

Amanda V. Steckel

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EDUCATION

University of Colorado Boulder, Boulder, CO

Aug 2019- Aug 2024

Doctor of Philosophy Candidate, Geological Sciences GPA: 3.95/4.00

Cornell University, Ithaca, NY

Masters of Engineering, Aerospace Engineering GPA: 4.00/4.00

May 2015

Bachelor of Science, Mechanical Engineering GPA: 3.31/4.00

May 2014

RESEARCH INTERESTS

I develop remote sensing techniques to study active geologic processes on icy worlds. These techniques are validated in laboratory and planetary analog environments. I have led research and development of new space payloads from concept to launch.

PROFESSIONAL & RESEARCH EXPERIENCE

California Institute of Technology, Pasadena, CA

Sep 2024-Present

Postdoctoral Scholar Research Associate in Planetary Science

- Collaborate with Mastcam-Z on the Perseverance rover, and hyperspectral remote sensing with the Ehlmann group.

Laboratory of Atmospheric and Space Physics (LASP), Boulder, CO

Jun 2020-Aug 2024

Graduate Researcher, National Science Foundation (NSF) GRFP Fellow

- Principal Investigator (PI) for Nautilus mission concept to Triton, with JPL's Team X at planetary science summer school (PSSS).
- Led hyperspectral spectroscopy for lunar exploration simulation (TREX, a NASA SSERVI node). Semi-autonomous mineral ID.
- Python models: landscape evolution of river formation on Mars; Europa Penitente growth
- Instructor for Intro to Field Geology.
- Collect microbial/geologic/solar radiation data in analog site (Ojos del Salado: 22,600'). Design icy moon plume experiment.

Maybell Quantum Industries (MQI), Denver, CO

Jun 2021- Sep 2021

Contractor (8th hire)

- Lead Engineer for venture backed startup. Design / analysis / manufacturing. • Personnel hiring and set initial development goals.

Cooperative Institute for Research in Environmental Sciences (CIRES), Boulder, CO

Aug 2019- Jun 2020

Graduate Researcher

- Upgrade and operate Fe Boltzmann, Na Fluorescence, and Fe Doppler lidar (McMurdo, Antarctica). Analyze stratospheric warming.

MIT Lincoln Laboratory (MIT LL), Lexington, MA

Sep 2015- Sep 2019

Associate Staff, Mechanical Engineering (Group 71). Security Clearance: Top Secret / SCI

- PI for technical initiative (~\$200k of internal funding) Freeform Propellant Delivery System FY '17, '18, '19
- Mechanical Lead for Optical Payload Programs
 - Initial concept, CDR presentation, to sponsor delivery
 - Integrate thermal, structural, electrical, optical engineering
 - Lead assembly & delivery in clean room
 - Cyberscan, CMM, digital microscope inspections
 - Lead design of custom sensor camera package
 - Environmental, functional, and performance testing
 - Lead detailed design and validation of mechanical parts, opto-mechanical and electromechanical assemblies
- Mechanical design for ESPA-class spacecraft research programs, leading propulsion, attitude control, and SWaP trade studies
- CubeSat and Small Satellite working groups, proposal and program support
- Manage summer intern / co-op program

Space Exploration Technologies (SpaceX), McGregor, TX

Jun 2014- Aug 2014

Ground Support Equipment Engineer

Space Systems Loral (SSL), Palo Alto, CA

Jan 2013- Aug 2013

Structural Analyst & Mainbody Design

NASA Goddard Space Flight Center, Greenbelt, MD

Jun 2012- Aug 2012

Magnetospheric Multiscale Mission (MMS) Propulsion Integration and Testing

AWARDS

Henry A. Waldrop Scholarship 2024 (**\$1,500**), Bruce and Marcy Benson Graduate Fellowship 2023 (**\$44,000**), Benson Travel Grant Award 2023 (**\$2,200**), GPSG Travel Grant 2023 (**\$500**), DPS Hartmann Travel Award 2023 (**\$800**), CU Boulder Domestic Travel Grant 2023 (**\$450**), Geology Student Travel Scholarship 2023 (**\$600**), Graduate School International Travel Scholarship 2021 (**\$750**), NSF Graduate Research Fellowship 2020 (**\$102,000**), Air Force Technical Initiative 2017, 2018, 2019 (**\$200,000**), Thomas J. and Joan T. Kelly Aerospace Prize 2015 (**\$2,000**)

SKILLS

Software: Python, Matlab, C, Fortran, Tetracorder, Labview • **CAD:** Solidworks, OnShape • **FEA:** ANSYS, Fluent, Femap, Nastran
Training: XRD, Laser, Cryo, Haz Waste, Chemical Handling (H₂O₂), Micro FOD, Clean Room, ESD, Solder, Lathe, Mill, 3D Print
Professional Development: MIT Course Physical Principles of Remote Sensing (2018), MIT LL Technical Education Course
Hyperspectral Imaging and Remote Sensing (2018), NSREC Radiation Short Course (2017), Small Satellite Conference (2017, 2018)

RESEARCH PROJECTS

Icy Moon Plume Deposit Simulation with UV and IR Spectral Characterization, LASP- P.I. Greg Holsclaw *Oct 2023- Aug 2024*
Toolbox for Research and Exploration (TREX) Field Campaign, PSI – P.I. Dr. Amanda Hendrix *Oct 2022- Aug 2024*
Nautilus: A Mission Concept to Triton, JPL PSSS – P.I. Amanda Steckel (Self) *Jun 2022- Aug 2023*
Microbial Response to Radiation in High Altitude, LASP and CU Boulder – P.I. Dr. Brian Hynek *Jan 2021- Jan 2022*
Mars Landscape Evolution Modeling, LASP and CU Boulder – P.I. Dr. Brian Hynek *Aug 2020- Aug 2024*
Atmospheric Lidar, CIRES and CU Boulder – P.I. Dr. Xinzhaoh Chu *Aug 2019- Jun 2020*
Integrated Propellant Storage and Feed System, MIT Lincoln Laboratory- P.I. Amanda Steckel (Self) *Oct 2017- Sep 2019*
Regolith Thruster, Cornell University – P.I. Dr. Mason Peck *Aug 2014- May 2015*
VIOLET Satellite Project Team, Cornell University, AFRL – P.I. Dr. Mason Peck *Aug 2010- Jan 2015*
High Temperature Biomass Pyrolysis Reactor, Cornell University – P.I. Dr. Elisabeth Fisher *Aug 2013- May 2014*
Ionospheric Satellite and Radar Data Analysis, Cornell University – P.I. Dr. David Hysell *Aug 2011- May 2013*

TEACHING

CU Boulder Introduction to Geology Lab Instructor *Jan 2022- May 2023*
Dynamics and Systems TA, Aerospace Vehicles TA *Jan 2020- May 2020*
MIT Lincoln Laboratory CubeSat course development with MIT Media Lab and MIT AeroAstro *Sep 2015- Sep 2019*
Cornell University CURIE Academy (Computer Vision), Mechatronics/Mechanical Synthesis TA *Jan 2013- May 2015*

MENTORING

Integrated Propellant Storage and Feed System Research Team (5 undergraduates) *Oct 2017- Sep 2019*
Mechanical Engineering Intern and Co-op Program (4-6 undergraduates / year, 4-5 air force cadets / year) *Sep 2017- Sep 2019*
Regolith Thruster Research Team (3 undergraduates) *Aug 2014- May 2015*
Violet Satellite Team Lead (4 undergraduates) *Aug 2013- Sep 2015*

PUBLICATIONS

Steckel, A.V., Tucker, G.E., Rossi, M., Hynek, B. Evaluating Fluvial Valley Network Characteristics in the Context of the Noachian Martian Climate. *JGR Planets* (In Prep).
Clark, R.N., Prettyman, T.H., Banks, M.E., Hendrix, A.R., Noe Dobrea, E., Lane, M.D., Vilas, F., Wright, S.P., Vaniman, D., Thieberger, C., Ahrens, C., Buxner, S., Pearson, N.C., Holsclaw, G., Borrelli, M., Kramer, G.P., Wettergreen, D., Vijayarangan, S., Candela, A., Breinfeld, A., Hansen, M., Kumari, N., Martin, A.C., Patterson, R., Meier, M., Knightly, P., **Steckel, A.V.**, and Osterloo, M. Science Team Experience with an Autonomous Rover and Automated Science Analyses During the TREX 2021 and 2022 Field Campaigns. In Prep.
Stern, J., Graham, H., Burcar, B., Martin, M., Noell, A., Hand, K., Bowman, J., Doran, P., Edgcomb, V., Holden, J., Howells, A., Hurford, T., Malaska, M., Radebaugh, J., Rodriguez, L., Borges, S., Diaz, M., Courville, S., Huber, J., Lawrence, J., Vick-Majors, T., Nixon, C., Spear, J., **Steckel, A.V.**, Solomonidou, A., Walker, C., Whelley, P., Wolfenbarfer, N., Vance, S., A Comprehensive Framework for Assessing Terrestrial Analogue Field Sites for Ocean Worlds. In Prep.
Steckel, A.V., Conrad, J.W., Dekarske, J., Dolan, S., Downey, B., Felton, R., Giesche, A., Hanson, L.E., Horvath, T., Maxwell, R., Shumway, A.O., Siddique, A.A., Strom, C., Teece, B.L., Todd, J., Trinh, K.T., Velez, M.A., Walter, C.A., Lowes, L., Hudson, T.L., and Scully, J.E.C., 2024. The Science Case for Nautilus: A Multi-flyby Mission Concept to Triton. In Prep.
A.V. Steckel, H. Delecki, W. Ren, and K. Thompson. “Freeform Propellant Delivery System for Cubesats (F-PoDS).” International Astronautical Congress (IAC) (2019).
Steckel, A. *Integrated Propellant Storage and Feed System* FY18 Engineering Research Technical Investment Program Report TIP-89, May 2019. <https://apps.dtic.mil/sti/citations/AD1098357>.
Steckel, A.V. Technical Report “Novel CubeSat Propulsion Storage and Feed System” (2017) MIT Lincoln Laboratory internal.
Steckel, A.V., Wilenz, D.‡, and Coon, M.‡, Masters Report “Lunar Regolith Rocket” (2015).

PRESENTATIONS (*oral presenter, †poster, ‡undergrad mentee)

Steckel, A.V. *, Clark, R.N., Pearson, N.C., Buxner, S., Prettyman, T.H., Kumari, N., Meier, M.L., Ahrens, C.J., Martin, A.C., Patterson, R.V., Lane, M., Vilas, F., Knightly, P., Wettergreen, D., Banks, M.E., Bell, E., Wright, S.P., Noe Dobrea, E.Z, and Hendrix, A., 2024. Mineral Identification using Tetracorder during the TREX Field Campaign. *LPI Contributions*, p.2793.
Steckel, A.V. †, Conrad, J.W., Dekarske, J., Dolan, S., Downey, B., Felton, R., Giesche, A., Hanson, L.E., Horvath, T., Maxwell, R., Shumway, A.O., Siddique, A.A., Strom, C., Teece, B.L., Todd, J., Trinh, K.T., Velez, M.A., Walter, C.A., Lowes, L.,

Hudson, T.L., and Scully, J.E.C., 2024. The Science Case for Nautilus: A Multi-flyby Mission to Triton. *LPI Contributions*, p.1173.

Steckel, A.V.†, Conrad, J.W., Dekarske, J., Dolan, S., Downey, B.G., Felton, R., Hanson, L.E., Giesche, A., Horvath, T., Maxwell, R. and Shumway, A.O., 2023. The Science Case for Nautilus: A Multi-Flyby Mission Concept to Triton. AGU23.

Steckel, A.V.*, Clark, R., Pearson, N.C., Buxner, S., Prettyman, T., Kumari, N., Meier, M., Ahrens, C., Martin, A.C., Patterson, R.V. and Lane, M., 2023, October. Hyperspectral Imaging Spectrometer for Geologic Unit Mapping in Planetary Analog Setting. In AAS/Division for Planetary Sciences Meeting Abstracts (Vol. 55, No. 8, pp. 317-07).

Prettyman, T.H., Buxner, S., **Steckel, A.V.**, Knightly, J.P., Hendrix, A., Noe Dobrea, E., Clark, R.N., Wettergreen, D.S., Ahrens, C., Kumari, N., Martin, A.C., Meier, M.L., Patterson, R.V., and Vilas, F., 2023. Radioelement Geochemistry: Rover Analog Study at Yellow Cat. *LPI Contributions*, 2806, p.1389.

Noe Dobrea, E.Z., Ahrens, C., Banks, M.E., Bell, E., Breitfeld, A., Bristow, T., Candela, A., Clark, R.N., Hansen, M., Hendrix, A., Holsclaw, G., Knightly, P., Lane, M.D., Martin, A.C., Meier, M.L., Patterson, R.V., Pearson, N.C., Prettyman, T.H., **Steckel, A.V.**, Vijayarangan, S., Vilas, F., Wettergreen, D., and Wright, S.P., 2023. Autonomous Rover Science in the Field: Yellow Cat. *LPI Contributions*, 2806, p.2366.

Steckel, A.V. †, Clark, R.N., Pearson, N.C., Buxner, S., Prettyman, T.H., Kumari, N., Meier, M.L., Ahrens, C.J., Martin, A.C., Patterson, R.V., Lane, M., Vilas, F., Knightly, P., Wettergreen, D., Banks, M.E., Bell, E., Wright, S.P., Noe Dobrea, E.Z, and Hendrix, A., 2023. Utilizing a Hyperspectral Camera for Field Surveys During the TREX Field Mission. *LPI Contributions*, 2806, p.2720.

Steckel, A.V.†, Tucker, G., Rossi, M., and Hynek, B. "Landscape Evolution Modeling of Martian River Valley Networks." AGU Fall Meeting Abstracts. Vol. 2021. 2021.

A.V. Steckel*, Jackson Jandreau, Xianxin Li, Cissi Lin "Chu Lidar Group Arrival Heights Campaign," Scott Base, Antarctica. January 28 (2020).

A.V. Steckel and Adam Shabshalowitz* "Integrated Propellant Storage and Feed System," Tampa, FL. December 9-13 (2019).

A.V. Steckel*, H. Delecki‡, W. Ren‡, and K. Thompson. "Freeform Propellant Delivery System for Cubesats (F-PODs)" International Astronautical Congress, Washington, D.C. October 21-25 (2019).

A.V. Steckel†, A. Shabshalowitz. "Integrated Propellant Storage and Feed System." NASA In-Space Propulsion TIM (2019)

A.V. Steckel†, A. Shabshalowitz. "Integrated Propellant Storage and Feed System." JANNAF 13th MSS / 11th LPS / 10th SPS Joint Subcommittee Meeting and PIB Meeting (2019)

A.V. Steckel* "Novel Cubesat Propulsion Storage and Feed System." MIT Lincoln Laboratory, Advanced Prototype Engineering Technology Symposium, Lexington, MA, (2017).

MEDIA (*invited panelist)

PSI Blog , TREX Team Tests Rover-Based Science Automation in Utah Desert	Oct 2022
Denver Fan Expo , Mars: Fact vs. Fiction Panel*	Jul 2022
9 News , Earth's highest active volcano may hold secrets to Mars, scientists say	Dec 2021
CIRES Blog , Life on Earth's Highest Volcano	Nov 2021
Mines Space Robotics Challenge , AIAA Diversity in Aerospace Panel*	Sep 2021
Colorado Space Business Roundtable , AIAA Panel Young Professional*	Jun 2021
CIRES Blog , Lidar Exploration at the Bottom of the World	Dec 2019
Cary Memorial Library , Women in Leadership Forum*	Mar 2018
American Industries Association , Team America Rocketry Challenge Star Spotlight	May 2015
Cornell University Blog , Regolith Thruster	Feb 2015

SERVICE

Graduate and Professional Student Government	2023- 2024
Cornell Alumni Admissions Ambassador	2017-Present
Rural Science Outreach , Waltham, CO	Nov 2021- Apr 2022
American Institute for Aeronautics and Astronautics (AIAA)	
• Rocky Mountain Council member	Mar 2021-Dec 2022
• Colorado Aerospace Days	Mar 2022
• Annual Technical Symposium (ATS) Volunteer	Sep 2019, Sep 2021, Sep 2022
• Congressional Visit Days	Mar 2019, Mar 2021
• Regional (WPI) Student Conference Judge	Apr 2016
• New England Council member	Aug 2015- Sep 2019
Science Fair Judge	
• Colorado Science and Engineering Fair	Apr 2021
• Colorado Wyoming Junior Academy of Science	Apr 2021
Citizens for Space Exploration	
• Congressional Visit Days	Jun 2021
Boys and Girls Club , Pueblo, CO	Apr 2021
Mountains for Moms	Jan 2012- May 2014