voter registration drives, absentee ballot events, and election day voter-turnout events
• Recruit and train volunteers to increase voter registration and voter turnout
• Published website and hosted candidate forum to educate students on local elections

**MIT Space Policy Research Group***, Cambridge, MA*
**Author,** 9/2019 – 3/2021
• Conducted policy analysis and prepared recommendations related to climate change for Biden administration
• Aided in distribution of recommendations to decisionmakers in Congress

**University at Buffalo Nanosatellite Program,** *Buffalo, NY*
**STEM Outreach Volunteer,** 1/2016 – 5/2018
• Presented on STEM opportunities in college to students at Nanuet Senior High School
• Participated in "Little bits" outreach at the Nichol's middle school
• Presented on the college experience to 6th grade students at White Plains Middle School

## Patent

**Device for Taking Multiple Samples while Avoiding Cross-Contamination,** 2020, US 10,969,306
• University project that created an asteroid sampling device for NASA's Microgravity Next Program
• 3D printed and assembled prototype for physical testing
• Conducted successful final system test in Neutral Buoyancy Laboratory at NASA JSC