# Amanda V. Steckel

Boulder, CO 80305 ▪ (301) 706-1151 ▪ amanda.steckel@colorado.edu

## EDUCATION

**University of Colorado Boulder**, Boulder, CO *Aug 2019- Present*
*Doctor of Philosophy Candidate, Geological Sciences* GPA: 3.95/4.00, Certificate in College Teaching

**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

**Laboratory of Atmospheric and Space Physics** (LASP), Boulder, CO *Jun 2020-Present*
*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 Flourescence, 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

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- Present*
**Toolbox for Research and Exploration (TREX) Field Campaign,** PSI – P.I. Dr. Amanda Hendrix *Oct 2022- Present*
**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-Present*
**Atmospheric Lidar**, CIRES and CU Boulder – P.I. Dr. Xinzhao 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

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| *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. 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., Breitfeld, 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., … **Steckel, A.V.,** … 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.

**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.

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.

**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.,** 2019. Integrated Propellant Storage and Feed System: FY18 Engineering Research Technical Investment Program.

**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.†,** 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).

**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 Syposium, Lexington, MA, (2017).

## MEDIA (*invited panelist)

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| **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

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| **Graduate and Professional Student Government** | *2023-Present* |
| **Cornell Alumni Admissions Ambassador** | *2017-Present* |
| **Rural Science Outreach**, Waltham, CO | *Nov 2021- Apr 2022* |
| **American Institute for Aeronautics and Astronautics** | |
| • 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* |