

## Maxwell M. W. Silver, Ph. D., Post-doctoral Researcher

silver@ipgp.fr • ORCID: 0000-0001-5093-6876 • www.linkedin.com/in/maxwellmwsilver

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### SCIENTIFIC SKILLS

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Slope stability physical and numerical modelling, permeable substrate flow analyses and modelling, watershed modelling, sample physical and hydrological properties analyses, clean sediment core preparation, photogrammetry, videography, anaerobic bacteria culture preparation using sterile techniques, microbial viability analyses, polymerase chain reaction (PCR) assessments, ion chromatography, DNA sequencing, laboratory management, and project management.

### IT SKILLS

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Python, HySEA finite element (FEM) finite difference (FDM) hybrid model, SHALTOP, ArcGIS, QGIS, COMSOL Multiphysics Modelling (including FEM), SAC-SMA, EPA SWMM, eRAMS, HEC-HMS, Stream Stats, TR-55, Matlab, 3D-Printing, Adobe Illustrator, Inksapes, Adobe Premiere, Excel.

### NOTABLE AWARDS

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2023	Colorado School of Mines.	The Outstanding Ph.D. Student Award, Hydrologic Science and Engineering.
2021	Colorado School of Mines.	The Alumnus of the Future, Mines Alumni Association.
2011	Pacific Lutheran University.	President's Scholarship.

### EDUCATION

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2023	Colorado School of Mines. <i>Hydrologic Science and Engineering.</i>	<b>Doctorate in Philosophy (Ph. D.).</b> Thesis: Silver, Maxwell M. W. (2023), <i>Submarine Landslide Processes, Mechanics, and Effects Investigated Through Physical Experiments, Numerical Models, and Natural Samples.</i>
2018	University of Arkansas. <i>Space and Planetary Science.</i>	<b>Master of Science (M. S.).</b> Thesis: Silver, Maxwell M. W. (2018), <i>An Investigation into the Suitability of Sulfate-Reducing Bacteria as Models for Martian Forward Contamination.</i>
2015	Pacific Lutheran University. <i>Geosciences.</i>	<b>Bachelor of Science (B. S.).</b> Thesis: <i>Changes in the Bathymetry of Commencement Bay, Tacoma, Washington, since the 1800's.</i>

### HIGHLIGHTED WORK EXPERIENCE

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2023 to Current	Institut de Physique du Globe de Paris (IPGP), Université Paris Cité.	<u>Post Doctoral Researcher:</u> <ul style="list-style-type: none"><li>Quantified, mapped, and described tsunami hazard and risk of volcanic caldera collapse off the coast of Mayotte using finite element models SHALTOP and HySEA informed by bathymetric and geochemical data. Calibrated numerical models using physical models.</li></ul>
2020 to 2023	Integrated Ocean Drilling Program (IODP) Expedition 386, Japan Trench Paleoseismology.	<u>Physical Properties Specialist:</u> <ul style="list-style-type: none"><li>Described and mapped earthquake and tsunami history and geotechnical slope stability offshore Japan.</li><li>Measured ~830m of sediment core physical properties, logged core data, determined and presented core physical properties, and prepared official reports.</li></ul>
2017	NASA Astromaterials Research and Exploration Science, Jacobs Engineering, Technology, and Science Contract, Johnson Space Center.	<u>Graduate Research Intern:</u> <ul style="list-style-type: none"><li>Quantified and described microbial survival and proliferation rates under Martian subsurface conditions.</li><li>Performed ion chromatography and PCR assessments, cultured anaerobic microbes using sterile techniques, and cored shallow sediment.</li><li>Quantified DNA concentrations and prepared DNA sequencing samples.</li><li>Designed, managed, and executed NASA research project, <i>Bacterial Survival of Mars Subsurface and Meteorite Impact</i> and presented data to NASA and Jacobs Management with resultant increase in responsibilities. Presented results to the 2018 Gordon Research Conference on the Origins of Life.</li></ul>

## Maxwell M. W. Silver, Ph. D.

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2019 to 2023	Colorado School of Mines.	<u>Ph. D. Researcher:</u> <ul style="list-style-type: none"><li>○ Quantified, characterized, and scaled to natural environments changes in geotechnical slope stability, geomorphology, stratigraphy, and subsurface fluid and grain flows under excess pore pressures across different sedimentologies using physical and numerical models.</li><li>○ Communicated findings to technical and non-technical audiences in relation to tsunami hazard and risk assessment.</li><li>○ Managed wet laboratory.</li><li>○ Mentored multiple undergraduate researchers in experimental techniques and sample analysis.</li></ul>
Spring 2023		<u>Course Coordinator:</u> <ul style="list-style-type: none"><li>○ Coordinated lectures, grading, and course material for a geophysics course co-offered for undergraduate and graduate students among five lecturers and a teaching assistant.</li></ul>
2016 to 2018	The Arkansas Center for Space and Planetary Sciences, University of Arkansas.	<u>Laboratory Supervisor:</u> <ul style="list-style-type: none"><li>○ Managed microbial laboratory and performed anaerobic culture preparation using sterile techniques.</li><li>○ Supervised and performed growth-media and chemical solution preparation, PCR assessments, gel-electrophoresis, optical density measurements, and refractory microscopy. Reported project progression/results to NASA, Lunar and Planetary Science Conferences, and Astrobiology Science Conferences.</li><li>○ Project Leader: Change of Venusian Topography and Geomorphology Utilizing ArcGIS.</li><li>○ Project Leader and Study Designer: Modeling Potential Martian Microbial Contaminant Progression through Mars Climate Model.</li></ul>
2014	The Environmental Science Institute, University of Texas.	<u>National Science Foundation Undergraduate Researcher (REU):</u> <ul style="list-style-type: none"><li>○ Prepared stalactite samples for oxygen isotope analyses to track climate change effects in central Texas with subsequent scientific publication.</li></ul>
2012 to 2015	Instructional Technologies, Pacific Lutheran University.	<u>Technician Supervisor:</u> <ul style="list-style-type: none"><li>○ Promoted in 3 months from to technician supervisor.</li><li>○ Project management of concerts and public speaking events and supervision of 50 student technicians.</li><li>○ Directly interfaced with clients and determined client needs for projects.</li><li>○ Professionally captured, processed, and published high quality video.</li></ul>

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### COMMUNITY STEWARDSHIP

2020 to 2022	Graduate Student Government (GSG), Colorado School of Mines.	<u>Elected President:</u> <ul style="list-style-type: none"><li>○ Increased minimum stipend level for teaching and research assistants.</li><li>○ Supervised all internal and external operations of the Colorado School of Mines Graduate Student Government (GSG; ~\$250k annual operating budget), including event planning, leadership of executive officers (9), representatives (~30), and mentorship of officers (9).</li><li>○ Chairperson of the GSG Executive Committee and General Council.</li><li>○ Represented Mines graduate students on 10 committees and liaised with top Mines administrators (e.g., the President of the University, the Provost, the Alumni Association Board of Directors, etc.).</li><li>○ Created two officer positions with supporting budgets to further support underrepresented groups (GSG Equity Chair) and international students (International Student Officer) at Mines.</li></ul>
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2019 to 2022		<u>Elected Vice President:</u> <ul style="list-style-type: none"><li>○ Chairperson of the planning committee, project manager, and director of the Graduate Research and Discovery Symposium (GRADS), a ~250-person research conference hosted each spring.</li></ul>
2009 to Current	Camp Leo, a Camp for Children with Type One Diabetes.	<u>Staff Manager and Counselor; Lions Club International Honorary Inducted Member:</u> <ul style="list-style-type: none"><li>○ Promoted to Counselor Staff Manager. Designed and implemented a management curriculum and mentored a team of 25 counselors.</li><li>○ Administered weekly 24-hour care for, mentored, and taught diabetic and medically fragile children ages 7 to 18.</li></ul>

### PEER REVIEWED PUBLICATIONS

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- Silver, M. M. W., & Dugan, B. (2023). Cohesion, permeability, and slope failure dynamics: Implications for failure morphology and tsunamigenesis from benchtop flume experiments. *Marine Geology*, 462, 107079. <https://doi.org/https://doi.org/10.1016/j.margeo.2023.107079>.
- Silver, M. M. W., and Dugan, B. (2020), *The influence of clay content on submarine slope failure: insights from laboratory experiments and numerical models*. Geological Society, London, Special Publications, v. 500, p. SP500-2019–186, doi:10.1144/SP500-2019-186.
- Jitsuno, K., Hoshino, T., Nishikawa, Y., Kogawa, M., Mineta, K., Strasser, M., Ikehara, K., Everest, J., Maeda, L., Inagaki, F., Takeyama, H., Bellanova, P., Brunet, M., Cai, Z., Cattaneo, A., Hochmuth, K., Hsiung, K., Ishizawa, T., Itaki, T., Jitsuno, K., Johnson, J., Kanamatsu, T., Keep, M., Kioka, A., Maerz, C., McHugh, C., Micallef, A., Min, L., Pandey, D., Proust, J., Rasbury, T., Riedinger, N., Bao, R., Satoguchi, Y., Sawyer, D., Seibert, C., Silver, M., Straub, S., Virtasalo, J., Wang, Y., Wu, T., Zellers, S., Kölling, M., Huang, J., Nagahashi, Y., (2024). Comparative single-cell genomics of Atribacterota JS1 in the Japan Trench hadal sedimentary biosphere. *MSphere*. <https://doi.org/10.1128/msphere.00337-23>
- Chu, M., Strasser, M., Ikehara, K., Everest, J., Xu, L., McNichol, A., Bellanova, P., Rasbury, T., Koelling, M., Riedinger, N., Luo, M., Maerz, C., Johnson, J., Straub, S., Jitsuno, K., Brunet, M., Cai, Z., Cattaneo, A., Chang, T. S., Hsiung, K., Ishizawa, T., Itaki, T., Kanamatsu, T., Keep, M., Kioka, A., McHugh, C., Micallef, A., Pandey, D., Proust, J. N., Satoguchi, Y., Sawyer, D., Seibert, C., Silver, M. M. W., Virtasalo, J., Wang, Y., Wu, T. W., Zellers, S., Bao, R., (in review), *Earthquake-enhanced dissolved carbon cycles in ultra-deep ocean sediments*. Nature Communications.

### NON-PEER REVIEWED PUBLICATIONS AND PRESENTATIONS

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- Strasser, M., Ikehara, K., and the Expedition 386 Scientists (2023), *International Ocean Discovery Program Expedition 386 Preliminary Report*.
- Silver, M. M. W., and Dugan, B. (2022), *Impact of Permeability and Cohesion in Submarine Slope Failure Type*. Geological Society of America Fall Meeting 2022, Abstract 382589.
- Silver, M. M. W., and Dugan, B. (2020), *Submarine Slope Failure Dynamics in Sand-Rich Systems: Insights from Physical Experiments and Numerical Models*. American Geophysical Union (AGU) Fall Meeting 2020, Abstract 684945.
- Silver, M. M. W. (2018), *Gordon Research Conference and Seminary on the Origins of Life*.
- Silver, M. M. W., Berger, E. L., Regberg, A. B. (2018), *Impact Shock Effects on Sulfate-Reducing Bacteria in Marine Sediments*. 49th Lunar and Planetary Science Conference, Abstract 2850.
- Silver, M. M. W., Mora, S., Ivey, M., and Chevrier, V. (2018), *Microbe Survival in Sulfate Brines of Varied Concentrations Characterized via OD590*, 2018. 49th Lunar and Planetary Science Conference Abstract 2896.
- Silver, M. M. W., Mora, S., Ivey, M., and Chevrier, V. (2017), *An Experimental Assessment on the Effects of Variations in Sulfate Concentrations on Sulfate Reducing Bacteria in Simulated Martian Conditions*. Lunar and Planetary Science Convention, Abstract 1047.
- Silver, M. M. W., Mora, S., Ivey, M., and Chevrier, V. (2017), *An Experimental Assessment on the Effects of Variations in Sulfate Concentrations on Sulfate Reducing Bacteria in Simulated Martian Conditions*. Astrobiology Science Conference, Abstract 3019.
- Shepard, L., Silver, M., Ivey, M., Chevrier, V. (2016), Presentation at Network of Researchers on Horizontal Gene Transfer and Last Universal Common Ancestor Conference.
- James, Eric W., Wong, C., Banner, J., Silver, M., and Musgrove, M. (2014), *1,500 Year Periodicity in Central Texas Moisture Source Variability Reconstructed from Speleothems*. American Geophysical Union, Abstract 1363.
- James, Eric W., Wong, Corinne I, Silver, M., Banner, J.L. & Musgrove, Mary Lynn. (2014), *1,500 Year Periodicity in Central Texas Moisture Source Variability Reconstructed from Speleothems*. American Geophysical Union, Abstract 25887.