

DYLAN S. DAVIS, Ph.D.

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Columbia Climate School
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EDUCATION

Ph.D. in Anthropology Pennsylvania State University Advisor: Kristina G. Douglass Dissertation Title: <i>Living with change: An archaeological study of human settlement patterns as environmental adaptations in Late Holocene Madagascar</i>	2018 – 2022
M.A. in Anthropology Binghamton University, New York Advisor: Carl P. Lipo	2017 – 2018
B.S. Anthropology & B.A. Geography Binghamton University, New York (<i>summa cum laude</i>) Concentrations: Archaeology, Computer Applications for Human Environmental Analysis	2014 – 2017

ACADEMIC APPOINTMENTS

2022 – Present: Postdoctoral Research Scientist in Climate, Biology & Paleoenvironment, Lamont-Doherty Earth Observatory, Columbia Climate School, Columbia University
2022 – Present: National Science Foundation SBE Postdoctoral Research Fellow, Columbia University
2021 – 2022: Graduate Lecturer, The Pennsylvania State University
2020 – 2021: Graduate Research Assistant, The Pennsylvania State University
2019 – 2020: Graduate Research Fellow, NASA Pennsylvania Space Grant Consortium
2018 – 2021: Teaching Assistant, The Pennsylvania State University

RESEARCH INTERESTS

– Human-environment systems dynamics	– geospatial analysis	– environmental archaeology
– remote sensing and GIS	– complex adaptive systems	– ethical research practices
– climate and social organization	– human adaptations to hypervariable climate	– landscape archaeology
– machine learning and AI	– geophysical applications in archaeology	– island and coastal studies
		– environmental modeling

EDITED WORKS

(*denotes equal contribution)

Davis, D. S., S. W. Hixon, and K. Douglass (editors)

In Prog. Advances and future directions in Collaborative Landscape Archaeology in Coastal and Island Contexts [Special Issue]. ***The Journal of Island and Coastal Archaeology***. Taylor & Francis.


D. S. Davis*, Hackel, J. *, L. N. Phelps*, E. Razanatsoa*, T. Rasolondrainy*, and G. Tiley* (editors)


In Prog. Madagascar's grassy biomes: from Holocene to Anthropocene [Special Issue]. ***Plants, People, Planet***. John Wiley & Sons. [\[CALL FOR PAPERS\]](#)

Davis, D. S., and M. C. Sanger (editors)

2021 Ethical Practice in Remote Sensing and Geophysical Archaeology [Special Issue]. ***Archaeological Prospection***. 28(3):269-399. John Wiley & Sons.

PEER REVIEWED PUBLICATIONS

Gold Open Access 

Green Open Access 


Davis, D. S.

Accepted Past, present, and future of complex systems theory in archaeology. ***Journal of Archaeological Research***.


Quintus, S., **D. S. Davis**, and E. E. Cochrane

In Press Evaluating Mask R-CNN Models to Extract Terracing across Oceanic High Islands: an example from Sāmoa. ***Archaeological Prospection***.


Davis, D. S., T. Rasolondrainy, G. Manahira, V. Andriankaja, L. Hubertine, R. Justome, F. Lahiniriko, H. Léonce, R. Roi, F. Victorian, M. B. J. Clovis, V. Voahirana, T. L. Carina, A. J. Yves, Z. M. Chrisostome, B. Manjakahery, and K. Douglass

In Press Evidence of extensive social networks as risk-mitigation strategies on Southwest Madagascar. ***Antiquity***. 


Davis, D. S., G. Manahira, F. Lahiniriko, V. Andriankaja, T. L. Carnat, Z. M. Chrisostome, M. B. J. Clovis, F. Fenomanana, L. Hubertine, R. Justome, H. Léonce, A. J. Yves, R. Roi, F. Victorian, V. Voahirana, R. Flerita, Z. M. Chrisostome, and K. Douglass

2023 Evidence of lithic blade technology in southwest Madagascar. ***The Journal of Island and Coastal Archaeology***. DOI: 10.1080/15564894.2022.2152139 


Cook-Hale, J.*, **Davis, D. S.***, and M. C. Sanger

2023 Evaluating the archaeological efficacy of bathymetric LiDAR across oceanographic contexts: A case study from Apalachee Bay, Florida. ***Heritage***. 6(2):928-954. 


Phelps, L. N., N. Andela, M. Gravey, **D. S. Davis**, C. A. Kull, K. Douglass, K., and C. E. R. Lehmann

2022 Madagascar's fire regimes challenge global assumptions about landscape degradation. ***Global Change Biology***. 28(23):6944-6960. [\[Attn score: 98th percentile\]](#) 

Davis, D. S., and J. Lundin

2021 Locating Charcoal Production Sites in Sweden Using Hydrological Algorithms and Deep Learning. ***Remote Sensing***. 13(18):3680. 


Davis, D. S., and K. Douglass

- 2021 Remote Sensing Reveals Lasting Legacies of Land-Use by Small-Scale Communities in the southwestern Indian Ocean. *Frontiers in Ecology and Evolution*. 9: 689399. [Attn score: 97th percentile] 


Davis, D. S., G. Caspari, M. C. Sanger, and C. P. Lipo

- 2021 Using Deep Learning to Detect Rare Archaeological Features: A Case from Coastal South Carolina, USA. *Society of Exploration Geophysicists Technical Program Expanded Abstracts*. 3265-3269. 


Davis, D. S., and M.C. Sanger

- 2021 Ethical Challenges in the Practice of Remote Sensing and Geophysical Archaeology. *Archaeological Prospection*. 28(3):269-276. 


Davis, D. S., G. Caspari, C. P. Lipo, and M. C. Sanger

- 2021 Deep Learning Reveals Extent of Archaic Native American Shell Ring Building Practices. *Journal of Archaeological Science*. 132:105433. [Attn score: 96th percentile] 


Davis, D. S.

- 2021 Theoretical repositioning of automated remote sensing archaeology: Shifting from features to ephemeral landscapes. *Journal of Computer Applications in Archaeology*. 4(1): 94-109. 


Davis, D. S., D. C. Buffa, T. Rasolondrainy, E. Creswell, C. Anyanwu, A. Ibirogbu, C. Randolph, A. Ouarghidi, L. N. Phelps, F. Lahiniriko, Z. M. Chrisostome, G. Manahira and K. Douglass

- 2021 The aerial panopticon and the ethics of archaeological remote sensing sacred cultural spaces. *Archaeological Prospection*. 28(3):303-318. [Attn score: 96th percentile] 


Davis, D. S., K. E. Seeber, and M. C. Sanger

- 2021 Addressing the problem of disappearing cultural landscapes in archaeological research using multi-scalar survey. *The Journal of Island and Coastal Archaeology*. 16(2-4): 524-540. 


Davis, D. S., R. J. DiNapoli, and K. Douglass

- 2020 Integrating point process models, evolutionary ecology, and traditional knowledge improves landscape archaeology: A case from Southwest Madagascar. *Geosciences*. 10(8): 267. [Attn score: 91st percentile] 


Davis, D. S.

- 2020 Defining what we study: The contribution of machine automation in archaeological research. *Digital Applications in Archaeology and Cultural Heritage*. 18: e00152. 


Davis, D. S., R. J. DiNapoli, M. C. Sanger, and C. P. Lipo

- 2020 The integration of lidar and legacy datasets provides improved explanations for the spatial patterning of shell rings in the American Southeast. *Advances in Archaeological Practice*. 8(4):361-375. 

Davis, D. S., D. C. Buffa, and A. C. Wroblewski

- 2020 Assessing the utility of open-access bathymetric data for shipwreck detection in the United States. *Heritage*. 3(2): 364-383. 


Davis, D. S.

- 2020 Geographic disparity in machine intelligence approaches for archaeological research. *Remote Sensing*. 12(6): 921. [Attn score: 92nd percentile] 


Davis, D. S., and K. Douglass

- 2020 Aerial and Spaceborne Remote Sensing in African Archaeology: A Review of Current Research and Potential Future Avenues. *African Archaeological Review*. 37(1): 9-24. 


Davis, D. S., V. Andriankaja, T. L. Carina, Z. M. Chrisostome, C. Colombe, F. Fenomanana, L. Hubertine, R. Justome, F. Lahiniriko, H. Léonce, G. Manahira, B. V. Pierre, R. Roi, P. Soafiavy, F. Victorian, V. Voahirana, B. Manjakahery, and K. Douglass

- 2020 Satellite-based remote sensing rapidly reveals extensive record of Holocene coastal settlement on Madagascar. *Journal of Archaeological Science*. 115: 105097. [Attn score: 96th percentile] 


Davis, D. S.

- 2020 Studying human responses to environmental change: Trends and trajectories of archaeological research. *Environmental Archaeology*. 25(2): 367-380. 


Davis, D. S.

- 2019 Object-based image analysis: a review of developments and future directions of automated feature detection in landscape archaeology. *Archaeological Prospection*. 26(2): 155-163. 


Davis, D. S., C. P. Lipo, and M. C. Sanger

- 2019 A comparison of automated object extraction methods for earthwork feature identification in South Carolina. *Journal of Archaeological Science: Reports*. 23: 166-177. 

Davis, D. S., M. C. Sanger, and C. P. Lipo

- 2019 Automated mound detection using LiDAR and object-based image analysis in Beaufort County, SC. *Southeastern Archaeology*. 38(1): 23-37. [Attn score: 98th percentile] 

Davis, D. S.

- 2017 The Applicability of Short-Wave Infrared (SWIR) Imagery for Archaeological Landscape Classification on Rapa Nui (Easter Island), Chile. *Alpenglow* 3(1): 7. 

MANUSCRIPTS IN REVIEW

Davis, D. S., and K. Douglass

- n.d. Landscape Dynamics and Settlement Patterns in Southwest Madagascar since the Late Holocene. In *The Malagasy World*, edited by Chantal Radimilahy, Kristina Douglass, and Zoë Crossland, Routledge Handbooks Online: Routledge.

Davis, D. S., Cook-Hale, J. W., N. Hale, and M. C. Sanger

- n.d. Bathymetric lidar and semi-automated feature extraction assist underwater archaeological surveys. Submitted to *Archaeological Prospection*.

Davis, D. S., R. J. DiNapoli, G. Pakarati, T. L. Hunt, and C. P. Lipo

- n.d. High Resolution short-wave infrared imagery improves estimates of ancient rock gardening distribution on Rapa Nui (Easter Island). Submitted to *International Journal of Remote Sensing*.

Reprinted Publications

Davis, D. S., and K. Douglass

- 2022 Aerial and Spaceborne Remote Sensing in African Archaeology: A Review of Current Research and Potential Future Avenues. In: Gokee, C., Klehm, C. (eds) *Spatial Approaches in African Archaeology*. pp. 9-24. Springer, Singapore. Reprinted from: Davis, D. S., and K. Douglass (2020) Aerial and Spaceborne Remote Sensing in African Archaeology: A Review of Current Research and Potential Future Avenues. *African Archaeological Review*. 37(1): 9-24.

Book Reviews

Davis, D. S., and K. Douglass

- 2023 Review of Human Behavioral Ecology and Coastal Environments, edited by H. B. Thakar and C. Flores Fernandez. *American Antiquity*. In Press. DOI: 10.1017/aaq.2023.31

MANUSCRIPTS IN PREPARATION (*equal contribution)

Alders, W., **D. S. Davis,** & J. J. Haines

- n.d. The gaze of the time traveler: Remote Sensing and study of multitemporal landscapes. To be submitted to *Journal of Archaeological Method and Theory*. In Preparation.

Davis, D. S., and K. Douglass

- n.d. Remote Sensing and the Ethics of Bird's Eye Investigations in African Archaeology: a push towards participatory practice. In: McCall, M. K., Panek, J., & Álvarez Larrain, A. (eds) *Participatory mapping and ppgis: research futures, potentials, and promises*. Edward Elger.

Davis, D. S., A. Domic, G. Manahira, and K. Douglass

- n.d. Geophysics demonstrate similarities and differences between long-term ecological impacts of foraging, pastoralism, and mixed subsistence strategies on SW Madagascar. To be submitted to *Journal of Anthropological Archaeology*. In Preparation.

Davis, D. S., B. Tucker, Tsiazonera, C. Howe, H. Theiss, A. Domic, L. Phelps, R. Opitz, C. E. Klehm, B. Tucker, and K. Douglass

- n.d. Traditional Malagasy lifeways play a central role in Madagascar's dry forest biome. To be submitted to *Journal of Social Archaeology*.

Phelps, L. N., S. Hixon, **D.S. Davis,** J. Chen, S. Monroe, C. Anyanwu, and K. Douglass

n.d. Human isotopic niches demonstrate livelihood innovation and resilience to Holocene environmental change across Africa. To be submitted to ***Proceedings of the National Academy of Sciences***.

Phelps, L. N., E. Razanatsoa, **D.S. Davis***, J. Hackel*, T. Rasolondrainy*, G. Tiley*, R.L. Andriamiarisoa, C.L. Anyanwu, G. Besnard, C. Birkinshaw, W. Bond, D. Buffa, D. Burney, E. Convery Fisher, S. Eshelman, L. Gautier, L. Gilson, S.G. Haberle, J. Hansford, S. Hixon, G. Joseph, C.A. Kull, V. Montande, U. Radespiel, J. Raharimampionona, T. Ramiadantsoa, T. Razafimanantsoa, C. Ronadh, J. Salmona, N. Scroxton, T. van Elst, K. Van-Thu Pham, N.R.G. Voarintsoa, M.S. Vorontsova, A.D. Yoder, B. Crowley, K. Douglass, C.E.R. Lehmann, and M. Vorontsova

n.d. Sustainability of ecosystems and livelihoods across the tropics hinges on interdisciplinary grassy biomes research. To be submitted to ***Nature Ecology and Evolution***. In Preparation.

Cook-Hale, J. W., **D. S. Davis**, and M. C. Sanger

n.d. Coming of age on the shallow continental shelf: submerged cultural landscape prospection for early to middle Holocene archaeological deposits, Apalachee Bay, Florida, U.S.A.. To be submitted to ***The Journal of Island and Coastal Archaeology***. In Preparation.

Douglass, K., E. M. Quintana Morales, T. Rasolondrainy, G. Manahira, B. Manjakahery, Rosily, A. Ediedy, F. Mampibay, H. Rabekoto, P. Rasoafiavy, Z. C. Maharesy, D. C. Buffa, **D. S. Davis**, and E. Burkhardt

n.d. The Vezo Ecological Knowledge Exchange. To be submitted to ***Journal of Ethnobiology***. In Preparation.

PUBLICATIONS FOR GENERAL PUBLIC (*Invited Submission)

Randolph, C., **D. Davis**, C. Anyanwu, K. Pham, D. Buffa, E. Creswell, A. Ibirogba, and K. Douglass

2022 Indigenous knowledge is key to a sustainable future. ***Penn State Institutes of Energy and the Environment Blog***.

***Davis, D.**, D. Buffa, and A. Wroblewski

2021 Automatic Shipwreck Detection in Bathymetry Data. ***Hydro International***. 25(1): 10-13.

Davis, D.

2019 When Social Science meets Computer Science NASA's mission directives are explored in innovative ways. Blog Post for the Pennsylvania Space Grant Consortium.

FUNDING

TOTAL AWARDED TO DATE (approximate): **\$365,169**

External Funding: **\$300,727** | Internal Funding: **\$58,259** | Travel Funding: **\$4,454**

(CU = Columbia University, PSU = Penn State, BU = Binghamton University)

Pending Applications

- **National Aeronautics and Space Administration (NASA)** – Early Career Investigator in Earth Science (**PI**), Effects of long-term human land-use and climate change on ecological productivity \$299,975 *in prep.*

External Research Funding

– National Science Foundation (NSF) – SBE Postdoctoral Research Fellowship (PI): <i>Long-term effects of socioeconomic activity on ecological stability</i> (Award No. SMA-2203789)	\$143,000	2022-2024
– American Philosophical Society – Supplemental COVID-19 Research Support Grant (PI)	\$1,000	2021
– National Geographic Society – Enduring Impacts RFP Grant (co-PI, PI K. Douglass): <i>Enduring Impacts of Climate and People on the Landscape of Southwest Madagascar</i> (Award No. NGS-77912R-21)	\$79,995	2021-2023
– National Science Foundation (NSF) – Doctoral Dissertation Research Improvement Grant: <i>The Role of Mobility in Human-Environment Interactions</i> (Award No. BCS-2039927)	\$31,556	2021-2023
– NSF Spatial Archaeometry Research Collaborations – Data and Analytics Grant (PI) – <i>Quantifying pastoralist niche construction on southwest Madagascar using multi-sensor remote sensing (1600 – Present)</i>	\$12,381	2021-2022
– NASA Pennsylvania Space Grant Consortium – Mini-Grant (PI) <i>Satellites, settlements, and environment: studying past mobility patterns and their environmental contexts in Southwest Madagascar</i>	\$4,995	2020-2021
– Sigma Xi – Grant in Aid of Research (PI) <i>Studying the effects of environmental change on human settlement Behavior in Southwest Madagascar</i> [Grant No. G2020031599752491]	\$800	2020-2021
– Microsoft – AI for Earth Azure Compute Credit Grant (co-PI, PI Kristina Douglass): <i>Harnessing the power of automated archaeological remote sensing in Holocene SW Madagascar</i>	\$15,000	2020-2021
– Explorers Club – Mamont Scholar Grant (PI) <i>Understanding Human-Environmental Interaction in Coastal Southwest Madagascar (ca. 10,000 - 1000 BP)</i>	\$2,000	2020-2021
– American Philosophical Society – Lewis and Clark Fund for Exploration and Research (PI): <i>Studying the effects of environmental change on the prehistoric settlement of Southwest Madagascar</i>	\$5,000	2020-2021
– NASA Pennsylvania Space Grant Consortium – Graduate Research Fellowship (PI) [Grant No. NNX15AK06H]	\$5,000	2019-2020

Internal Research Funding

– Lamont-Doherty Earth Observatory Climate Center, CU – Seed Grant (PI), <i>Examining the role of subsistence economies on long-term socio-ecological dynamics on Madagascar</i>	\$13,230	2023-2024
– Department of Anthropology, PSU – Hill Fellowship Post-Comprehensive Award (PI)	\$5,000	2021
– Liberal Arts Research and Graduate Studies Office, PSU – Dissertation Support Grant (PI)	\$1,994	2020-2021
– Africana Research Center, PSU – Research Grant (PI): <i>An investigation of environmental change and its effects on settlement and mobility in Southwest Madagascar since the Late Holocene</i>	\$1,000	2020-2021
– African Studies Program, PSU – Dickerson Family Fund Award (PI)	\$900	2020

Evaluating Settlement Strategies in Southwest Madagascar Using Remote Sensing and Spatial Analysis

– Department of Anthropology, PSU – Hill Fellowship Pre-Comprehensive Award (PI)	\$1,220	2020
– Energy and Environmental Sustainability Laboratories/Laboratory for Isotopes and Metals in the Environment, PSU – Graduate Student Seed Grant (PI): <i>Improved Carbon-14 Dating of Ratite Eggshell fragments from East Africa and Madagascar</i>	\$1,735	2020
– Institute for Cyber-Science, PSU – Seed Grant (Co-PI, PI: Kristina Douglass): <i>Machine Learning and the Preservation of Cultural Heritage on Madagascar</i> (I conceived of and wrote this grant largely independently, but graduate students could not serve as the PI)	\$25,000	2019-2020
– Department of Anthropology, PSU – Hill Fellowship Graduate Training Award (PI)	\$1,500	2019
– Energy and Environmental Sustainability Laboratories, PSU – Graduate Student Seed Grant, PSU (PI): <i>Carbon-14 Dating of New Archaeological Sites in Southwest Madagascar: New Insights into the Early Settlement History of the Indian Ocean</i>	\$2,430	2019

Academic Awards

– William T. Sanders Graduate Award in Anthropology	\$729	2021
– 3 rd Place Award in Social & Behavioral Sciences, 36 th Annual Graduate Exhibition (PSU)	\$100	2021
– Liberal Arts Teaching and Research Scholarship (PSU)	\$1,000	2020
– Graduate Scholar Award (PSU)	\$2,000	2020
– Graduate Scholar Award (PSU)	\$2,000	2019
– Richard Antoun Faculty Award for Excellence in Anthropology	\$250	2017

Travel Funding

– Conference Travel Award, Department of Anthropology (PSU)	\$250	2022
– RGSO Conference Travel Award (PSU)	\$400	2021
– RGSO Conference Travel Award (PSU)	\$600	2019
– AGSA UPAC Travel Fund (PSU)	\$604	2019
– RGSO Conference Travel Award (PSU)	\$400	2019
– Graduate Student Conference Travel Reimbursement Funding (BU)	\$400	2018
– Travel Grant, Department of Anthropology (BU)	\$500	2018
– Travel Grant, Department of Anthropology (BU)	\$500	2017
– Undergraduate Student Conference Travel Fund (BU)	\$300	2017
– Harpur Edge Student Support Fund (BU)	\$500	2017

NON-MONETARY AWARDS & RECOGNITION

– Top Cited Article in <i>Archaeological Prospection</i> between 2021-2022	2023
– Top Cited Article in <i>Archaeological Prospection</i> between 2019-2020	2021
– Top Downloaded Paper in <i>Archaeological Prospection</i> between 2018-2019	2020
– National Science Foundation Graduate Research Fellowship: Honorable Mention	2017

TEACHING INTERESTS

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|-----------------------------------|------------------------------|--|
| – Archaeological research methods | – Environmental Archaeology | – Malagasy Archaeology |
| – island and coastal archaeology | – North American archaeology | – Remote sensing, GIS and spatial analysis |
| | – Human behavioral ecology | – Anthropological theory |
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TEACHING EXPERIENCE

ANTH 1: Understanding Humans (PSU), **Instructor** (SU-2021, FA-2021) [online format], **Teaching Assistant** (SP-2020)

- TA Duties: Grading, hold office hours, and develop and present occasional lectures. 100 students

ANTH 9: Rise of Civilization in the Old World (PSU), **Teaching Assistant** (FA-2018; FA-2019)

- Duties: Grading, hold office hours, lead review sessions, and present occasional lectures. 100 students

ANTH 11: North American Archaeology, **Instructor** (SP-22) [online format]. 160 students

ANTH 140: Anthropology of Alcohol (PSU), **Teaching Assistant** (FA-2020, SP-2021) [online format]

- Duties: Train undergraduate TAs, logistical planning of course materials, hold office hours. 1,000 students (largest course offered by Penn State and the Anthropology Department)

ANTH 426W: Archaeological Laboratory Analysis (PSU), **Teaching Assistant** (SP-2019)

- Duties: Teach writing development skills, grade written assignments, hold office hours, assist students with lab-work. 10 students

Introduction to Geospatial Methods in Anthropological Research (PSU, ARISE Program), **Course Development, Instructor** (SU-2022):

- Developed 1-week course for undergraduate students to learn fundamental skills in GIS, remote sensing, and geospatial analysis and their applications to anthropological research. 12 students.
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INVITED TALKS

2023 *Climate & Society: what archaeology can teach us about human responses to climate change.* Lecture presented at Columbia University Red Cross Event on Climate Change, Columbia University. February 23.

2023 *Decisions and Consequences: understanding the long-term role of human livelihoods on ecological systems.* Lecture presented at the Biology & Paleoenvironment Division Seminar Series, Lamont-Doherty Earth Observatory. February 20.

2023 *Legacies of Human Land Use and their Lessons for Resilience and Sustainability.* Lecture presented at the Complexity Science, Modeling and Sustainability Seminar Series, Columbia University. February 7.

2023 *Archaeology of sustainability: lessons about coastal land-use strategies from SW*

Madagascar. Lecture presented at the Past Global Changes (PAGES) Q-MARE Seminar Series, Smithsonian Tropical Research Institute. January 4.

- 2022 *Satellites, machine learning, and community collaboration: A 21st century approach to environmental archaeology*. Guest Lecture presented to “World Archaeology: Global Perspectives on the Past.” Washington University in St. Louis. September 14. St. Louis, MO.
- 2022 *Settlement Distribution and Land Use Patterns in Southwest Madagascar Since the Late Holocene*. Guest Lecture presented to ANTH572 Graduate Seminar (Advances in Anthropological Methods), March 23, Penn State, USA.
- 2022 *The impacts of pastoralism on landscape ecologies in Southwest Madagascar*. Lecture presented at the Archaeological Sciences in Eastern Africa: The Great Conversation Q&A forum and lecture series, Department of Archaeology, Max Plank Institute for the Science of Human History. March 8, 2022. Jena, Germany.
- 2022 *Power-Dynamics and pathways towards equity in Landscape Research: a case study from archaeology*. Guest Lecture presented at the Decolonizing Water Scholarship Reading Group. February 25, 2022. The Pennsylvania State University, USA.
- 2021 *Settlement and Land Use in Late Holocene Southwest Madagascar*. Lecture presented at the Archaeological Science Seminar Series. May 14, 2021, Newcastle University, UK.

CONFERENCE PRESENTATIONS (*Invited)

***Davis, D. S.** and K. Douglass

- 2023 Behavioral Ecology and Evolutionary Approaches to Human-Environment Dynamics on SW Madagascar. Paper presented at the 88th Annual Meeting of the Society for American Archaeology, Portland, OR.

Cook Hale, J. W., **D. S. Davis**, M. C. Sanger, and N. L. Hale

- 2023 Evaluating the use of bathymetric LiDAR for submerged archaeological site prospection. Poster presented at the 88th Annual Meeting of the Society for American Archaeology, Portland, OR.

***Davis, D. S.**

- 2022 “Big Data” and Archaeological Studies of Human-environmental dynamics. Invited Lightning Presentation and Roundtable Discussion at the Archaeological Institute of America, 2022

Davis, D. S., D. C. Buffa, T. Rasolondrainy, E. Creswell, C. Anyanwu, A. Ibirogba, C. Randolph, A. Ouarghidi, L. N. Phelps, F. Lahiniriko, Z. M. Chrisostome, G. Manahira and K. Douglass

- 2022 Bird’s Eye Ethics: The panopticon and archaeological remote sensing. Poster presented at Frontiers in Archaeological Sciences 3: Rethinking the Paradigm, October 7-9, Cornell University, Ithaca, NY.

Cook Hale, J. W., **D. S. Davis**, M. Sanger, K. Woo, N. L. Hale, and C. A. Hemmings

- 2022 Remote sensing, machine learning, and the search for shallowly submerged formerly coastal sites: a case study from Apalachee Bay, Gulf of Mexico, Florida, U.S.A. Paper presented at the 2022 AIMA Conference: Decolonising Maritime Archaeology, Heritage and Museums in Australasia, September 21-23, Adelaide, South Australia.

Davis, D. S., T. Rasolondrainy, G. Manahira, V. Andriankaja, L. Hubertine, R. Justome, F. Lahiniriko, H. Léonce, R. Roi, F. Victorian, M. B. J. Clovis, V. Voahirana, T. L. Carina, A. J. Yves, Z. M. Chrisostome, B. Manjakahery, and K. Douglass

- 2022 Social networks as risk-mitigation strategies on Southwest Madagascar: A multiproxy analysis. Paper presented at the 16th Congress of the Pan African Archaeological Association for Prehistory and the Related Studies, 2022, Zanzibar, Tanzania.

***Davis, D. S.,** C. Howe, H. Theiss, L. N. Phelps, C. Anyanwu, R. Opitz, C. Klehm, and K. Douglass

- 2022 Elucidating the pastoralist niche on SW Madagascar using automated remote sensing. Paper presented at the 87th Annual Meeting of the Society for American Archaeology, 2022, Chicago.

Randolph, C., **D.S. Davis,** D. Buffa, and K. Douglass

- 2022 Collaborative Archaeology in SW Madagascar: Implications for Conservation using Direct Stakeholder Involvement. Paper presented at Synergy Between Palaeo-scientists and Stakeholders for Biodiversity Conservation in Madagascar and its Surrounding Islands Workshop, March 23-24. Virtual.

***Davis, D. S.,** G. Caspari, C. P. Lipo, and M. C. Sanger

- 2021 Using Deep Learning to Detect Rare Archaeological Features: A Case from Coastal South Carolina, USA. Paper presented at the International Meeting for Applied Geoscience & Energy Meeting. Session Title: Applications for Archaeology, Void, and Target Detection. Denver, CO, September 26 – October 1.

***Davis, D. S.**

- 2021 Documenting the Ecological Legacy of Land-Use by Small-Scale Communities in Southwest Madagascar. Paper presented at the UK Earth Observation Week - Supporting climate and environmental sustainability through Earth Observation, 2021, Virtual.

Davis, D. S., V. Andriankaja, T. L. Carina, Z. M. Chrisostome, C. Colombe, F. Fenomanana, L. Hubertine, R. Justome, F. Lahiniriko, H. Léonce, G. Manahira, B. V. Pierre, R. Roi, P. Soafiavy, F. Victorian, V. Voahirana, B. Manjakahery, and K. Douglass

- 2021 Remote Sensing and Spatial Analysis Reveal Coastal Settlement Strategies in Southwest Madagascar. Paper presented at the 25th Society of Africanist Archaeologists, Oxford, UK, August 14-15.

***Davis, D. S.,** L. N. Phelps, C. Anyanwu, and K. Douglass

- 2021 Grasslands and Pastoralists: Palaeoecological, Archaeological, and Geophysical Evidence. Lightning Talk presented at the Malagasy Grassy Biomes Workshop, Virtual, July 27-30.

***Davis, D. S.**

- 2021 Using machine intelligence to locate ephemeral archaeological landscape modifications: A case from Madagascar. Paper presented at CAA 2021: Digital Crossroads. Session title: From Artificial Intelligence to Stratigraphic Reality. Dynamics of an Inverse Process for AI Applications in Archaeology. June 14-18.

Davis, D. S.

- 2021 Archaeology Highlights Strategies for Coping with Climate Change. Oral presentation at the 36th Annual Graduate Research Exhibition, March 24-26, Pennsylvania State University.

Davis, D. S.

- 2020 Quantifying Ancient Landscape Modifications using Machine Learning and Evolutionary Theory: A Case Study from Madagascar. Poster presented at the Center for Computational Mathematics and Applications Workshop on Mathematical Machine Learning and Application. University Park, PA. December 14-16.

Davis, D. S., and K. Douglass

- 2020 Archaeological Settlement on Madagascar Revealed Using Semi-Automated Satellite Remote Sensing. Poster presented at the Institute for Computational Data Sciences (ICDS) Symposium, Pennsylvania State University. October 21-22. DOI: 10.13140/RG.2.2.19537.76648

Douglass, K., and D. Davis

- 2020 Archaeology of Adaptation and Mobility. Lightning Talk presented at Microsoft's AI for Earth Digital Summit. June 25-26.

Davis, D. S.

- 2020 Spatial Modeling Indicates Drivers of Settlement Behavior in Southwest Madagascar. Paper presentation at Anthropology Day, Penn State University, State College, PA. March 24. (**Cancelled due to COVID-19 Pandemic**).

Davis, D. S.

- 2019 Developing a Predictive Model for Locating Cultural Deposits on Southwest Madagascar. Paper presented at the 14th Madagascar Workshop, University of Toronto, October 25-26.

Davis, D. S., M. C. Sanger, and C. P. Lipo

- 2019 Shell Rings and Settlement Organization in the Coastal American Southeast: New insights from remotely sensed data. Poster presented at the 84th Annual Meeting of the Society for American Archaeology, Albuquerque, NM, April 10-14. DOI: 10.13140/RG.2.2.16808.62726

Davis, D. S.

- 2018 Unveiling the Past: Using LiDAR to Discover Lost Archaeological Features in the American Southeast. Poster presented at the 3rd Annual GIS Day, Binghamton University, February 16. <https://orb.binghamton.edu/gisday/1>.

Davis, D. S.

- 2018 Filling in the Map: Object-Based Image Analysis and the Identification of Shell Rings on Hilton Head Island, SC. Poster presented at the 83rd Annual Meeting of the Society for American Archaeology, Washington D. C., April 11-15. DOI: 10.13140/RG.2.2.21335.57767/1.

Davis, D. and C. Lipo

- 2017 The Benefits of Short-Wave Infrared Imagery for Archaeological Landscape Analysis: A Case Study from Easter Island, Chile. Poster presented at the 82nd Annual Meeting of the Society for American Archaeology. Vancouver, BC, March 29 – April 2. DOI: 10.13140/RG.2.2.24888.75527.

Davis, D. and C. Lipo

- 2017 Resource Scarcity and Monumental Architecture: Cost Signaling on Rapa Nui (Easter Island), Chile. Poster presented at Binghamton Research Days. Binghamton University, April 21. DOI: 10.13140/RG.2.2.29083.05928.

PUBLISHED DATASETS

Quintus, S., **D. S. Davis**, and E. E. Cochrane

- 2022 Supporting Data – Diverse terracing practices revealed by automated lidar analysis across the Sāmoan islands. Zenodo. <https://doi.org/10.5281/zenodo.7312103>.

Davis, D. S., T. Rasolondrainy, G. Manahira, S. W. Hixon, V. Andrianakaja, L. Hubertine, R. Justome, F. Lahiniriko, H. Léonce, R. Roi, F. Victorian, M. B. J. Clovis, V. Voahirana, T. L. Carina, A. J. Yves, Z. M. Chrisostome, B. Manjakahery, and K. Douglass

- 2022 Evidence for Extensive Social Networks as Risk-Mitigation Strategies on Southwest Madagascar. Github. https://github.com/d-davis/mada_ceramic.

Davis, D. S., and J. Lundin

- 2021 Locating Charcoal Production Sites in Sweden Using Hydrological Algorithms and Deep Learning. Penn State ScholarSphere. <https://doi.org/10.26207/zfc5-rd31>.

Davis, D. S., and K. Douglass

- 2021 Remote Sensing Reveals Lasting Legacies of Land-Use by Small-Scale Communities in the southwestern Indian Ocean. Penn State ScholarSphere. <https://doi.org/10.26207/zmsr-tc92>.

Davis, D. S., G. Caspari, C. P. Lipo, and M. C. Sanger

- 2021 Deep Learning Reveals Extent of Archaic Native American Shell Ring Building Practices. Penn State ScholarSphere. <https://doi.org/10.26207/ry6k-q463>.

Davis, D. S., V. Andrianakaja, T. L. Carina, Z. M. Chrisostome, C. Colombe, F. Fenomanana, L. Hubertine, R. Justome, F. Lahiniriko, H. Léonce, G. Manahira, B. V. Pierre, R. Roi, P. Soafiavy, F. Victorian, V. Voahirana, B. Manjakahery, and K. Douglass

- 2019 Satellite-based remote sensing rapidly reveals extensive record of Holocene coastal settlement on Madagascar. Penn State ScholarSphere. <https://doi.org/10.26207/1a47-pw11>.

Davis, D. S., R. J. DiNapoli, M. C. Sanger, and C. P. Lipo

- 2019 The integration of lidar and legacy datasets provides improved explanations for the spatial patterning of shell rings in the American Southeast. Penn State ScholarSphere. <https://doi.org/10.26207/7erq-3662>.

Davis, D. S., C. P. Lipo, and M. C. Sanger

- 2018 A comparison of automated object extraction methods for mound and shell-ring identification in coastal South Carolina. Anthropology Datasets 4. https://orb.binghamton.edu/anthro_data/4/.

Lipo, C. P., M. Sanger, and **D. Davis**

- 2018 Automated mound detection using LiDAR and Object-Based Image Analysis in Beaufort County, SC. Anthropology Datasets 3. https://orb.binghamton.edu/anthro_data/3.

INTERNAL REPORTS

Davis, D. S.

- 2022 Final Report: Satellites, settlements, and environment. Pennsylvania Space Grant Consortium, State College, PA.

Davis, D. S.

- 2021 Final Report: Studying the effects of environmental change on the prehistoric settlement of Southwest Madagascar. American Philosophical Society, Philadelphia, PA.

Davis, D. S.

- 2020 Interim Report: Studying the effects of environmental change on the prehistoric settlement of Southwest Madagascar. American Philosophical Society, Philadelphia, PA.

Davis, D. S.

- 2019 Concluding Report: Carbon-14 Dating of New Archaeological Sites in Southwest Madagascar. Internal Report. Environmental and Energy Sustainability Laboratories, The Pennsylvania State University, University Park, PA.

CARTOGRAPHIC WORK

- 2020 Figure 2: "Teotihuacan and other Terminal Formative and Classic period sites mentioned in Central Mexico" in K. G. Hirth, D. Carballo, and B. Arroyo (eds.) *Teotihuacan: The World Beyond the City*. Dumbarton Oaks, Washington D.C.
- 2020 Figure 9-1: "Five different periodic rendezvous or trade fairs held in the western United States before European contact." In K.G. Hirth *The Organization of Ancient Economies: A Global Perspective*.
- 2020 Figure 9-7: "Merchant circuits between large and small markets across three different environmental zones." In K.G. Hirth *The Organization of Ancient Economies: A Global Perspective*.

FIELDWORK

- July – August 2023 – Coral Coring Surveys and Paleoclimate Reconstruction, SW Madagascar: **Co-PI** (with K. Douglass, J. Zinke, and T. Rasolindrainy)

- April 2021 – July 2021 – Archaeological Excavations and Paleoecological Survey at Velondriake, Madagascar: **Principal Investigator** [planned and organized field logistics, I was not in the field due to the COVID-19 Pandemic]
- May 2020 – November 2020 – Archaeological Survey of the Velondriake Region, Morombe, Madagascar: **Principal Investigator** [planned and organized field logistics, I was not in the field due to the COVID-19 Pandemic]
- July 2019– August 2019 – Terrestrial and Marine Archaeological Survey of the Velondriake Region, Morombe, Madagascar: **Principal Investigator**
- July 2018 – Sea Pines Archaeological Research Project, Hilton Head Island, South Carolina, USA: **Field Archaeologist** (PI: Matthew Sanger)
- October 2017 – Archaeological Survey in Beaufort County, South Carolina, USA: **Principal Investigator**
- July 2017 – August 2017 – Sea Pines Archaeological Research Project, Hilton Head Island, South Carolina, USA: **Field Archaeologist** (PI: Matthew Sanger)
- June 2015 – August 2015: The Gabii Project, Rome, Italy: **Student** (PIs: Nicola Terrenato, Marcello Mogetta)

LABWORK

- July 2022 – Present: **Postdoctoral Researcher** in the Olo Be Taloha Lab, Columbia University
- June 2021 – August 2021: **Graduate Research Assistant** in the Olo Be Taloha African Environmental Archaeology Lab, Pennsylvania State University
- June 2020 – August 2020: **Graduate Research Assistant** in the Primate Functional Morphology Lab, Pennsylvania State University
- January 2019 – May 2022: **Doctoral Researcher** in the Olo Be Taloha African Environmental Archaeology Lab, Pennsylvania State University
- March 2019 – May 2022: **Doctoral Researcher** in the Isotope and Paleoclimatology Lab, Pennsylvania State University
- September 2018 – September 2020: **Doctoral Researcher** in the Human Environmental Dynamics Lab, Pennsylvania State University
- February 2017 – May 2018: **Lab Assistant** in the Archaeological Imaging, Mapping, and Morphology Lab, Binghamton University
- February 2017 – May 2018: **Graduate Researcher** in the FRI Remote Sensing Lab, Binghamton University

TECHNICAL TRAINING

Methods	Software/Technology
GIS, spatial analysis, remote sensing, image analysis, predictive modeling, 3D-mesh creation, object-based image analysis, deep learning, photogrammetry, geophysical survey, archaeological survey, archaeological excavation, data processing and analysis, ceramic analysis, acid hydrolysis for AMS dating preparation, Bayesian	ArcGIS, QGIS, SAGA, Whitebox GAT, ENVI, eCognition, R, Surfer, GPR, Magnetometer, Python, MeshLab
	LiDAR, multispectral imagery, thermal imagery, SAR

Statistics

WORKSHOPS ATTENDED

- 2023: Winter Workshop on Complex Systems 2023, Institute for Advanced Studies, Amsterdam, NL.
- 2020: DataArc Workshop: Tool Evaluation. Center for Advanced Spatial Technologies, University of Arkansas, November 16.
- 2020: COMPASS Science Communication Training Workshop, The Pennsylvania State University
- 2017: Using R for Archaeological Data Analysis, Mapping, and Visualization Workshop. 82nd Annual Meeting of the Society for American Archaeology Meeting, Vancouver, BC.

ADDITIONAL TRAINING

2012 – Open Water Diving Certification (SSI)

2013 – Advanced Open Water Diving Certification (SSI)

- Advanced certifications: Wreck, Night/limited visibility, Deep, Drysuit, Nitrox (EAN 40%)

2023 – Wilderness First Aid & Adult CPR Certification (valid thru 30 April, 2026)

PROFESSIONAL MEMBERSHIPS

- | | |
|---|----------------|
| – CAA International | 2021 – Present |
| – Explorers Club | 2020 – Present |
| – Society for Africanist Archaeologists | 2019 – Present |
| – Sigma Xi | Inducted 2018 |
| – Society for American Archaeology | 2016 – Present |
| – Phi Beta Kappa Honor Society | Inducted 2017 |
| – Gamma Theta Upsilon, International Geographical Honor Society | Inducted 2017 |

ACADEMIC SERVICE

- | | |
|---|----------------|
| – Organized Symposia | |
| ▪ Pan-African Archaeological Association Conference 2022 | 2022 |
| Session Title: <i>Approaches to studying African Landscapes</i> (co-organizer) | |
| – Organized Workshops | |
| ▪ Malagasy Grassy Biomes Working Group (co-organizer) | July 2021 |
| – Editorial Positions: | |
| ▪ Guest Editor, Special issue of <i>Plants, People, Planet</i> | 2022 – Present |
| ▪ Guest Editor, Special Issue of <i>Journal of Island and Coastal Archaeology</i> | 2021 – Present |
| ▪ Early Career Researcher Board, <i>Archaeological Prospection</i> | 2020 – Present |
| ▪ Guest Editor, Special Issue of <i>Archaeological Prospection</i> | 2020 – 2021 |
| – External Reviewer: | 2019 – Present |
| ▪ <u>Grant Agencies</u> : NASA (1), Graduate Women in Science (GWIS) National Fellowship Program (1), National Geographic Society (4) | |
| ▪ <u>Books</u> : University Press of Florida (1) | |

- Journals:

ARCHAEOLOGY/ANTHROPOLOGY: *Journal of Archaeological Science* (4), *American Antiquity* (1), *Heritage Science* (2), *Heritage* (2), *Antiquity* (1), *Journal of Archaeological Research* (1), *African Archaeological Review* (1), *Journal of Archaeological Science: Reports* (1), *Journal of Field Archaeology* (1), *Advances in Archaeological Practice* (5), *Canadian Journal of Archaeology* (1), *Southeastern Archaeology* (2), *Geoarchaeology* (4),

GEOGRAPHY/GEOSCIENCES: *Archaeological Prospection* (25), *Remote Sensing of Environment* (2), *Remote Sensing* (19), *ACME: An International Journal for Critical Geographies* (2), *International Journal of Applied Earth Observation and Geoinformation* (1), *Geosciences* (2)

ENVIRONMENTAL STUDIES: *The Holocene* (1), *Quaternary International* (1)

PLANT SCIENCES: *Plants, People, Planet* (1)

MULTIDISCIPLINARY: *Scientific Data* (2), *PLOS ONE* (1), *The Innovation* (2), *Water* (2), *Sustainability* (1)

- Book Chapters: *Analecta Praehistorica Leidensia (APL)*

- | | |
|---|-------------|
| – Anthropological Research in Science Education (ARISE) Committee
(Summer program for historically underrepresented undergraduate students from Penn State Campuses) | 2021 – 2022 |
| – Graduate-Undergraduate Mentorship Program | 2020 – 2022 |
| – Anti-Racism Pedagogy Group Member (Part of an effort to design an Anthropology of Race and Racism course for undergraduate students, PSU) | 2020 – 2021 |
| – Member of Colloquium Committee, Department of Anthropology (PSU) | 2019 – 2021 |
| – Member of Outreach Committee, Department of Anthropology (PSU) | 2019 – 2022 |
| – Member of international effort to increase impact of student scholarship
(International Journal of Student Research in Archaeology) | 2019 – 2021 |
| – Member of Awards Committee, Department of Anthropology (PSU) | 2019 – 2022 |
| – Mentor for 3 first-year PhD students in Anthropology Department (PSU) | 2019 – 2021 |
| – Editor for undergraduate academic journal at Binghamton University | 2015 |

Mentorship Activities

(PSU = Penn State, CU = Columbia University)

- | | |
|--|----------------|
| – Graduate Student Mentorship* | |
| ○ Chiamaka Magnut (PSU, Anthropology; CU, Earth & Environmental Studies) | 2021 – Present |
| ○ Abiola Ibirogbu (PSU, Anthropology; CU, Earth & Environmental Studies) | 2021 – Present |
| – Undergraduate Honors Thesis Advising | |
| ○ Claire Byrnes (PSU, Geography & Anthropology) | 2021 – 2022 |
| – Undergraduate Research Assistants* | |
| ○ Sydney Ernst (PSU) | Spring 2021 |
| ○ Claire Byrnes (PSU) | 2020 – 2021 |

* I trained these students in geospatial technologies and their applications to archaeology and cultural heritage research. This included satellite remote sensing and GIS analysis, basic coding in Javascript and R, predictive modeling, statistical machine learning, as well as data collection and storage practices.

MEDIA COVERAGE

 (* indicates newsletter research highlight)

- May 18, 2022, **Phys.org**, “Tree loss on Madagascar not caused by small-scale fires used for land clearing”
- May 18, 2022, **EurekAlert**, “High rates of landscape degradation not product of landscape fire”
- November 24, 2021, **Geospatial Solutions**, “GIS helps archaeologists trace a mother’s journey”
- October 24, 2021, **Science Alert**, “Satellite Data Shows Even Small Ancient Gatherer Communities Shaped The Landscape”
- October 19, 2021, **EurekAlert**, **Phys.org**, **ScienceDaily**, **Mirage News**, **Eurasia Review**, **Bioengineer.org**, **Fuentitech**, **Florida News Times**, **TechCodex**, **NewsBinding**, “Small-scale foragers left more than footprints on the landscape”
- October 7, 2021, **ZME Science**, “Machine learning reveals archaeology from up to 5,000 years ago”
- August 30, 2021, **Archaeology Magazine**, “Archaic Shell Rings Spotted in Southeastern United States”
- August 20, 2021, **AZO Robotics**, “Researchers Use AI and Machine Learning to Reveal Undiscovered Shell Rings”
- August 19, 2021, **EurekAlert**, **Phys.org**, **Mirage News**, **Penn State News**, Remote sensing and machine learning reveal Archaic shell rings
- August 12, 2021, **Invited Guest Speaker** on ArchaeoTech Podcast, Ethics and Remote Sensing Archaeology – Episode 161 (<https://www.archaeologypodcastnetwork.com/archaeotech/161>)
- July 21, 2021, **Penn State News**, **Phys.org**, **Archaeology News Network**, “The ethics of remote sensing in archaeology”
- January 22, 2021, **Medium**, “Archaeologists Use AI to ‘Dig Deeper’”
- May 14, 2020, **Unite.AI**, “AI Is Dramatically Changing Archaeology. Discovering New Sites And Artifacts”
- May 7, 2020, **Singularity Hub**, **The Mandarin**, “The New Indiana Jones? AI. Here’s How It’s Overhauling Archaeology.”
- February 25, 2020, **Futurity**, Ancient Madagascar Shows Humans Make New Places Suit Them
- February 18, 2020, **Penn State News**, Computers scour satellite imagery to unveil Madagascar’s mysteries
- *Davis, Dylan. 2019. Locating and Protecting Cultural Heritage using Remote Sensing Survey in Madagascar. *The Current: Newsletter of the Island & Coastal Archaeology Interest Group*. 7(1):13.
- August 14, 2018, **Invited Guest Speaker** on ArchaeoTech Podcast, Using Math and Maps to find Mounds in the Southeast US – Episode 86 (<https://www.archaeologypodcastnetwork.com/archaeotech/86>)
- July 27, 2018, **Azo Sensors**, New Image Analysis Method Used by Archaeologists to Identify Old North American Mounds
- July 23, 2018, **EurekAlert**, **Science Daily**, **Phys.org**, **Heritage Daily**, **ScienMag** “Archaeologists identify ancient North American mounds using new image analysis technique”
- February 19, 2018, **BU Pipe Dream** Geography department holds third annual GIS Day
- January 22, 2018, **BU Pipe Dream** BU research challenges Easter Island’s historical narrative
- July 14, 2017, **The Island Packet**, What’s buried in Sea Pines and more than 4,000 years old? Find out who’s digging for answers

PUBLIC OUTREACH ACTIVITIES

- Graduate School Application Preparation Workshop, Penn State, **Co-Organizer** 2020
- Talked to elementary schoolers about African Archaeology, Germantown Academy, PA, **Invited Speaker** 2020, 2021, 2022
- ENVISION Workshop, Eberly College of Science, Penn State University, **Volunteer** 2020
- Community Education Extended Learning (CEEL) Program, State College (Pennsylvania) School District, **Volunteer** 2019 – 2020
- Haunted-U (Eberly College of Science, Penn State University), **Volunteer** 2019