

Ryan A. Manzuk, Ph.D.
Postdoctoral Research Associate
Program on Science and Global Security, Princeton University
221 Nassau Street, Princeton, NJ 08544
rmanzuk@princeton.edu

Education and Professional Experience

2024 →	Princeton University , Program on Science and Global Security, Princeton, NJ <i>and</i> University of Wisconsin , Department of Nuclear Engineering, Madison, WI Postdoctoral Research Associate Project focus: Verification of mining activities and environmental impacts
2018–2024	Princeton University , Princeton, NJ Ph.D., Geosciences; Advisor: Adam Maloof Thesis: <i>Reading Earth's surface history from image archives</i>
2016–2018	The Peace Corps , Guinea, West Africa Agroforestry Volunteer; Project focus: reforestation, beekeeping, and coffee cultivation
2012–2016	The University of Chicago , Chicago, IL B.S. with honor, Geophysical Sciences; Advisor: Mark Webster Thesis: <i>Morphometric analysis of the Cambrian trilobite Olenellus</i>

Research Methods and Skills

Field: Structure from motion 3D mapping using hand-held and drone photography; grid-based mapping and sample collection in differential GPS geospatial framework; source interviews; open-source intelligence.

Laboratory: 3D sample imaging and reconstruction via structure from motion, serial grinding and imaging, and X-ray Micro-CT; design and implementation of optics and imaging technologies; Computer Numerical Control and manual machining; morphometric analysis from 2D and 3D images; gas source isotope ratio mass spectrometry.

Programming and computing: Matlab; Python; C++; optical remote sensing; hyperspectral remote sensing; deep learning; machine learning; computer vision; QGIS; G-code; Dragonfly ORS; Avizo; LaTeX; HTML; CSS; Adobe Suite.

Languages: Superior ability in written and spoken French, as well as superior ability in Pular (a strictly verbal West African language), based upon Peace Corps implementation of ACTFL proficiency standards.

Peer Reviewed Publications

(*undergraduate student I mentored)

8. **Manzuk, R.A.** and Philippe, S.
Uranium in cobalt-hydroxide exports from the Democratic Republic of the Congo.
Nature Communications, 2026. [PDF]
7. **Manzuk, R.A.**, Bieri, R., Erden, B., Samuels, B.M., and Maloof, A.C.
Tracking agricultural land-use change with intuitive satellite methods to support stakeholder and rights-based engagement.
PLOS One, in review.
6. **Manzuk, R.A.**, Nadeau, M.D., Mate, C., Jacquet, S.M., and Maloof, A.C.
Lithofacies vectors: Disentangling environmental variability, diagenesis, and secular change.
American Journal of Science, 326, Article 8, 2026. [PDF]

5. Howes, B.J., Mehra, A., Wilcots, J., Geyman, E.C., **Manzuk, R.A.**, Deutsch, C.A., and Maloof, A.C. The where, when, and how of ooid formation: What ooids tell us about ancient seawater chemistry. *Earth and Planetary Science Letters*, 637:118697, 2024. [PDF]
4. *Panigrahi, I., **Manzuk, R.A.**, Maloof, A.C., and Fong, R. Improving Data-Efficient Fossil Segmentation via Model Editing. *CVPR Workshop on Learning with Limited Labeled Data for Image and Video Understanding (L3D-IVU)*, 2023. [PDF]
3. **Manzuk, R.A.**, Maloof, A.C., Kaandorp, J.A., and Webster, M. Branching archaeocyaths as ecosystem engineers during the Cambrian radiation. *Geobiology*, 21(1):66–85, 2023. [PDF]
2. **Manzuk, R.A.**, *Singh, D., Mehra, A., Geyman, E.C., Edmonson, S., and Maloof, A.C. A high-resolution, multispectral macro-imager for geology and paleontology. *GSA Today*, 32(9):4–9, 2022. [PDF]
1. Mehra, A., Howes, B.J., **Manzuk, R.A.**, Spatzier, A., Samuels, B.M., and Maloof, A.C. A novel technique for producing three-dimensional data using serial sectioning and semi-automatic image classification. *Microscopy and Microanalysis*, 2022. [PDF]

Media Coverage and Outreach

I have written explainer pieces about my work for The Conversation and contributed to journalism related to my work for [The Financial Times](#), [Le Monde](#), and [Lighthouse Reports](#).

My work has been featured in coverage by BBC News, [Bloomberg](#), [Radio France Internationale](#), [The Canary](#), [Radio-télévision belge de la Communauté française](#), [Princeton University](#), and [The University of Wisconsin - Madison](#), among others.

Invited Talks

<i>Nov. 2025</i>	Wheaton College , Symposium on Science, Justice, and Human Rights
<i>Oct. 2025</i>	Princeton University , Science and Global Security Seminar
<i>Feb. 2025</i>	Harvard University , Biweekly Solid Earth and Planetary Physics Seminar (BiSEPPS)
<i>Apr. 2024</i>	Columbia University , Biology and Paleo Environment Seminars

Teaching

<i>Spring 2025, 2026</i>	SPI 593G: Satellite Imagery for Policymakers, People, and the Planet [main instructor] Introduction to remote sensing with hands-on exercises focused on use cases from humanitarian contexts to open-source intelligence. Co-instructor: Alex Glaser.
<i>Spring 2023</i>	GEO 370 / ENV 370: Sedimentology [assistant] Data-focused explorations of the physical and chemical processes that shape Earth's surface through the transport and deposition of sediments. Main instructor: Adam Maloof.
<i>Spring 2022</i>	GEO 376 / ENV 375 / CEE 379 / MAE 376: The Physics of Glaciers [assistant] Physics-based modeling of glaciers and data analysis; design of tank experiments for desktop glacier simulations. Main instructors: Ching-Yao Lai and Adam Maloof.
<i>Spring 2021</i>	GEO 202: Ocean, Atmosphere and Climate [assistant] Introduction to gathering and analyzing geoscience data including satellite imagery and float-based measurements. Main instructor: Graeme MacGilchrist.

<i>Fall 2020</i>	ENV 367 / GEO 367: <i>Earth System Modeling, Assessing Mitigation Strategies</i> [assistant] Forcing a compact Earth system model (OSCAR) and analyzing outputs in Python Jupyter notebooks. Main instructor: Laure Resplandy.
<i>Fall 2019, 2020</i>	Junior Colloquium , Princeton University Department of Geosciences [main instructor] Basic skills in data analysis and computation using Python Jupyter notebooks.

Selected Awards, Honors, and Fellowships

<i>2025–2026</i>	Digital Science Communication Fellow, Museum of Science
<i>2025–2026</i>	Future Values Fellow, Princeton University
<i>2023–2024</i>	Myhrvold-Havranek Graduate Fellowship, Princeton University
<i>2019–2023</i>	Department of Geosciences Graduate Student Research Fund, Princeton University (3×)
<i>2021</i>	Department of Geosciences Graduate Student Teaching Award, Princeton University
<i>2021</i>	Princeton Research Day Orange & Black Presenter Award, Princeton University
<i>2020</i>	Society for Sedimentary Geology Weimer Student Research Grant
<i>2018–2019</i>	David Elliston Guyer '67 and Walter R.F. Guyer *41 Fellowship, Princeton University
<i>2016</i>	Mary Jean Mulvaney Scholar Athlete Award, The University of Chicago