Ryan Manzuk

Ph.D. Candidate
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Education and Professional Experience

2018 → *Anticipated defense 2024	**Princeton University**, Princeton, NJ Ph.D., Geosciences; Advisor: Adam Maloof Thesis: Quantifying impacts of reefs on Earth's surface environments throughout the Phanerozoic via novel image capture and analysis techniques
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: Morphometric analysis of the Cambrian trilobite *Olenellus*, with documentation of new material from Cherry Creek, Nevada, USA

Research Methods and Skills

Field: Geologic mapping and section measurement with emphasis on sedimentology, stratigraphy, and paleontology; Structure from motion 3D reconstruction of outcrops and landscapes using hand held and drone photography; Grid-based mapping with oriented sample collection in differential GPS geospatial framework.

Laboratory: 3D reconstruction of rock and fossil hand samples via the Grinding, Imaging and Reconstruction Instrument (GIRI); $\delta^{13}C$ and $\delta^{18}O$ measurements on a gas source isotope ratio mass spectrometer; morphometric analysis from 2D and 3D images; design and implementation of optics and imaging technologies; Computer Numerical Control and manual machining.

Programming and computing: Matlab; Python; C++; optical 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)

6. **Manzuk, Ryan A.**, Bieri, R., Erden, B., Samuels, B. M., and Maloof, A. C.
A novel method for detecting agricultural land use change in Landsat imagery.
Remote Sensing of Environment (submitted)

5. Howes, B. J., Mehra, A., Wilcots, J., Geyman, E. C., **Manzuk, Ryan 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 (2024), 118697 [PDF]

4. *Panigrahi, I., **Manzuk, Ryan A.**, Maloof, A. C., and Fong, R.
Improving data-efficient fossil segmentation via model editing.
CVPR Workshop on Learning with Limited Labelled Data for Image and Video Understanding (L3D-IVU) (2023) [PDF]

3. **Manzuk, Ryan A.**, Maloof, A. C., Kaandorp, J. A., and Webster, M.
Branching archaeocyaths as ecosystem engineers during the Cambrian radiation.
Geobiology 21, 1 (2023), 66–85 [PDF]

2. **Manzuk, Ryan A.**, *Singh, D., Mehra, A., Geyman, E. C., Edmonsond, S., and Maloof, A. C.
A high-resolution, multispectral macro-imager for geology and paleontology.
GSA Today 32, 9 (September 2022), 4–9 [PDF]

1. Mehra, A., Howes, B. J., **Manzuk, Ryan 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), 1–16 [PDF]

Teaching

Spring, 2023	**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
Spring, 2022	**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
Spring, 2021	**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
Fall, 2020	**ENV 367 / GEO 367:** *Earth System Modeling, assessing mitigation strategies* [assistant] Forcing a compact Earth system model (OSCAR) and analyzing outputs in Python Jupyter notebooks. **Main Instructor:** Laure Resplandy
Fall, 2019, 2020	**Junior Colloquium:** *Princeton University Department of Geosciences* [main instructor] Basic skills in data analysis and computation using Python Jupyter notebooks.

Field Experience

2023	**The Flinders Ranges, Australia** [5 weeks] High-resolution mapping and sampling of Neoproterozoic and Cambrian paleoenvironments.
2021	**The Big Horn Mountains, Wyoming, USA** [1 week] Paleoenvironmental context surrounding Earth's first rooted land plants (Devonian).
2021	**Paradox Basin, Utah, USA** [3 weeks] Searching for glacioeustasy in a tropical carbonate stratigraphy.
2019	**The Pelly Mountains, Yukon Territory, Canada** [6 weeks] Paleoenvironmental reconstruction of lower Cambrian archaeocyathid reefs.
2019	**Bolivian Altiplano** [6 weeks] Stratigraphic analysis of the environmental context surrounding the K-Pg mass extinction.
2019	**Esmerelda County, Nevada, USA** [4 weeks] Paleoenvironmental reconstruction of lower Cambrian archaeocyathid reefs.
2018	**Zumaia, Spain and Gubbio, Italy** [4 weeks] Stratigraphic context of potentially cyclic slope deposits near the K-Pg boundary.
2016	**San Salvador Island, The Bahamas** [1 week] Study of a modern carbonate platform sedimentology and biological systems.

Awards, Honors, and Fellowships

2019-2023	Department of Geosciences Graduate Student Research Fund Princeton University [*3 x $5000*]
2021	Department of Geosciences Graduate Student Teaching Award, Princeton University
2021	Princeton Research Day Orange & Black Presenter Award, Princeton University
2020	Society for Sedimentary Geology Weimer Student Research Grant [*$1000*]
2019	COS 424 computer vision AI Kaggle competition winner
2018-2019	David Elliston Guyer '67 and Walter R.F. Guyer *41 Fellowship, Princeton University
2016	Mary Jean Mulvaney Scholar Athlete Award, The University of Chicago
2015	Men's 4x400m Relay School Record Holder, The University of Chicago
2015	Academic All-American Honors, USTFCCCA
2013-2016	Varsity Track and Field Team Captain, The University of Chicago
2012-2016	The College Dean's List, The University of Chicago