T. Elliott Arnold

West Chester University, Earth and Space Sciences Department

Email: Tarnold2@wcupa.edu Website: Organic Matters Lab

PROFESSIONAL APPOINTMENTS

2023-present	Assistant Professor, Earth and Space Sciences Department, West Chester University
2018-2022	Post-doctoral Researcher and Lab Manager, University of Pittsburgh
2012-2018	Water Institute Graduate Fellow, University of Florida

EDUCATION

Ph.D., Organic Geochemistry, University of Florida, Thesis Advisor: Mark Brenner
Dissertation: Using organic biomarkers to reconstruct environmental change in the subtropics

M.S., University of Florida, Thesis Advisor: Mark Brenner
Thesis: Application of stable isotopes to determine growth patterns in freshwater mollusks

B.S., Pennsylvania State University

RESEARCH FUNDING

2012: U.S. Fish and Wildlife Service Grant ($10,000)
2012: Water Institute Research Grant ($10,000)
2013: Land Use and Environmental Change Institute Travel Grant ($300)
2013: National Science Foundation Innovation through Institutional Integration Grant ($2,500)
2013: National Science Foundation Inter-University Training in Continental-scale Ecology Grant ($4,000)
2019: National Geographic Foundation Early Career Grant ($9,900)
2019: National Science Foundation Paleo Perspectives on Climate Change (P2C2) ($900,000)
2022: Provost Research Grant ($9,000)
2023: PASSHE FPDC Grant ($7,500)
2023: CSM Student Engagement Award (SEA) ($6,000)
2023: National Science Foundation Paleo Perspectives on Climate Change sub-award ($20,850)
2023: NASA F.19 Research Initiation Awards ($ 222,068.64, rejected)
2024: American Chemical Society Grant ($60,142.01, rejected)
2024: NASA F.19 Research Initiation Awards ($ 230,221.83, program archived)
2024: Research in Mathematics and the Sciences (RIMS) ($5,740)
2024: NSF-EAR/IF - Earth Sciences Instrumentation and Facilities ($95,000, program archived)
2025: Research in Science and Math Award (RIMS) (Co-PI) ($5,992)
2026: Provost Research Grant ($9,000, Rejected)
2026: PASSHE FPDC Grant ($11,925)

FACULTY SERVICE

Department

- Elections Chair: 2024, 2025, 2026
- ROAR (Alumni Outreach) Member: 2022, 2023, 2024, 2025 (chair), 2026 (chair)
- Assessment Member: 2022, 2023, 2024
- Faculty Advisor for the Earth and Space Sciences Club: 2024, 2025, 2026

- Faculty Advisor for Sigma Gamma Epsilon – National Geology Honors Society: 2024, 2025, 2026

College of Science and Mathematics

- Outstanding Student Awards Committee: 2024, 2025 (Chair), 2026 (Chair)
- CSM Faculty Awards Committee Member: 2025, 2026

University

- APSCUF Departmental Representative: 2023, 2024, 2025, 2026
- Sustainability Council: 2025, 2026
- OSRP Advisory Council: 2025, 2026

Professional

- Member of the Geological Society of America (GSA) and American Geophysical Union (AGU)
- Student-Faculty Northeast GSA coordinator and liaison
- Reviewer for *Organic Geochemistry, Applied Sciences, Environmental Monitoring and Assessment, Biogeochemistry, Journal of Paleolimnology, Quaternary International, and Quaternary Science Reviews*

INVITED TALKS (since 2019) (bold indicates invited talks since joining WCU)

2020: Pennsylvania State University, Department of Anthropology Seminar, *Drought and the Tiwanaku*
2023: University of Pittsburgh, South American Lakes Symposium, *Peten Itza, Modern Climatology and Glacial Predictions*
2023: West Chester University Sustainability Seminar Series, *Drought and its Modern Consequences*
2024: West Chester University, Seminar Series, *Atmospheric Transmission of Temperature and Precipitation Change in the Subtropics during North Atlantic Heinrich Events*
2025: Dartmouth University, Anthropology Department Seminar Series, *Micro- and Nano-plastic delivery to the Chesapeake and Delaware Bays.*
2025: Northwestern University, Seminar Series, *Using Hydrogen Isotopes to Reconstruct Precipitation Regimes*
2025: Invited Speaker, Towards a Plastic Free Future, co-Sponsored by The Office of Sustainability and Community organizers. *Polyester Fabrics in our Waterways*
2025: Pitzer College, Seminar Series, Zooarchaeology: A Very Brief Introduction
2026: Temple University, Seminar Series, *Heinrich Events and their influence on subtropical climate*
2026: YES! Delaware Youth Environmental Summit, *Microplastics are Everywhere*
2026: Invited Speaker, Towards a Plastic Free Future, co-Sponsored by The Office of Sustainability and Community organizers. *Sources of Microplastics in our Environment*

CONFERENCE PRESENTATIONS (bold indicates presentations since joining WCU)

2014: Arnold, T. E., Freeman, K., Brenner, M., & Diefendorf, A. F. (2014, December). Carbon and hydrogen isotope composition of plant biomarkers as proxies for precipitation changes across Heinrich Events in the subtropics. In *AGU Fall Meeting Abstracts* (Vol. 2014, pp. PP31C-1151).

2015: Arnold, T. E., Diefendorf, A. F., Brenner, M., Freeman, K. H., & Curtis, J. H. (2015, December). Carbon and hydrogen isotope composition of plant biomarkers from lake sediments as proxies for precipitation changes across Heinrich Events in the subtropics. In *AGU Fall Meeting Abstracts* (Vol. 2015, pp. PP12A-05).

2015: Arnold, T. E., Henson, W., Reijo, C. J., Laing, J., & Weinkam, G. (2015, December). Enhancing introductory hydrology curriculum by integrating perspectives from multi-disciplinary graduate fields of study. In *AGU Fall Meeting Abstracts* (Vol. 2015, pp. ED13F-0915).

2018: Arnold, T. E., McGrath, S. J., Hillman, A. L., Werne, J. P., Arkush, E., & Abbott, M. B. (2018, December). Fecal Sterols as Indicators of Camelid Domestication in Peru. In *AGU Fall Meeting Abstracts* (Vol. 2018, pp. PP11E-1295).

2018: Lei, A., Arnold, T. E., Werne, J. P., Caballero, M., Correa-Metrio, A., & Perez, L. (2018, December). Contrast of Leaf-wax Hydrogen Isotope Values in Mexico and Central America and It's Indication of Regional Environmental Controls. In *AGU Fall Meeting Abstracts* (Vol. 2018, pp. PP31D-1682).

2019: American Geophysical Union Conference, *Reconstructing air temperatures in Florida during North Atlantic Heinrich Events*

2019: Arnold, T. E., McGrath, S., Werne, J., Abbott, M., Arkush, E., & Hillman, A. (2019, August). Investigating Camelid Utilization Among Andean Cultures Using Fecal Stanols. In *Twenty-ninth Annual Goldschmidt Conference* (p. 130).

2023: Arnold, T., Hillman, A. L., Abbott, M., & Werne, J. (2023). Reconstructing Drought in Peru during the Medieval Climate Anomaly: Implications for Societies Past and Present. In *Geological Society of America Abstracts* (Vol. 55, p. 392945).

2023: Thompson, A., Konecky, B. L., Berke, M. A., Werne, J. P., & Arnold, E. (2023, December). *Implications of paleoclimate modeling for future Central American hydroclimate*. In AGU Fall Meeting Abstracts (Vol. 2023, pp. PP02-02).

2025: Berke, M. A., Arnold, T. E., Aguilar, A., Williams, R., Konecky, B., & Werne, J. (2025, September). Late Quaternary Neotropical Climate and Environmental Variability Across Glacial–Interglacial Cycles at Lake Petén Itzá. In *IMOG 2025* (Vol. 2025, No. 1, pp. 1-1). European Association of Geoscientists & Engineers.

STUDENT-ADVISED NATIONAL AND REGIONAL CONFERENCE ABSTRACTS (all since joining WCU)

Costa, S., **Arnold, T.E.**, Simpson, J., Lipka, M., & Sidhu, K. (2024). Microplastic characterization in the Chesapeake and Delaware Bay watersheds. Geological Society of America Abstracts with Programs, 56(1). https://doi.org/10.1130/abs/2024NE-397737

Costa, S., Sidhu, K., Simpson, J., & **Arnold, T. E**. (2025). Microplastic characterization in the Chesapeake and Delaware Bay watersheds. Geological Society of America Abstracts with Programs, 57(3). https://doi.org/10.1130/abs/2025NE-407886

Mattie, C., Ashman, I., Rathman, L., & **Arnold, T. E**. (2025). Influences on microplastic concentrations in Plum Run. Geological Society of America Abstracts with Programs, 57(3). https://doi.org/10.1130/abs/2025NE-407868

Wheeler, T., & **Arnold, T. E.** (2025). Sedimentary algal pigments in lakes as an indicator of changes in trophic status. Geological Society of America Abstracts with Programs, 57(3). https://doi.org/10.1130/abs/2025NE-407868

Powell, M., & **Arnold, T. E.** (2025). Spatial and temporal patterns in heavy metal contamination in aquatic sediments surrounding a closed steel smelter in Coatesville, PA. Geological Society of America Abstracts with Programs, 57(3). https://doi.org/10.1130/abs/2025NE-407865

Mattie, C., Ashman, I., Rathman, L., & **Arnold, T. E.** (2025). Modeling the relationship among environmental variables and microplastic pollution in a freshwater stream across an annual cycle (Paper 249-3). In GSA Connects 2025, session *Emerging Contaminants: Geochemical Insights and Impacts on Human and Environmental Health*. Geological Society of America, San Antonio, TX. https://doi.org/10.1130/abs/2025AM-9222

Levi-Price, S., Cichon, P., Groves, N., Losco, R., & **Arnold, T. E.** (2025). *A comparison of methodologies for quantifying microplastics in soil* [Poster presentation]. Joint 60th Annual Northeastern/59th Annual North-Central Section Meeting, Geological Society of America, Erie, PA. *Geological Society of America Abstracts with Programs, 57*(3). https://doi.org/10.1130/abs/2025NE-407846

Cichon, P., Levi-Price, S., Groves, N., Losco, R., & **Arnold, T. E.** (2025). *Effect of microplastics on soil permeability* [Poster presentation]. Joint 60th Annual Northeastern/59th Annual North-Central Section Meeting, Geological Society of America, Erie, PA. *Geological Society of America Abstracts with Programs, 57*(3). https://doi.org/10.1130/abs/2025NE-407873

Groves, N., Levi-Price, S., Cichon, P., Losco, R., & **Arnold, T. E.** (2025). *The effect of plastic particles on heat flux in sand* [Poster presentation]. Joint 60th Annual Northeastern/59th Annual North-Central Section Meeting, Geological Society of America, Erie, PA. *Geological Society of America Abstracts with Programs, 57*(3). https://doi.org/10.1130/abs/2025NE-409063

Edmunds, K., Kelley, R., & **Arnold, T.E.** (2026). A Sediment Record of Environmental Change Spanning the Transition from the Late Glacial to the Early Holocene from The Great Marsh in Exton, PA: Geological Society of America Northeastern Section Meeting, Hartford, Connecticut, 21–24 March.

Antrim, K., Macias, C., Lopez, M., & **Arnold, T.E.** (2026). Testing the Efficacy of Spent Coffee Ground Biochar for Treating Acid Mine Drainage: Geological Society of America Northeastern Section Meeting, Hartford, Connecticut, 21–24 March.

Mattie, C., Ashman, I., Rathman, L., & **Arnold, T. E.** (2026). Modeling the Relationship Between Environmental Variables and Microplastic Pollution. Geological Society of America Northeastern Section Meeting, Hartford, Connecticut, 21–24 March.

Frederick, K., Lane, P., Vachula, R., Waters, M., & **Arnold, T. E.** (2026, October 12). *Geochemical records of environmental change and human activity during the Classic Maya Period at Cenote Xcach* [Oral conference presentation]. GSA Connects 2026, Denver, CO, United States.

PUBLICATIONS (bold indicates publications since joining WCU)

Arnold, T. E., Brenner, M., Curtis, J. H., Dutton, A., Baker, S. M., Escobar, J. H., & Ortega, C. A. (2014). Application of stable isotopes ($\delta^{18}O$) to determine growth patterns of the invasive gastropod *Pomacea maculata* in Florida lakes. *Florida Scientist*, *77*(3), 126.

Kenney, W. F., Brenner, M., Arnold, T. E., Curtis, J. H., & Schelske, C. L. (2016). Sediment cores from shallow lakes preserve reliable, informative paleoenvironmental archives despite hurricane-force winds. *Ecological Indicators*, *60*, 963-969.

Kenney, W. F., Brenner, M., Curtis, J. H., Arnold, T. E., & Schelske, C. L. (2016). A Holocene Sediment Record of Phosphorus Accumulation in Shallow Lake Harris, Florida (USA) Offers New Perspectives on Recent Cultural Eutrophication. *PloS one*, *11*(1), e0147331.

Tessin, A., Bianchi, T. S., Sheldon, N. D., Hendy, I., Hutchings, J. A., & Arnold, T. E. (2017). Organic matter source and thermal maturity within the Late Cretaceous Niobrara Formation, US Western Interior. *Marine and Petroleum Geology*, *86*, 812-822.

Arnold, T. E., Diefendorf, A. F., Brenner, M., Freeman, K. H., & Baczynski, A. A. (2018). Climate response of the Florida Peninsula to Heinrich events in the North Atlantic. *Quaternary Science Reviews*, *194*, 1-11.

Arnold, T. E., Kenney, W. F., Curtis, J. H., Bianchi, T. S., & Brenner, M. (2018). Sediment biomarkers elucidate the Holocene ontogeny of a shallow lake. *PloS one*, *13*(1), e0191073.

Arnold, T. E., Brenner, M., Kenney, W. F., & Bianchi, T. S. (2019). Recent trophic state changes of selected Florida lakes inferred from bulk sediment geochemical variables and biomarkers. *Journal of Paleolimnology*, *62*(4), 409-423.

Kamenov, G. D., Escobar, J., Arnold, T. E., Pardo-Trujillo, A., Gangoiti, G., Hoyos, N., ... & Trejos-Tamayo, R. (2020). Appearance of an enigmatic Pb source in South America around 2000 BP: anthropogenic vs natural origin. *Geochimica et Cosmochimica Acta*.

Scott, W. P., Contreras, S., Bowen, G. J., Arnold, T. E., Bustamante-Ortega, R., & Werne, J. P. (2021). Lake water based isoscape in central-south Chile reflects meteoric water. *Scientific reports*, *11*(1), 1-9.

Arnold, T. E., Hillman, A. L., Abbott, M. B., Werne, J. P., McGrath, S. J., & Arkush, E. N. (2021). Drought and the collapse of the Tiwanaku Civilization: New evidence from Lake Orurillo, Peru. *Quaternary Science Reviews*, *251*, 106693.

Arnold, T. E., Hillman, A. L., Abbott, M. B., Werne, J. P., McGrath, S. J., & Arkush, E. N. (2021). Reply to comments by Marsh et al. on "Drought and the collapse of the Tiwanaku Civilization: New evidence from Lake Orurillo, Peru". *Quaternary Science Reviews*, 107032.

Singh, Y. R., Abbott, M. B., Arnold, T. E., & Singh, S. P. (2021). Early Eocene palynofloras and geochemistry from the Garo Hills in Meghalaya (India). *Review of Palaeobotany and Palynology*, 104458.

Arnold, T. E., Hillman, A. L., Abbott, M. B., Werne, J. P., McGrath, S. J., & Arkush, E. N. (2021). Fecal stanol ratios signal a shift in subsistence strategies among Andean cultures. *Quaternary Science Reviews*, *270,* 107193.

Eusebio, M. S., Piper, P. J., Campos, F., Arnold, T. E., Zimmerman, A. Krigbaum, J. (2022). Using Organic Compound-Specific Stable Isotope Ratios to Identify Animals in Prehistoric Foodways of Southeast Asia. In (A. E. Sharpe and J. Krigbaum, eds.) *Applications of Isotope Research in Zooarchaeology*. Gainesville, Florida, Univ. Press of Florida.

Eusebio, M. S., Piper, P. J., Arnold, T. E., & Krigbaum, J. (2023). Possible leafy vegetables in prehistoric southern Vietnamese cuisine with a distinctive biomolecular profile. *Journal of Archaeological Science: Reports*, *47*, 103741.

Oyo-Ita, I. O., Sam, E. S., Oyo-Ita, O. E., Arnold, E. T., Inyang, D. O., & Werne, J. P. (2023). Stable carbon isotope and n-alkane distributions in sediment cores from saline and freshwater Gabu lakes, Southeast Nigeria: Environmental implications. *Environmental Earth Sciences*, *82*(18), 422.

Singh, Y. R., Devi, A. B., Singh, N. S., Abbott, M. B., Arnold, T. E., Singh, W. A., ... & Devi, O. V. (2024). Dinoflagellate cysts from the Shillong Plateau, Meghalaya (India): Palynological signature during the late Palaeocene–early Eocene Transition. *Terra Nova*.

Arnold, T. E., Hilliker, J. L., Werne, J. P., & Thompson, A. J. (2026). Atmospheric transmission of temperature and precipitation change in Florida during North Atlantic Heinrich events. *Paleoceanography and Paleoclimatology*, *41*(2), e2025PA005143.

Arnold, T. E., Lei, Y., Strong, D. J., Hilliker, J., Caballero, M., Correa-Metrio, A., ... & Werne, J. P. (2026). Biosynthetic fractionation drives leaf wax hydrogen isotope variability across Mexico and Central America. *Organic Geochemistry*, 105259.

Mattie, C., Ashman, I., Fork, M., & Arnold, T. E. (2026). Seasonality and maximum wind gusts c orrelate with microplastic concentrations in a freshwater stream system. Environmental Mo nitoring and Assessment, 198, Article 1173. https://doi.org/10.1007/s10661-026-15985-9

Arnold, T.E., Costa, S., Sidhu, K., Simpson, S, Mattie, C., Lipka, M. (2026). Microplastic Fluxes to the Chesapeake and Delaware Bays: Sediment Enrichment, Hyporheic Retention, and Watershed-Scale Transport Across 24 Tributary Streams. *Journal of Contaminant Hydrology. In Review.*

MEDIA COVERAGE

- Live Science: Here's Why Scientists Are Poring Over Ancient Alpaca Poo (Online Article) by Mindy Weisberger, 2018

TEACHING AND ADVISING

Instructor

- 2012-2014: GLY 1150L, Florida Geology Lab, University of Florida
- 2013-2014: IDG 3931, Environmental Issues in Wate Resources, University of Florida, Honors College
- 2019-2020: ENV 247, Environmental Geology and Lab, Chatham University
- 2023-present: SCI 101, Earth and its Systems, West Chester University
- 2023-present: ESS 102, Humans and the Environment, West Chester University
- 2023-present: ESS 301/501, Environmental Geochemistry, West Chester University
- 2023-present: ESS 331/531, Introduction to Paleontology, West Chester University
- 2023-present: ESS 347/547, Earth and Space Sciences Seminar, West Chester University

Advisor

- 2023: Alejandra Aguilar, M.S., University Notre Dame, *Hydroclimate During Marine Isotope Stage 7 (MIS 7) at Lake Petén Itzá, Guatemala*
- 2023: Jarunetr "Nadia" Sae-Lim's Ph.D., Washington University in St. Louis, *Paleoclimate of the Peruvian Andean Highlands during the Late Holocene*
- 2024: Michael Powell, M.S., West Chester University, *Environmental geochemical mapping and multivariate geostatistical analysis of heavy metal contamination in topsoil surrounding a closed steel smelter: Cleveland-Cliffs Steel Rolling Factory, Coatesville, PA*
- 2024: Joshua Sabala, M.S., University of Delaware, *Sorption of Pentabromobenzene to Arctic Sediments in Varying Dissolved Organic Matter Systems*
- 2026 (projected): Kelly Edmunds, M.S., West Chester University
- 2026 (projected): James Simpson, M.S., West Chester University
- 2027 (projected): Emily Mero, M.S., West Chester University
- 2027 (projected): Cody Macias, M.S., West Chester University

SKILLS

Field

- Lake sediment, soil, and peat coring
- Plant, soil, sediment, and water sampling
- Geochemical analyses of freshwater bodies (ORP, pH, Cond., DO)

Laboratory

- Advanced operation and maintenance of: Thermo GC/MS systems, Thermo Single- and Triple-Quad Mass Spectrometers, Delta V and Q Isotope Ratio Mass Spectrometers, Thermo High Precision Liquid Chromatography Systems, Costech CNS Elemental Analyzers, Thermo Flash EA, Thermo TC/EA systems, Elementar Elemental Analyzer (configured for Carbon, Nitrogen, and Sulfur combustion/analysis), Isoprime precision IRMS systems.
- Organic geochemistry sample preparation and extraction via Accelerated Solvent Extractor (ASE)
- Biomarker analysis using GC-FID and GC-MS
- Compound-specific isotope analysis using GC-C-IRMS
- EA-IRMS analysis of bulk carbon and nitrogen cycling applications
- Water isotope analysis using Picarro water isotope analyzer
- Microscope-based sample selection for radiocarbon dating
- SEM-EDS analyses of synthetic polymers

- ATR-FTIR characterization of plastic compounds

Data Analysis and Modeling

- Paleoclimate proxy interpretation and age-depth model development (BACON package)
- Climate data-model intercomparison (iTRACE)
- Statistical analysis and visualization in Python and R